Draft Environmental Impact Statement and California Desert Conservation Area Plan Amendment for the Proposed Chevron Energy Solutions Lucerne Valley Solar Project

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Volume I

January 2010

Prepared for:

BUREAU OF LAND MANAGEMENT
BARSTOW FIELD OFFICE

Prepared by:

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United States Department of the Interior

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January 2010

Dear Reader/Interested Party:

I am pleased to announce the availability of the Chevron Energy Solutions Lucerne Valley Solar Project Draft Environmental Impact Statement (DEIS) and Amendment to the California Desert Conservation Area (CDCA) Plan, for permitting of solar energy resources. Chevron Energy Solutions, the Applicant, is proposing to develop a 45-megawatt photovoltaic solar plant and associated facilities on 516 acres of federal land managed by the Bureau of Land Management (BLM). The site of the Proposed Action is located on unincorporated land in the Mojave Desert, approximately eight miles east of Lucerne Valley. Also included in the proposal is an interconnection to an existing Southern California Edison distribution line located north of the site. In addition, the proposal includes an amendment to the CDCA Plan that would designate the proposed site as suitable for solar energy generation.

The attached DEIS analyzes five alternatives: (1) No Action, in which the Applicant s application would be denied and current management of the site would be maintained; (2) the Applicant s application would be denied and the CDCA Plan would be amended to declare the site either suitable or unsuitable for solar development; (3) BLM would grant the Applicant a right-of-way (ROW) for their project as proposed; (4) BLM would grant the Applicant a ROW for a modified project design; and (4) BLM would grant the Applicant a ROW for a smaller project. Alternatives 3, 4, and 5 include an amendment to the CDCA Plan as part of the Proposed Action. This amendment would find the project area as suitable for solar development.

The DEIS has been prepared in accordance with the National Environmental Policy Act as well as the Federal Land Policy and Management Act, which establishes the land management authority of the BLM and provides guidance for how public lands are to be managed. The document has been sent to members of the public who requested a copy and to pertinent local, state, tribal, and federal government entities.

This DEIS will be circulated for a 90-day public comment period. All comments must be postmarked no later than 90 days from the date the Notice of Availability for this EIS is published in the *Federal Register*. Please send your written comments to Mr. Greg Thomsen (Bureau of Land Management, California Desert District Office, 22835 Calle San Juan de los Lagos, Moreno Valley, CA 92553), or by email to lucernesolar blm.gov. A public meeting will be held in Lucerne Valley, California, to allow oral comments to be presented to the BLM. Please see BLM s Web page at www.blm.gov/ca/st/en/fo/barstow.html for information about the location, date, and time of this meeting. All substantive issues raised during the comment period will be considered, and modifications based on these comments may be made to develop the Final EIS.

Additional hard copies or CD-ROM versions of the DEIS may be obtained by contacting Greg Thomsen at the California Desert District Office noted in the previous paragraph. The document will also be available on the Internet at www.blm.gov/ca/st/en/fo/barstow.html.

We are pleased to provide this copy of the Chevron Energy Solutions Lucerne Valley Solar Project DEIS for your review and extend our appreciation for your cooperation and assistance during this process. We look forward to your continued participation.

Sincerely,

Roxie C. Trost

Roxie C. Trost
Field Manager
Barstow Field Office

Enc: Chevron Energy Solutions Lucerne Valley Solar Project Draft Environmental Impact Statement

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Executive Summary

Introduction

The following sections summarize the Draft Environmental Impact Statement (DEIS) for Chevron Energy Solutions (CES) Lucerne Valley Solar Project. This information is provided as a convenient synopsis for the public but is not a substitute for review of the complete DEIS. This summary provides a general overview of the proposed Lucerne Valley Solar Project and the BLM's purpose and need; briefly describes the alternatives; and summarizes major impacts for key resources associated with the alternatives.

Chevron Energy Solutions (CES), the Applicant, is proposing to develop a 45-megawatt (MW) solar photovoltaic (PV) plant and associated facilities on 516 acres of federal land managed by the Bureau of Land Management (BLM). The site of CES's Proposed Action is located on unincorporated land in the Mojave Desert, approximately eight miles east of Lucerne Valley. Also included in the proposal is an interconnection to an existing Southern California Edison distribution line located north of the site. In addition, CES's proposal includes an amendment to the California Desert Conservation Area (CDCA) Plan that would designate the proposed site as suitable for solar energy generation. The project would not require an amendment to the CDCA Plan to reroute a portion of Zircon Road to allow its continued public use. That decision would be considered plan maintenance.

Purpose and Need

BLM's Purpose and Need

The BLM's purpose and need for the Lucerne Valley Solar Project EIS is to respond to CES's application under Title V of the FLPMA (43 USC 1761) for a right-of-way (ROW) grant to construct, operate and decommission a solar generation facility and associated infrastructure in compliance with FLPMA, BLM ROW regulations,43 CFR Part 2800, and other applicable federal laws. BLM's review of CES's application is also consistent with the following laws and directives pertaining to renewable energy resources:

- Sec. 211 of Energy Policy Act of 2005, enacted in August, 2005, which mandated up to 10,000 MW of non-hydropower renewable energy projects on the public lands by 2015.
- Instruction Memorandum 2007-097, dated April 4, 2007, Solar Energy Development Policy establishes BLM policy to ensure the timely and efficient processing of energy ROWs for solar power on the public lands.
- Secretarial Order 3283 Enhancing Renewable Energy Development on the Public Lands, signed January 16, 2009. This order facilitates the Department of the Interior's efforts to achieve the goals established in Sec. 211of the Energy Policy Act of 2005.
- Secretarial Order 3285 Renewable Energy Development by the Department of the Interior, signed March 11, 2009. The order establishes the development of renewable energy as a priority for the Department of the Interior and establishes a Departmental Task Force on Energy and Climate Change.

The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to CES for the proposed solar project. The decision the BLM will make is whether or not to grant a ROW and if so, under what terms and conditions, and whether to amend the CDCA land use plan in two potential ways.

First, the EIS will be used to consider whether the CDCA Plan should be amended to designate the lands as suitable or unsuitable for solar energy development.

Second, the Applicant's proposal would reroute a portion of Zircon Road, a currently designated route of travel. The purpose of this Proposed Action also includes compliance with 43 Code of Federal Regulations (CFR) Part 8342.1, which establishes criteria to consider when making route designations. The designations should be based on protecting the resources of the public lands, promoting the safety of the public land users, and minimizing the conflicts among the various public land users. The designations also must be in accordance with the following criteria:

- Off-highway vehicle (OHV) areas and trails must be located to minimize the damage to soil, watershed, vegetation, air, or other resources of the public lands and to prevent impairment of wilderness suitability.
- OHV areas and trails must be located to minimize harassment of wildlife or significant disruption of wildlife or wildlife habitats. Special attention must be given to protect endangered or threatened species and their habitats.
- OHV areas and trails must be located to minimize conflict between OHV use and other existing or proposed recreational uses of the same or neighboring public lands and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

OHV areas and trails must not be located in officially designated wilderness areas or primitive areas. OHV areas and trails may be located in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect the natural, aesthetic, scenic, or other values for which such areas are established.

Public Involvement

The Notice of Intent for the Lucerne Valley Solar Project EIS was published in the Federal Register on July 23, 2009, initiating a 30-day scoping period. The BLM also held two public scoping meetings near the location of the Proposed Action, as follows:

- Lucerne Valley, California, on July 29, 2009, and
- San Bernardino, California, on July 30, 2009.

The issues evaluated in this EIS are derived from public comments made during the scoping period and summarized in the CES Lucerne Valley Solar Project EIS Scoping Summary Report issued in October 2009 (see Appendix A). The Scoping Summary Report is also posted on the BLM Barstow Field Office Web site at http://www.blm.gov/ca/st/en/fo/barstow.html. Comments for the following resource areas were received during scoping from agencies, organizations,

and the public and became the basis for defining issues:

- Air Quality (Including Climate Change)
- Geologic Resources
- Soils
- Hydrology, Water Quality, and Water Resources
- Biological Resources
- Cultural Resources
- Land Use
- Recreational Resources
- Aesthetic/Visual Resources
- Traffic and Transportation
- Hazardous Wastes
- Social and Economic Considerations
- Environmental Justice

Summary Description of the Proposed Action and Alternatives

As defined by the purpose and need, the BLM is responding to CES's application to lease federal lands administered by the BLM for solar energy production. In doing so, the BLM will adopt one of the alternatives listed below.

Alternatives considered in the DEIS are based on issues identified by the BLM as well as comments received during the public scoping process. The BLM is required to consider in detail a range of alternatives that are considered "reasonable," usually defined as alternatives that are realistic (not speculative), technologically and economically feasible, and that respond to the purpose and need.

This document provides information to the authorized officer to make the following decisions:

- Should ROW grant be issued? If so, should it be as requested or modified?
- Should the Proposed Action area remain undesignated or be designated as suitable or unsuitable for solar energy development?
- Should Zircon Road be rerouted?

Alternative 1: No Action / No Plan Amendment

The No Action Alternative assumes that the ROW application is denied; that a Lucerne Valley Solar Plant and associated facilities would not be constructed and operated; and that the CDCA Plan would not be amended. Under this alternative the need would be met; the BLM would make a decision on the ROW application. Although the purpose would not be met through this alternative, it could be met through other applications for other projects on BLM lands. The adoption of Alternative 1 would leave current management practices intact and would be in conformance with the CDCA Plan.

Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the project site as either suitable or unsuitable for large-scale solar development. Under this alternative the need for the proposed project would be met, BLM would make a decision on the ROW application. Although the purpose would not be met through this alternative, it could be met through other applications for other projects on BLM lands.

Alternative 3: CES's Proposed Action

The Applicant has applied for a BLM ROW authorization to construct, operate, maintain, and decommission a 45-MW, solar PV power plant and associated facilities on a site located south of Old Woman Springs Road, approximately eight miles east of the junction of Barstow Road and Old Woman Springs Road in Lucerne Valley. The total ROW would span 516 acres and consists of land under the jurisdiction of the BLM in San Bernardino County, California.

The proposed project would be built in two phases. Phase I would be 20 MW, with construction beginning in late 2010. It would interconnect to the existing Southern California Edison (SCE) 33-kilovolt (kV) transmission line located immediately north of the site across Foothill Road and could be built without upgrading the existing line. Phase II would be contingent upon available transmission capacity and future power sales would be constructed once SCE reconductors the existing transmission line.

CES's Proposed Action would require an amendment to the CDCA Plan that would change the designation within the ROW to suitable for solar energy generation. The project would not require an amendment to the CDCA Plan to reroute a portion of Zircon Road south of its current location to permit its continued public use. This decision would be considered plan maintenance.

Alternative 4: Modified Site Layout

In response to comments received during public scoping, the BLM is analyzing an alternative that reduces impacts on visual resources. This alternative would be the same as Alternative 3, with three modifications to reduce environmental impacts:

1. Require a 50-foot setback from Santa Fe Fire Road
2. Use natural vegetation as a screen; and
3. Design site drainage to provide a water source for the vegetative screen if feasible through the Streambed Alteration Agreement.

To reduce the visual impacts, the minimum distance from the edge of Santa Fe Fire Road that the proposed project perimeter fence could be located (or set back) would be increased to 50 feet. The setback would remain unaltered by project construction, so the existing vegetation would serve to screen the project from nearby residents and somewhat for users of Santa Fe Fire Road. Additionally, the area immediately inside the fence line would be used to replant some native vegetation that would otherwise be removed during site preparation activities. Some of the drainage for the graded area would be redirected to flow from the site into the setback, increasing the water available to the setback vegetation and salvaged plants and trees, as well as increasing the success of plant salvage efforts.

Alternative 4 would also require amending the CDCA Plan to change the ROW designation to suitable for solar energy development. A decision for the alignment of Zircon Road would be made as plan maintenance.

Alternative 5: Smaller Project Alternative

This alternative reduces the output of the solar power plant from 45 MW to 30 MW. It would also reduce the size of the developed area from 433 acres to 238 acres (Figure 2-4). This alternative would be developed in two phases. Phase I would be the development of the area east of Santa Fe Fire Road, similar to Phase I under Alternative 3. However, under this alternative, the area

south of the relocated Zircon Road would not be developed. For this alternative 108 acres, as opposed to 180 acres in Alternatives 3 and 4, would be developed. Energy production for Phase I would be approximately 20 MW. Phase II would be the development of the area west of Santa Fe Fire Road, and would be 120 acres and produce 10 MW of energy. Under this alternative, reconductoring of the 33-kV transmission line would not be required.

This alternative, like Alternative 3 and 4, would require amending the CDCA Plan to change the ROW designation to suitable for solar energy development. The decision for the alignment of Zircon Road would be a planning maintenance decision.

Environmental Impacts and Mitigation Measures

Proposed Action and Alternatives

This document analyzes the environmental issues associated with the construction operation, maintenance, and decommissioning of the Proposed Action and alternatives and the required CDCA Plan amendment. Impacts were analyzed by resource area based on information provided by the Applicant in the initial application and in response to subsequent data requests, field investigations and surveys, public scoping, literature research, and input from federal, state, and local agencies. Environmental effects of constructing, operating, maintaining, and decommissioning the solar facility as proposed (Alternative 3) are summarized below by resource area.

A summary comparison of effects of the alternatives is provided in Table ES-1.

Air Quality

Construction of Phases I and II components would generate air pollutant emissions, such as equipment and vehicle exhaust and fugitive dust. These emissions would include criteria pollutants (VOCs, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$) and hazardous air pollutants, such as diesel particulate matter (PM). During construction, total annual emissions of PM_{10}, if both phases occur in the same year, would be above the California Clean Air Act threshold of 15 tons per year with a value of 16.82 tons per year.

It is expected that potential emission sources resulting from operations and maintenance activities would be mainly related to vehicle traffic on roads, including all-terrain vehicles and water trucks for panel washing. Estimations of operational emissions show that the expected exhaust and fugitive dust emissions would not exceed the thresholds established by the Mojave Desert Air Quality Management District or the federal action applicability criteria for general conformity.

During reclamation, all equipment, buildings, concrete foundations, and driven piles would be removed from the site. This analysis assumes that emissions would be in a magnitude similar to those estimated for construction for Phase I (worst-case scenario from construction). This would result in short-term effects on the projected background conditions of the area, especially in levels of PM.

Greenhouse gas (GHG) emissions would be generated during construction, routine operational activities, maintenance, and decommissioning. CO_2 and CH_4 would be emitted from on-road vehicles and non-road equipment during construction and from vehicles used during routine operational activities. A comparison of the GHG emissions (88.3 $MTCO_2e$) to the existing power plant inventory for California (107,243,302 $MTCO_2e$) shows that the emissions resulting from

the Proposed Action would be 0.00008 percent. Since the CES's Proposed Action is intended to generate electricity from a renewable source of energy, no increase of consumption of fossil fuels and related combustion emissions are expected. A typical 45-MW fossil fuel fired power plant in California would produce 1,448,330 $MTCO_2e$) over its 30 year lifespan. Subtracting CES's Proposed Action GHG emissions (88.3 $MTCO_2e$) from these avoided emissions also indicates that CES's Proposed Action would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. Only 433 acres of the site (516 acres) would be developed, and of this, only 12.5 acres would be graded. The remaining 420.5 acres would have the vegetation cut, but the soil would not be permanently disturbed. This would result in a loss of 317.5 tons of carbon storage capacity.

Noise

Individual pieces of equipment would generate noise levels in a range from 74 to 89 dBA at 50 feet from the source (Table 4.2-1). The worst case result of composite construction noise is derived by adding the individual equipment noise levels logarithmically, which would result in a maximum level of 97 dBA. In addition, a temporary increase in traffic noise on SR 247 and local roads would occur.

It is estimated that construction activities would produce a short-term, adverse increase over the existing ambient noise levels at the site boundary of the project area (50 feet from the source). In addition, the use of percussive or vibratory equipment during the installation of the solar arrays may produce a short-term groundborne vibration (above 75 VdB) and groundborne noise levels. Due to the location of the closest residence (located less than 0.1 mile from the site), these noise and vibration levels would not be attenuated over distance and reduced to background levels at the closest sensitive receptor (located less than 0.1 mile from the site). Because construction of Phase I would begin in the north and move to the south, disturbance from Phase I construction would result in a short-term, adverse effect to the residence. Implementation of MM NOI-1 would mitigate construction noise impacts during Phase I and Phase II construction.

Other sensitive land uses, such as recreation and special management areas may be affected by a short-term increase of noise levels. Effects on recreational users may be detectable along Santa Fe Fire Road but would be short-term and unlikely to impair the recreational resource.

The relative loudness of transformers depends on the construction design and techniques, as well as the ambient noise levels at a site. During construction, the Phase I equipment would include a total of 10 transformers (one for every two megawatts of power generation) to be enclosed within each photovoltaic power block. The composite noise level from identical sources—which can be predicted based on the final design, location, and technical specifications—would add three dB per identical transformer. However, the closest transformer to the closest receptor is over 500 feet away. Even with the composite noise of 10 transformers in Phase I, the sound level at the closest receptor would not exceed 55 dB. While this would result in a long-term increase in ambient noise levels, it would not be audible to the nearest receptor.

Geology, Topography, and Geologic Hazards

Although the site is located on an alluvial fan whose sediments have the potential for movement during large precipitation events, the project area would be constructed to minimize that potential movement by utilizing the natural on-site drainage. In addition, all excavations associated with the action alternatives would be filled with soil or a post or foundation. It would

not create subterranean void spaces. Therefore, all alternatives would not increase the geologic instability of the area and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. There would be no effect on a unique geologic feature.

There is the potential for damage to project components due to fault rupture, earthquakes, or seismic shaking. However, all project structures would have to comply with applicable earthquake building codes; therefore, earthquake-related damage to structural components of the project area would be minimized and would be confined to the site. However, workers and wildlife potentially could be exposed to earthquake damage at the facility. Flash flood events could result in on-site damage that could represent a hazard to on-site workers or wildlife. It is possible that a major flash flood could result in damage down gradient of the site. Compliance with earthquake building codes and maintaining the natural drainage would minimize potential risk associated with the most likely geologic hazards in the area; however, once these events occur, they can strain or stress the existing infrastructure.

Soils

The site of the project area is ranked in Wind Erodibility Group 2, indicating that the soils are very highly erodible. The area that would be graded would be the Switch Yard (0.003 acres), the operation and maintenance building (0.006 acres), the access road (7 acres), the power line (5 acres), and the parking/laydown area (0.5 acres). Both topsoil and vegetation would be removed and vegetation would not be allowed to re-grow over an approximate 12.5 acre area. Therefore, there would a strong potential for wind and water erosion over this 12.5 acres. To reduce the potential effects from erosion and topsoil removal, the Applicant would implement their storm water pollution prevention plan (SWPPP) during construction.

The solar arrays would protect the underlying soil from wind erosion and would reduce the energy of precipitation before it hits the ground surface so the potential for erosion would decrease in some areas. However, precipitation would flow off of the panels and would be concentrated at the lower ends of the panels, so this may create gullies at these locations. Although erosion could occur based on the design of the project, it would be a short-term adverse effect, and the site maintenance would restore potential soil lost. Therefore, none of the alternatives would contribute to substantial soil erosion or loss of topsoil in the area during construction.

Due to the lack of protected soils at the site, development of the project area would not affect soils identified for special protection.

Water Resources

The Applicant is conducting flooding models using the Hydrologic Engineering Centers River Analysis System [HEC-RAS] of the United States Army Corps of Engineers; however, the data were not available at the time of publication of this document. This modeling may not be appropriate for modeling flows on alluvial fans because HEC-RAS cannot address all variables that may occur during flash floods. Previous modeling by the Applicant has indicated the major drainage channels could experience high flows during episodic rain events. The available information suggests that flooding is possible in the project area, but the intensity and frequency of these events is not known. Therefore, it is not possible at this time to estimate what the potential flood risk is at the site and the possible effects.

All action alternatives would increase the area of impermeable surfaces and would decrease the area of infiltration. However, due to the relatively small size of these impermeable surfaces within the larger watershed, the action alternatives would not significantly increase the potential for flooding in the watershed or its subbasins.

The natural flow patterns would be altered at these graded areas, the areas where concrete pads and structures are installed into the ground, and within the solar array field. However, since the primary drainage channels within the site would be left intact and sheet flow would still occur through the remainder of the site, this type of flow pattern alteration would not alter the overall flow pattern for the area.

Groundwater quality would not be altered by the any alternative.

During construction and decommissioning activities, increased erosion could result in a decrease in surface water quality by increasing turbidity (i.e., the clay and silt load in surface water). The Applicant would use siltation prevention measures during construction as well as implement their SWPPP and their Spill Prevention and Response Plan. The alternatives would not degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters if the SWPPP and Spill Prevention and Response Plan are properly implemented.

During construction water would be used for dust control and soil compaction. The water use for construction of the first 20-MW phase is estimated at approximately 1.75 million gallons (5.4 acre-feet). The second 25-MW phase is estimated to require approximately 1.25 million gallons of water (4.6 acre-feet). During operation and maintenance, water would be used primarily for panel washing. Although the actual water requirements for operations and maintenance are not known, the estimated amount of water required would be between 10,000 to 20,000 gallons for the first 20-MW installation and 22,500 to 45,000 gallons per year if the entire 45-MW field is built. The water obtained for both construction and operations would be from a permitted off-site source; therefore, it would not decrease the water supply in the project area.

Biologic Resources

Vegetation

Direct effects to yucca plants (e.g., Joshua trees) during construction would be short-term. These plants would be flagged for salvage and removed. No long-term adverse indirect effects on yucca plants (e.g., due to noise, vibration, dust) would be anticipated. Long-term adverse effects to vegetation would occur as a result of surface disturbing activities associated with construction, such as grading. Grading and grubbing activities would cause the direct loss of approximately 12.5 acres of creosote bush-white bursage, white bursage, desert wash, and/or already disturbed vegetative communities.

Approximately 420 acres of the 516-acre ROW will be mowed, reducing vegetation to between 6 and 12 inches in height, for development of the solar arrays. Re-sprouting at the base of these plants after mowing would likely occur, although the long-term effects to vegetation would depend on the scale, intensity, and duration of the activity. Vegetation that is not directly affected by clearing or mowing could be indirectly affected by shading from the solar panels. This would affect smaller vegetation (less than two feet in height). Overall, the adverse effects could include direct mortality, loss of plant habitat, plant injury, alteration of plant community structure, and community fragmentation, while dust during construction could indirectly decrease plant photosynthesis.

Succulent plants that would potentially be affected by the action alternatives occur in low numbers. Effects to succulent species would be short-term because suitable habitat for this species is present adjacent to the project area. Grading and grubbing activities would disturb soil around the perimeter of the site, thus creating opportunities for non-native invasive weed species to colonize in areas where they had not previously occurred. Invasive weed species could outcompete native plants for such resources as water and space.

Wildlife

Vegetation clearing and grading associated with construction would directly affect wildlife by removal and crushing shrubs and herbaceous vegetation, resulting in loss and fragmentation of cover, breeding, and foraging habitat. Furthermore, these activities and vehicle use could cause direct mortality to wildlife; slower-moving wildlife, such as small mammals, ground nesting birds, and especially reptiles, have a higher risk of mortality.

Noise, vibration, and human activity would likely cause most wildlife species to avoid the project area until the disturbance conditions have concluded. The presence of humans, construction equipment, and dust would cause wildlife to alter foraging and breeding behavior and could cause wildlife to avoid suitable habitat. Once an action alternative is constructed, transmission poles could also pose a direct collision hazard to birds. Most species are expected to reoccupy adjacent habitats following completion of construction activities and recovery of the vegetation.

Wildlife would be indirectly affected because of the presence of the solar farm. Human activities in the project area potentially provide food or other attractants in the form of trash, litter, or water, which could draw unnaturally high numbers of opportunistic predators and scavengers such as the common raven, kit fox, and coyote.

Loss and degradation of habitat would cause wildlife to rely more heavily on habitat in surrounding areas. Competition could cause wildlife to forage for longer periods and/or to have lower overall nutrition. Loss of burrows due to construction, ground vibration, or avoidance behavior would also cause wildlife to search for or dig new burrows. Infrastructure built as part of an action alternative would alter wildlife movement in the area and just outside the boundary of the project area. Fences and transmission poles could also cause increased predation of reptiles, small mammals, and small birds around the site of the project area because raptors would use the infrastructure for perches. Indirect effects on wildlife would occur due to adverse effects on vegetation. Loss of vegetation would indirectly reduce available forage and shelter habitat for wildlife, degrading and fragmenting existing higher quality habitat. Loss of vegetation would also indirectly affect wildlife because many species depend on succulents as a source of water.

The introduction of an artificial water source into the area may provide suitable habitat for the Argentine ant (*Linepithema humile*), an invasive species in California typically associated with water sources. This species often displaces native ant species.

Special Status Species

Clearing and grading activities would directly remove special status plants from the area, would cause temporary and permanent soil disturbance that would impede future use by special status plants, and would denude the area of seed banks for those species. CES's Proposed Action would also remove approximately 12.5 acres of creosote bush-white bursage, white bursage, and/or desert wash communities that are associated with special status plants.

Construction activities, ongoing maintenance, including vegetation clearing, and the frequent use of vehicles on-site during both construction and operations could introduce invasive weeds to the site. Once these weeds become established, they proliferate very quickly and can out-compete native special status plants. The habitat can become monotypical, thereby reducing quality and diversity for wildlife dependent on native habitat.

Le Conte's thrasher, northern harrier, and prairie falcon have been observed on the site and may be adversely affected by an action alternative. Suitable habitat exists on the site for burrowing owl, and this species was observed in the area in the past. If owls are present on the site during construction, they may not be able to move quickly enough to avoid mortality due to collisions with vehicles and equipment or collapse of burrows during clearing and grading. Increased vehicle use on the site during operation and maintenance could also increase collisions and mortality of the burrowing owl on-site.

Desert tortoise are present on-site and would be adversely affected by an action alternative. Effects would be both short- and long-term. Action alternative activities could potentially extend to areas outside the boundary of the project area. For example, the tortoise could be susceptible to mortality from collisions with vehicles entering and leaving the site. A tortoise proof exclusion fence would be installed, under the direction of an Authorized Biologist, around all construction areas prior to the initiation of earth disturbing activities. The fence would be checked at least monthly during construction and operations and maintained when necessary by site operator to ensure its integrity. After fence installation, the authorized biologist would conduct a 100 percent coverage protocol survey for desert tortoises within the construction site. All desert tortoises found would be marked and removed from the enclosure and placed outside the nearest fence in accordance with *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1999). Additional desert tortoise protective measures are presented in Section 4.6.4.2.

An action alternative could result in direct or indirect effects on birds protected by the Migratory Bird Treaty Act, including northern harrier, prairie falcon, golden eagle, red-tailed hawk, and any other migratory bird species. If vegetation clearing is conducted during the avian breeding season, active nests could be destroyed. Alteration of foraging behaviors due to on-site disturbances may also cause avoidance of suitable habitat.

Cultural Resources

No cultural resources eligible for inclusion in the National Register of Historic Places (NRHP) are known to occur in the project area, in the proposed locations for temporary access roads, or within a one-mile radius of the site perimeter. Construction of the proposed facility would involve ground disturbance, resulting in potentially adverse effects on previously unidentified surface and subsurface cultural resources, including human remains. Evaluations of sites identified during the BLM Class III inventory (Chambers Group 2009) against NRHP criteria concluded there is no evidence of intact deposits of subsurface cultural material; however, this does not preclude the potential for an unanticipated discovery during construction.

Paleontological Resources

An action alternative has a low potential to affect significant nonrenewable fossil resources because the Quaternary alluvium it would be located on has low paleontologic sensitivity. However, Pleistocene older alluvium and other fossil-bearing rock would have high potential to

contain significant vertebrate fossils. Such sediments may be encountered during subsurface construction activities, resulting in accidental damages to paleontological resources.

Lands and Reality

The site is located on land designated MUC M (moderate), which allows energy generating facilities, including solar development; however, the site would extend 1.4 miles into a three-mile-wide CDCA Plan-designated "contingent" utility corridor (Corridor "S"). The Energy Production and Utility Corridor Element of the CDCA Plan currently allows only linear utilities, such as highways, pipelines, transmission lines, communications lines, and natural gas pipelines, to be sited within the corridor without a plan amendment. As a result, a plan amendment to allow large-scale solar generation that may block the construction of such projects may appear to conflict with the goals of the CDCA Plan. The action alternatives, however, have been sited directly west of rugged terrain, which forms a natural barrier to utility development. Because the cost of building any infrastructure over this terrain would be significantly more expensive than circumventing it, potential developers would be more likely to site linear infrastructure to the north of the project area. Therefore, the Applicant's analysis of the corridor concluded that sufficient area would remain in the corridor for reasonably foreseeable future utility projects. The action alternatives would, therefore, have no adverse effect on the BLM's ability to site future utilities within the corridor and would not conflict with either the Energy Production and Utility Corridor Element or the MUC M designation of the CDCA Plan.

Special Management Areas

There would be no effect to Special Management Areas as a result of an action alternative. State Route 247 is a County-designated Scenic Route. Drivers along State Route 247 would have short-term views of the site during construction, operations and maintenance, and reclamation. Impacts to sensitive viewers is evaluated in more detail in Section 4.12.

Recreation

The action alternatives include the realignment of Zircon Road within the site Zircon Road in its present form would remain open until the realignment is completed. Thus, there would be no loss of access. Construction of an action alternative would affect off-site recreational uses through short-term disruption of access from fugitive dust, from clearing and grading, and long-term alteration of the views as seen from recreation areas. Visual effects are discussed in greater detail in Section 4.12.

During construction, portions of Santa Fe Fire Road may be temporarily inaccessible; however, the road would not be completely closed to vehicle traffic during construction. During this time, recreational users attempting to access the San Bernardino National Forest would be able to use Santa Fe Fire Road. The temporary closure of portions of Santa Fe Fire Road during grading and hardening would result in short-term effects on access but long-term beneficial effects on the quality of the road. Closure of Santa Fe Fire Road would not affect any other designated recreational area.

Visual Resources

During the construction period, construction activities and materials, equipment, trucks, and parked vehicles could be visible on the site and thus temporarily change the existing visual environment. Construction activities would be conducted in a manner that would minimize

(visible) dust emissions. Therefore, visual changes associated with construction period activities at the site would be short-term.

An action alternative likely would create a fairly substantial visual contrast, particularly for viewsheds directed toward the backs of the solar panels. Overall impacts are minor based on KOP-specific considerations. According to the BLM interim VRM Class IV management objectives, an action alternative's contribution to visual resources would not be considered significant. The project would be an industrial facility in a lightly populated area, and there would be a noticeable change to the view for residents and visitors. All potentially considered scenic vistas that would have full visibility of the site occur from elevated positions located more than two miles away from where the project contrast would be seen in the foreground-middle ground distance zone, resulting in moderate rather than strong visual contrasts.

The site is not in a designated area of natural beauty or scenic recreational area. However, the County of San Bernardino has designated SR 247 as a scenic route. As mentioned earlier, the State only extends scenic highway eligibility to this roadway. The site is generally unremarkable, with no distinguishing geological features or distinctive vegetation. However, visual resources of the surrounding valley and mountain environment are noticeable with overall views that would be degraded to a degree. The presence of the solar facility would create a moderate contrasting change in the visual quality of the overall landscape.

The solar facility would be visible from an eligible state scenic highway (SR 247) at less than a quarter mile away. Duration of view is short, and the highway is not officially designated by Caltrans but does carry the San Bernardino scenic route status; therefore, an action alternative would not result in an adverse impact from these views.

An action alternative would not result in a major adverse impact upon nighttime views in the area from introducing a new source of light or glare. In sunlight, for viewers looking directly at the solar panels, at a distance or an elevated position, the solar field at its most reflective state would mirror the sky and could appear like a lake at hours of the day when the panels were oriented toward the viewer (e.g., looking from the south with the sun behind the viewer on a sunny afternoon). It would not produce significant glare. At night, the solar collectors would not be visible from the viewpoints identified.

An action alternative would result in increased levels of visual contrast by introducing new permanent above-ground structures into the landscape. However, these changes would not directly conflict with the management objectives associated with the interim VRM Class established for the site. In summary, visual changes associated with operations and maintenance would be long-term.

Transportation and Traffic

Construction of both phases would result in short-term increases in traffic volume of a maximum of 90 trips per day (45 morning and 45 evening trips) due to the construction labor force (assuming they all drive separately) and an additional unquantified short-term increase in traffic volume due to delivery of construction equipment and supplies to the site. This increase in traffic volume would occur primarily on SR 247, Foothill Road, and Santa Fe Fire Road as these are the predominant roads that would be used to access the site. Zircon Road and Santa Fe Fire Road may experience short-term effects as these roads are improved. Up to a maximum of 90 additional trips per day would not change the LOS of SR 247, nor would it affect the LOS of I 15, SR 18, or Bear Valley Road. During Phase II the labor force would mirror the labor force discussed for Phase I.

During Phase I, a 33-kV transmission line segment would be constructed across Foothill Road, resulting in short-term effects on Foothill Road as traffic may be stopped periodically while the line is constructed. The original Zircon Road would not be closed until the realignment as been completed. The realignment of Zircon Road would result in long-term, beneficial effects to the quality of the road. During Phase I, the Applicant would improve Santa Fe Fire Road. During grading and hardening, portions of Santa Fe Fire Road may be temporarily inaccessible; however, the road would not be completely closed. The residence located adjacent to the site at the intersection of Foothill Road and South Santa Fe Road would have full access to their home during construction.

Human Health and Safety

If a release of hazardous material were to occur, proper implementation of the Spill Prevention and Response Plan and the SWPPP would limit the area that could be contaminated and ensure that any release is cleaned up in a manner that complies with federal, state, and local regulations. It is unlikely that a hazard to the public or environment would occur as a result of soil disturbance at the site during construction. Disturbance of groundwater is also not expected to occur during site construction because foundations would not be drilled to these depths. During operation, leaks or spills could occur if the transformers at the substations were damaged from a seismic event, fire, or other unforeseen incident. However, leaks would likely be contained within the walls of the substation and the transformers would have biodegradable oil. The solar facility may increase the potential for additional incidents related to fire and fire safety.

Social and Economic Conditions

Construction during both phases would require only a peak labor workforce of 45 workers. Some workers would be local (i.e., permanent residents of San Bernardino County), but it is expected that some would migrate to the work site from outside of the area. There would be no noticeable short-term population effect and no effect on any public service capacities or level of service standards.

Hotels and motels within the immediate vicinity and within commuting distance to the site would receive the benefit of increased occupancy and related spending from temporary workers; therefore, there would be a short-term beneficial effect. The social well-being of LVEDA (and its representatives) would be enhanced because compatible sustainable infrastructure development would be implemented within the Lucerne Valley.

The project footprint would change the historic relationship that these users have with the land but would not necessarily alter it in a detrimental manner. There is a possibility that some positive aspects of social well-being associated with the use and enjoyment of select acreage of wildlife habitat that is taken over by the project footprint could be affected both on a short- and long-term basis.

Project workers and suppliers would experience a positive sense of social well-being as their resources, skills, and goods and services could potentially be mobilized to build, operate, and sustain the solar plant. The utility/wholesale processor would experience a positive sense of social well-being and satisfaction by knowing that they are contributing to California's renewable energy generation portfolio targets for electricity generation and earning profits. The final end use customers would enjoy the social benefit of having a portion of their final demand met from

renewable solar resources. The social benefit relates to a sense of satisfaction that a portion of their final demand is derived from emission-free solar power generation assets.

Assuming that $20 million of construction phase direct spending (related to wages and purchases of materials and equipment) occurs in San Bernardino County, the initial $20 million in direct local content expenditures would generate a grand total of $36.1 million in total output to the region. Indirect effects include the effects occurring along the supporting supply chain as goods and services are purchased from vendors and subcontractors supporting the installation. Induced effects represent the cumulative effects from household spending, reflecting labor earnings from direct and indirect related economic activity. On average, 25 construction and supervisory personnel would be required on-site for approximately eight months to build Phase I, with 45 personnel being required at peak times. During Phase II, this manpower loading would be repeated.

An action alternative would be expected to have a short-term beneficial effect on local jurisdiction tax revenues during the construction of Phases I and II. Operations and maintenance of both phases of an action alternative would be expected to have a long-term beneficial effect on San Bernardino County's public revenues.

Environmental Justice

An action alternative is not expected to have a disproportionately high and adverse human health or environmental effect on minority and low-income populations in the Lucerne Valley.

Energy and Minerals

Access to some prospected or production sites for mineral or energy resources could be inhibited during construction; operations and maintenance; or decommissioning of an action alternative; however, due to the lack of known mineral resources at the site, no effect on mineral or energy resources would occur. In addition, an action alternative would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this renewable energy project, this would not be an adverse effect.

Conclusion

An action alternative would result in short-term and long-term adverse effects (after mitigation) on biological resources. Unavoidable, short-term effects on visual resources would occur during construction and decommissioning. During operations and maintenance, effects on visual resources would be long-term but minor. In addition, moderate, short-term cumulative effects on air quality (PM_{10} levels) would occur during construction and decommissioning. Beneficial effects may result on social and economic conditions. Table ES-1 contains a summary of impacts by alternative.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.1 Air Quality	No effects	No effects	During construction, total annual emissions of PM10, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 16.82 tons per year. During reclamation there would be potential short-term increase in air pollutant emissions. During construction, routine operational activities, maintenance, and decommissioning, GHG emissions would be generated. A comparison of the GHG emissions (88.3 MtCO2e) to the existing power plant inventory for California (107,243,302 MtCO2e) shows that the emissions resulting from the Proposed Action would be 0.00008 percent. A typical 45-MW fossil fuel fired power plant in California would produce 1,448,330 metric tons of carbon dioxide equivalents (MtCO2e) over its 30 year lifespan. Subtracting the Proposed Action GHG emissions (88.3 MtCO2e) from these avoided emissions also indicates that the Proposed Action would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. This would result in a loss of 317.5 tons of carbon storage capacity.	Effects during Phases I and II under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur using the same vehicles for the same length of time.	During construction, total annual emissions of PM10, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 15.51 tons per year. During construction, routine operational activities, maintenance, and decommissioning, GHG emissions would be generated. A comparison of Alternative 5 GHG emissions (51.5 MtCO2e) to the existing power plant inventory for California (107,243,302 MtCO2e), not including construction) shows that emissions resulting from Alternative 5 would be are 0.00005 percent. A typical 30-MW fossil fuel fired power in California would produce 965,553 MtCO2e over its 30 year lifespan. Subtracting the alternative project GHG emissions (51.5 MtCO2e) from these avoided emissions also indicates that Alternative 5 would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. This would result in a loss of 254 tons of carbon storage capacity.
4.2 Noise	No effects	No effects	Individual pieces of equipment would generate noise levels in a range from 74 to 89 dBA at 50 feet from the source	Effects under this alternative would be slightly reduced. Since	Effects under this alternative would be short-term, adverse construction noise, ground-borne vibration, and

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			(Table 4.2-1). Due to the location of the closest residence (located less than 0.1 mile from the site), these noise and vibration levels would not be attenuated over distance and reduced to background levels at the closest sensitive receptor (located less than 0.1 mile from the site). Because construction of Phase I would begin in the north and move to the south, disturbance from Phase I construction would result in a short-term, adverse effect to the residence. During construction, the Phase I equipment would include a total of 10 transformers (one for every two megawatts of power generation) to be enclosed within each photovoltaic power block. However, the closest transformer to the closest receptor is over 500 feet away. Even with the composite noise of 10 transformers in Phase I, the sound level at the closest receptor would not exceed 55 dB. While this would result in a long-term increase in ambient noise levels, it would not be audible to the nearest receptor.	Alternative 3 is the same size and the same amounts and types of disturbance would occur, the same amount of noise would be generated, however, since the project would be moved 50 feet further away from the closest sensitive receptor and have a vegetative screen installed, noise effects would be attenuated slightly.	traffic noise similar to the effects under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.4 Geology, Topography, & Geologic Hazards	No effects	No effects	The Proposed Action would not increase the geologic instability of the area and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. There would be no effect on a unique geologic feature. Flash flood events could result in on-site damage that could represent a hazard. It is possible that a major flash flood could result in damage down gradient of the site. Compliance with earthquake building codes and maintaining the natural drainage would minimize potential risk associated with the most likely geologic hazards; however, once these events occur, they can strain or stress the existing infrastructure.	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur.	Effects under this alternative would be the similar as those identified under Alternative 3. The difference in the area graded (10 acres) and developed (238 acres) would be reduced, but the type, intensity, and duration of the effects would be similar.
4.4 Soils	No effects	No effects	Both topsoil and vegetation would be removed and vegetation would not be allowed to re-grow over an approximate 12.5 acre area. Therefore, there would a strong potential for wind and water erosion over this 12.5 acres. The Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area during construction. Due to the lack of protected soils at the site, development of the Proposed Action would not affect soils identified for special	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur.	Effects would be the similar, but less than those identified for Alternative 3. Only 10 acres would be graded as opposed to 12.5 acres; therefore, fewer acres of topsoil would be removed. Since the alternative would decrease the number of structures, specifically concrete pads and post, and the area over which erosion would occur and topsoil removed would be less than Alternative 3, then the effects from this alternative would be similar but less than those for Alternative 3.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			protection.		
4.5 Water Resources	No effects	No effects	The Applicant is conducting flooding models using the Hydrologic Engineering Centers River Analysis System [HEC-RAS] of the USACOE; however, the data were not available at the time of publication of this document. Previous modeling by the Applicant has indicated the major drainage channels could experience high flows during episodic rain events. The available information suggests that flooding is possible in the Proposed Action area, but the intensity and frequency of these events is not known. Therefore, it is not possible at this time to estimate what the potential flood risk is at the site and the possible effects. The flow pattern alteration would not alter the overall flow pattern for the area. Groundwater quality would not be altered by the Proposed Action. The Proposed Action would not degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters. The water obtained for both construction and operations would be from a permitted off-site source; therefore, it would not decrease the water supply in the Proposed Action area.	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur and the same amount of water would be used.	Effects would be similar to those identified for Alternative 3. However, because only 238 acres would be developed and solar arrays would be located on approximately 228 acres, this alternative would slightly reduce the area graded to approximately 10 acres and decrease the area where infiltration would not occur.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.6 Biological Resources	No effect	No effect	Direct effects to yucca plants during construction would be short-term. Grading and grubbing activities would cause the direct loss of approximately 12.5 acres of creosote bush-white bursage, white bursage, desert wash, and/or already disturbed vegetative communities. Approximately 420 acres of the 516-acre ROW will be mowed, reducing vegetation to between 6 and 12 inches in height, for development of the solar arrays. The long-term effects to vegetation would depend on the scale, intensity, and duration of the activity. Grading and grubbing activities could create opportunities for non-native invasive weed species to colonize in areas where they had not previously occurred. Construction could directly affect wildlife by loss and fragmentation of cover, breeding, and foraging habitat. These activities and vehicle use could cause direct mortality to wildlife. Human activity would likely cause most wildlife species to avoid the Proposed Action area until the disturbance conditions have concluded. Transmission poles could also pose a direct collision hazard to birds. Human activities could potentially provide food or other	Effects would be similar to those described for Alternative 3. Alternative 4 would involve the same initial effect on native communities; however, the corridor along Santa Fe Fire Road would provide an opportunity for some native vegetation to be salvaged from the construction site and transplanted. Similarly, Alternative 4 would involve the same initial effect on native plant species except Joshua trees could be replanted along the corridor. Invasive species could likely be increased, as with Alternative 3, due to mechanically disturbed soil and habitat. Alternative 4 would have effects similar to those described for Alternative 3. Although Alternative 4 would provide increased habitat for wildlife, water and foraging opportunities could draw wildlife into an	Under Alternative 5, construction and operations and maintenance activities would cause similar direct and indirect effects as described under Alternative 3. However, this alternative would reduce the area of disturbance and, therefore, reduce the amount of vegetation that would be removed compared to Alternative 3. Only 238 acres would be developed with solar arrays. This alternative would reduce the loss of wildlife habitat. Only 238 acres would be developed with solar arrays. This alternative would reduce the potential effects to special status species compared to Alternative 3.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			attractants which could draw unnaturally high numbers of opportunistic predators and scavengers. Loss of burrows due to construction could also cause wildlife to search for or dig new burrows. Infrastructure development could alter wildlife movement in the area and just outside the boundary of the Proposed Action. Fences and transmission poles could also cause increased predation wildlife because raptors could use the infrastructure for perches. Loss of vegetation could indirectly reduce available forage and shelter, degrading and fragmenting existing higher quality habitat. The introduction of an artificial water source into the project area may provide suitable habitat for the Argentine ant, an invasive species in California. Clearing and grading activities would directly remove special status plants from the area. Construction activities, ongoing maintenance, including vegetation clearing, and the frequent use of vehicles on-site could introduce invasive weeds to the site. Le Conte's thrasher, northern harrier, and prairie falcon have been observed on the site and may be adversely affected by the Proposed Action. If owls are present on the site during construction, they may not be able	area of greater traffic and risk for mortality. Alternative 4 would have similar effects on special status species as those described for Alternative 3. Although Alternative 4 could provide increased habitat for wildlife, water and foraging opportunities could draw wildlife into an area of greater traffic and risk for mortality. This would be particularly relevant for desert tortoise, nesting and foraging birds, and foraging raptors.	

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			to move quickly enough to avoid mortality due to collisions with vehicles and equipment. Vehicle use on the site during operation and maintenance could also increase collisions and mortality of the burrowing owl. Desert tortoise are present on-site and could be adversely affected by the Proposed Action. Effects would be both short- and long-term. The Proposed Action could result in direct or indirect effects on birds protected by the Migratory Bird Treaty Act, including northern harrier, prairie falcon, golden eagle, red-tailed hawk, and any other migratory bird species.		
4.7 Cultural Resources	No effects	No effects	No cultural resources eligible for inclusion in the NRHP are known to occur in the Proposed Action area.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects to cultural resources resulting from this alternative would be similar to those identified under Alternative 3.
4.8 Paleontological Resources	No effects	No effects	The Proposed Action has a low potential to affect significant nonrenewable fossil resources.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects to paleontological resources resulting from this alternative would be similar to those identified under Alternative 3.
4.9 Land Use and Realty	No effects	No effects	The Proposed Action would, have no adverse effect on the BLM's ability to site future utilities within the corridor and would not conflict with either the Energy Production and Utility Corridor Element or the MUC M designation of the CDCA Plan.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects under this alternative would be the same as those identified under Alternative 3.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.10 Special Management Areas	No effects	No effects	No effect to Special Management Areas (SMAs) as a result of the Proposed Action. State Route 247 is a County-designated Scenic Route. Drivers along State Route 247 would have short-term views of the Proposed Action site during construction, operations and maintenance, and reclamation. Impacts to sensitive viewers is evaluated in more detail in Section 4.6.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects under this alternative would be the same as those associated with the Proposed Action (Alternative 3).
4.11 Recreation	No effects	No effects	Construction of the Proposed Action would affect off-site recreational uses through short term disruption of access from fugitive dust from clearing and grading and long term alteration of the views as seen from recreation areas; however, visual effects are discussed in greater detail in Section 4.12. The temporary closure of portions of Santa Fe Fire Road during grading and hardening would result in short-term effects on access but long-term beneficial effects on the quality of the road.	Effects under this alternative would be the same as those identified under Alternative 3.	The effects to recreation would be the same under this alternative from construction, operations and maintenance, and decommissioning as those identified in alternative 3.
4.12 Visual Resources	No effects	No effects	During the construction period, construction activities and materials, equipment, trucks, and parked vehicles all could be visible on the proposed project site and thus temporarily change the existing visual environment. Construction activities would be conducted in a manner that would minimize (visible) dust emissions. Therefore, visual changes associated with construction period activities at the proposed project site	Under this alternative, recreationists traveling the Santa Fe Fire Road en route to Blackhawk Canyon would see shielded views of the proposed project which would reduce the visual effect of the Proposed Action. All other viewpoints would have the same	Visual effects during construction of Phase I and II would be similar to effects under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period. Since a smaller amount of area is being developed and the amount of energy being produced is less, the facility itself would be smaller and be less of a

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			would be short-term. The proposed project would result in increased levels of visual contrast by introducing new permanent above-ground structures into the landscape. However, these changes would not directly conflict with the management objectives associated with the interim VRM class established for the proposed project site. In summary, visual changes associated with operations and maintenance would be long-term.	views as Alternative 3 and the effects on visual resources would be the same during Phases I and II.	contrast to the surrounding area. Visual changes associated with operations and maintenance would be long-term, however, they would be less than that experienced under Alternative 3.
4.14 Transportation	No effects	No effects	Construction of both phases of the project would result in short-term increases in traffic volume of a maximum of 90 trips per day (45 morning and 45 evening trips) due to the construction labor force (assuming they all drive separately) and an additional unquantified short-term increase in traffic volume. Up to a maximum of 90 additional trips per day would not change the LOS of SR 247, nor would it affect the LOS of I 15, SR 18, or Bear Valley Road. During Phase II the labor force would mirror the labor force discussed for Phase I.	Effects under this alternative would be the same as those identified under Alternative 3.	Implementation of this alternative would result in similar effects to traffic volume as Alternative 3. The number of trips from workers and construction equipment as well as the delivery of supplies at the peak of construction would be the same as under Alternative 3; however, the effect would be for a shorter period since the construction phases under this alternative are shorter than the construction phases under Alternative 3. The effects to Foothill Road, Santa Fe Fire Road, and Zircon Road would be the same. There would be short-term traffic disruptions due to oversize loads. However, since this alternative is smaller than Alternative 3, this disruption would be for a shorter period of time.

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.14 Human Health and Safety/Hazardous Materials	No effects	No effects	It is unlikely that a hazard to the public or environment would occur as a result of soil disturbance at the site during construction of the Proposed Action. Disturbance of groundwater is also not expected to occur during site construction because foundations would not be drilled to these depths. Leaks would likely be contained within the walls of the substation and the transformers would have biodegradable oil. The solar facility may increase the potential for additional incidents related to fire and fire safety.	The effects and related mitigation measures would be the same for this alternative as those for Alternative 3.	Because the footprint is smaller and the construction period shorter for this alternative, the likelihood of potential small spills would be reduced proportionately; however, the types of effects and related mitigation measures would be the same for this alternative as those for Alternative 3.
4.15 Social and Economic Conditions	No effects	No effects	Assuming that $20 million of construction phase direct spending (related to wages and purchases of materials and equipment) occurs in San Bernardino County, the initial $20 million in direct local content expenditures would generate a grand total of $36.1 million in total output to the region. Indirect effects include the effects occurring along the supporting supply chain as goods and services are purchased from vendors and subcontractors supporting the installation. Induced effects represent the cumulative effects from household spending, reflecting labor earnings from direct and indirect related economic activity. On average, 25 construction and supervisory personnel would be required on-site for approximately eight months to build Phase I, with 45 personnel being required at peak times. During Phase II, this manpower loading would be repeated.	Effects during Phases I and II under this alternative would be similar to Alternative 3.	Effects during Phases I and II under this alternative would be similar to Alternative 3

Table ES-1 Comparison Summary of Effects of Proposed Action and Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.16 Environmental Justice	No effects	No effects	The Proposed Action is not expected to have a disproportionately high and adverse human health or environmental effect on minority and low-income populations in the Lucerne Valley.	Effects under this alternative would be similar to Alternative 3.	Effects under this alternative would be similar to Alternative 3
4.17 Energy and Minerals	No effects	No effects	No effect on mineral or energy resources would occur. The Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this renewable energy project, this would not be an adverse effect.	Effects under this alternative would be similar to Alternative 3	Effects under this alternative would be similar to Alternative 3.

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1.0 Introduction

This chapter describes the purpose and need, discusses the relevant laws, plans, policies and programs and briefly describes the issues raised during scoping that will be addressed in the Environmental Impact Statement (EIS).

1.1 Purpose of and Need

Chevron Energy Solution (CES, or the Applicant) has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) grant on public land to develop a solar energy project.

The Applicant is proposing to develop a 45-megawatt (MW) photovoltaic (PV) solar project on a site located in the Mojave Desert, south of Barstow, east of Victorville, and northeast of Los Angeles in San Bernardino County. Specifically, the site is on unincorporated land approximately eight miles east-southeast of the junction of Barstow Road and Old Woman Springs Road (State Route 247) near the community of Lucerne Valley (Figure 1-1). The Proposed Action would be built in two phases. Phase I consists of the construction and operation of a 20-MW solar plant and associated facilities and would include an interconnection to the existing Southern California Edison (SCE) 33-kilovolt (kV) transmission line located north of the site. Phase II includes construction and operation of a 25-MW solar plant and associated facilities and would be contingent upon available transmission capacity and future power sales. The total ROW would span 516 acres.

The following presents the BLM's, the Department of Energy (DOE), as well as CES's purpose and need.

1.1.1 BLM's Purpose and Need

The BLM's purpose and need for the Lucerne Valley Solar Project EIS is to respond to CES's application under Title V of the FLPMA (43 USC 1761) for a right-of-way (ROW) grant to construct, operate and decommission a solar generation facility and associated infrastructure in compliance with FLPMA, BLM ROW regulations,43 CFR Part 2800, and other applicable federal laws. BLM's review of CES's application is also consistent with the following laws and directives pertaining to renewable energy resources:

- Sec. 211 of Energy Policy Act of 2005, enacted in August, 2005, which mandated up to 10,000 MW of non-hydropower renewable energy projects on the public lands by 2015.
- Instruction Memorandum 2007-097, dated April 4, 2007, Solar Energy Development Policy establishes BLM policy to ensure the timely and efficient processing of energy ROWs for solar power on the public lands.
- Secretarial Order 3283 Enhancing Renewable Energy Development on the Public Lands, signed January 16, 2009. This order facilitates the Department of the Interior's efforts to achieve the goals established in Sec. 211of the Energy Policy Act of 2005.
- Secretarial Order 3285 Renewable Energy Development by the Department of the Interior, signed March 11, 2009. The order establishes the development of renewable

energy as a priority for the Department of the Interior and establishes a Departmental Task Force on Energy and Climate Change.

The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to CES for the proposed solar project. The decision the BLM will make is whether or not to grant a ROW and if so, under what terms and conditions, and whether to amend the CDCA land use plan in two potential ways.

First, the EIS will be used to consider whether the CDCA Plan should be amended to designate the lands as suitable or unsuitable for solar energy development.

Second, the Applicant's proposal would reroute a portion of Zircon Road, a currently designated route of travel. The purpose of this Proposed Action also includes compliance with 43 Code of Federal Regulations (CFR) Part 8342.1, which establishes criteria to consider when making route designations. The designations should be based on protecting the resources of the public lands, promoting the safety of the public land users, and minimizing the conflicts among the various public land users. The designations also must be in accordance with the following criteria:

- Off-highway vehicle (OHV) areas and trails must be located to minimize the damage to soil, watershed, vegetation, air, or other resources of the public lands and to prevent impairment of wilderness suitability.
- OHV areas and trails must be located to minimize harassment of wildlife or significant disruption of wildlife or wildlife habitats. Special attention must be given to protect endangered or threatened species and their habitats.
- OHV areas and trails must be located to minimize conflict between OHV use and other existing or proposed recreational uses of the same or neighboring public lands and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

OHV areas and trails must not be located in officially designated wilderness areas or primitive areas. OHV areas and trails may be located in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect the natural, aesthetic, scenic, or other values for which such areas are established.

DOE's Purpose and Need

The Applicant may apply to the Department of Energy (DOE) for a loan guarantee under Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act"), to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects (the "Section 1705 Program"). The primary purposes of the Recovery Act 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.

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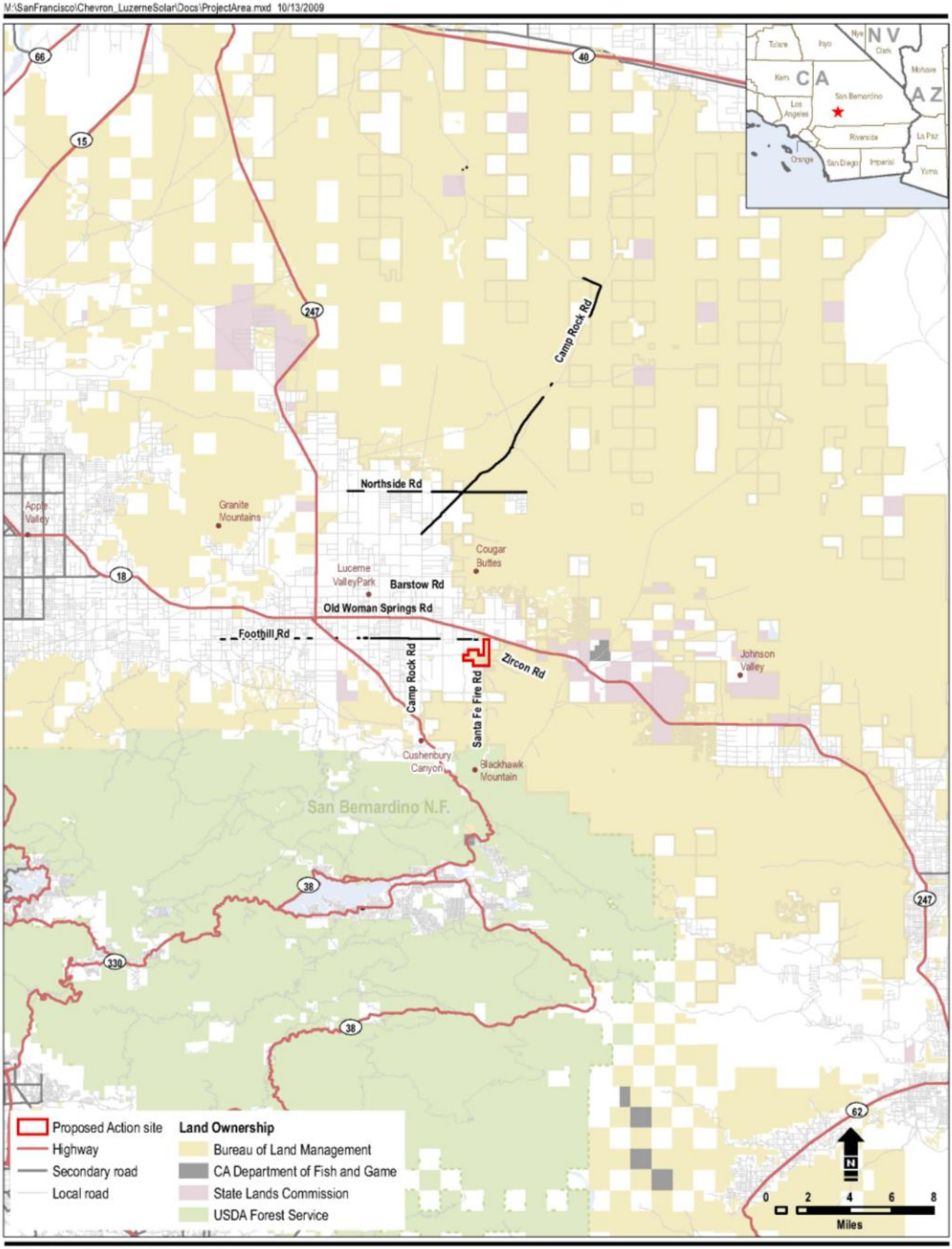

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999

Figure 1-1

General Project Location Map

Lucerne Valley Solar Project

San Bernardino County, California

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Should a loan guarantee be sought for this project and if DOE decides to enter into negotiation of a possible loan guarantee with the applicant, DOE would likely become a cooperating agency in developing the final EIS. The purpose and need for action by DOE is to comply with its mandate under EPAct by selecting eligible projects that meet the goals of the Act.

The need includes consideration for this or other funding available through the DOE. Should DOE accept the application as suitable for this funding, DOE may adopt this EIS, or become a cooperating agency in developing the final EIS. If so, this EIS may be used by DOE to meet the NEPA requirements in making a determination of funding.

1.1.2 Proponent's Purpose and Need for the Proposed Action

CES has applied to the BLM for a ROW grant on public land to develop a solar energy project. CES's purpose and need in developing this facility is to promote solar technology for energy development, developing up to 45 MW of energy on public land, while maintaining a profit margin.

The Applicant is proposing to develop a 45-megawatt (MW) photovoltaic (PV) solar project on a site located in the Mojave Desert, south of Barstow, east of Victorville, and northeast of Los Angeles in San Bernardino County. Specifically, the site is on unincorporated land approximately eight miles east-southeast of the junction of Barstow Road and Old Woman Springs Road (State Route 247) near the community of Lucerne Valley (Figure 1-1). This land is managed by the BLM.

The Proposed Action would be built in two phases. Phase I consists of the construction and operation of a 20-MW solar plant and associated facilities and would include an interconnection to the existing Southern California Edison (SCE) 33-kilovolt (kV) distribution line located north of the site. Phase II includes construction and operation of a 25-MW solar plant and associated facilities and would be contingent upon available transmission capacity and future power sales. The total ROW would span 516 acres. The Applicant's POD states that the Proposed Action would help address federal and state mandates designed to increase the production of renewable energy. Foremost among these, according to the Applicant, is the State goal to produce up to 10,000 MW of solar energy by 2020. The proposed site was chosen because of its excellent solar radiation, proximity to potential customers, and access to existing electric transmission.

1.2 About This Document

This document follows regulations promulgated by the Council on Environmental Quality for implementing the procedural provisions of NEPA (40 CFR 1500-1508); the Department of the Interior's NEPA regulations, 43 C.F.R. Part 46; the BLM NEPA Handbook, H-1790-1; Sections 201, 202, and 206 of FLPMA (43 CFR 1600); and the BLM Land Use Planning Handbook, H-1601-1. This EIS describes the components of and reasonable alternatives to the Proposed Action and environmental consequences of the Proposed Action and the alternatives.

The EIS is divided into eight chapters for ease of reading and to better organize information for decision making.

Chapter 1 provides general background and explains the purpose and need, roles of the BLM and other agencies, decisions to be made, and authorities regulating the process of analysis

and disclosure. It also provides a summary of issues raised by the public during the scoping phase of the process that will be addressed in the EIS.

Chapter 2 presents a reasonable range of alternatives to address the stated purpose and need for the project, including the Proposed Action, the No Action Alternatives, the Modified Site Layout Alternative, and the Smaller Project Alternative. It also discusses alternatives not carried forward for detailed analysis, identifies the agency-preferred alternative, and summarizes environmental effects for each alternative.

Chapter 3 describes the affected human environment in the Proposed Action area and identifies potential cumulative projects.

Chapter 4 discloses potential direct and indirect environmental effects associated with the Proposed Action and other alternatives and discusses potential mitigation measures to reduce or minimize effects. It also describes the cumulative effects associated with the Proposed Action and other alternatives when added to other past, present, and reasonably foreseeable future actions in the cumulative effects area.

Chapter 5 lists state and federal agencies and other governmental bodies that were consulted or that contributed to the preparation of the EIS; describes Native American consultations and public participation during scoping; and lists agencies, organizations, and persons to whom the EIS will be sent or has been sent.

Chapter 6 lists the names and qualifications of those persons consulted in the preparation of this EIS.

Chapter 7 lists the acronyms and abbreviations used in the EIS.

Chapter 8 provides the bibliography of information that was used to prepare the EIS and an index to references made in the document.

Appendices contain information that supplements or supports analyses in the body of the EIS.

1.3 Summary of Public Scoping and Issue Identification

1.3.1 Public Scoping Process

The issues evaluated in this EIS are derived from public comments made during the scoping period and are summarized in the CES Lucerne Valley Solar Project EIS Scoping Summary Report issued in October 2009 (see Appendix A). The Scoping Summary Report is also posted on the BLM Barstow Field Office Web site at http://www.blm.gov/ca/st/en/fo/barstow.html. Comments received during scoping from agencies, organizations are addressed in the analysis of direct, indirect and cumulative effects in this Draft EIS.

Additional information on the scoping process is provided in Section 5.1.

1.3.2 Issues Raised During Scoping

This section outlines the issues raised during the public scoping process. Each issue, described as a question to be answered in the EIS, is followed by a notation in parentheses which indicates where the issue has been addressed in this document.

Air Quality (Including Climate Change)

- How will BLM address fugitive dust emissions from vehicle travel and the construction and operation phases in the EIS (Section 4.1)?
- How will BLM analyze the greenhouse gas emission reduction versus that of other forms of energy production in the EIS (Section 4.1)?
- How will BLM EIS provide a detailed analysis and comparison of Environmental Protection Agency criteria pollutants, National Ambient Air Quality Standards, non-attainment areas before and after implementation, and quantify emissions sources from the Proposed Action, and the need for an equipment emission mitigation plan (Section 4.1)?
- How will the placement of the solar arrays affect the desert's ability to store carbon (Section 4.1)?

Geologic Resources

- How will the EIS evaluate potential impacts of local faults and the effect of seismic activity (Section 4.3)?

Soils

- How will the EIS address drainage, erosion, and sediment control (Section 4.4)?

Hydrology, Water Quality, and Water Resources

- How much water is necessary to clean panels and other required uses (Section 4.5)?
- What will be the water source (Section 4.5)?
- What is the Applicant's site drainage plans, including wastewater discharge, Clean Water Act permitting, flooding potential, and flash-flood mitigation (Section 4.5)?

Biological Resources

- What will be the effects (including increased shade) on the local plant communities (including creosote bush) and the inclusion of an invasive plant management plan need to be addressed in the EIS (Section 4.6.1)?
- What will be the effects of construction and operation on vegetation, grazing and wildlife species (Sections 4.6.1 and 4.6.2)?
- What will be the cumulative effect on migration patterns of animal species (including bighorn sheep) (Sections 4.6.2 and 4.6.3)?
- What will be the effects on the desert tortoise, round-tailed ground squirrel, and other special status species (Section 4.6.3)?

Cultural Resources

- How will a possible historic designation for State Route 247/Old Woman Springs Road be affected (Section 4.7)?
- What are the results of consultation with local Native American tribal representatives (Section 4.7)?

Land Use

- How will consistency with local land use plans, including using public lands for renewable energy projects be affected (Section 4.9)?
- How will future land uses affect the local environment (Section 4.9)?

Recreational Resources

- How will renewable energy projects affect local OHV use and other forms of outdoor recreation (Section 4.11)?

Aesthetic/Visual Resources

- How will views into and out of Lucerne Valley be affected (Section 4.12)?
- How will renewable energy projects in the region affect aesthetic/visual resources and degrade the aesthetic quality of the area Section 4.12)?
- How will the scenic quality of State Route 247/Old Woman Springs Road be affected (Section 4.12)?

Traffic and Transportation

- How will public access to Santa Fe Fire Road be affected after construction is completed (Section 4.13)?
- How will construction affect right-turning movements from State Route 247 to the site (Section 4.13)?
- How will construction and operation affect State Route 18 and Bear Valley Road (Section 4.13)?

Hazardous Wastes

- How will the EIS address possible public health and safety issues related to hazardous waste types, volumes, storage, and disposal? Will there be management and mitigation plans (Section 4.14)?
- How will the EIS describe the life cycle impacts of photovoltaic components (Section 4.14)?

Social and Economic Considerations

- How will the local economy be affected? How will BLM evaluate the effects on tax revenue, other future projects that will benefit the local community, employment, utility incentives for local residents and businesses, and possible effects on surrounding land values (Section 4.15)?
- How will renewable energy affect tourism (Section 4.15)?

Environmental Justice

- How will BLM analyze the effects on minority or low-income populations and coordinate with those populations (Section 4.16)?

1.4 Policies, and Programs

1.4.1 Relationship to Federal Policies, Plans, and Programs

The following section summarizes the federal, state, and local policies, plans, and laws that apply to this EIS.

Federal Land Policy and Management Act of 1976

FLPMA establishes the land management authority of the BLM and provides guidance for how public lands are to be managed by the BLM. The BLM manages public lands under multiple-use and sustained yield principles. Multiple-use is a concept that directs management of public lands and their resource values in a way that best meets the present and future needs of Americans and is defined as "a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources" (FLPMA §103[c]]). FLPMA directs BLM to manage the public lands in a way that does not cause undue or unnecessary degradation to the environment.

Section 202 of FLPMA outlines the requirement to consider proposed uses on the public lands in a land use plan. The regulations that implement BLM's planning process are found in 43 CFR 1600.

National Environmental Policy Act

NEPA requires federal agencies to review the effects of their actions on the natural and human-made environment prior to taking action. The law requires all federal agencies to consider the direct, indirect and cumulative effects of proposals and reasonable alternatives prior to making a decision. NEPA requires that all federal actions that could result in a significant effect on the environment to be subject to review by federal, state, local, and tribal environmental authorities, as well as by other affected parties and interested citizens. The regulations that implement BLM's NEPA process are fund at 40 CFR 1500-1508.

Clean Air Act

Initially enacted in 1963, the Clean Air Act, as amended has established a set of national standards for air pollution to protect human health. In 1990, the EPA was authorized to set National Ambient Air Quality Standards to establish acceptable concentrations of six criteria pollutants: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), lead (Pb), nitrogen dioxide (NO_2), and particulate matter 2.5 microns in size ($PM_{2.5}$). The State of California implements the Act through its State Implementation Plan, which is enforced at the local level by air quality management districts.

Clean Water Act

The act regulates discharges of pollutants into waters of the United States. Also included are requirements to set water quality standards for all contaminants in surface waters. The act

makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under its provision.

Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973, as amended, provides for federal protection of plant and animal species listed as threatened or endangered. The United States Fish and Wildlife Service (USFWS) is responsible for administering the ESA on behalf of the United States. The major components of the ESA are as follows:

- Provisions for the listing of threatened and endangered species;
- The requirement for consultation with the USFWS on federal projects;
- Prohibitions against "take" of listed species. Under the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct"; and
- Provisions to allow the incidental taking of threatened and endangered species.

National Historic Preservation Act of 1966, as Amended

The National Historic Preservation Act of 1966 requires federal agencies with jurisdiction over a proposed federal project to take into account the effect of the undertaking on cultural resources listed or eligible for listing on the National Register of Historic Places and requires that the agencies afford the State Historic Preservation Office and the Advisory Council on Historic Preservation with an opportunity to comment on the undertaking.

California Desert Conservation Area Plan, as amended

The CDCA encompasses 25 million acres in southern California designated by Congress in FLPMA in 1976. Congress directed the BLM to prepare and implement a comprehensive long-range plan for the management, use, development, and protection of public lands within the CDCA. The CDCA Plan, approved in 1980, provides overall regional guidance for management of the public lands in the CDCA and establishes long-term goals for protection and use of the California desert.

Approval of some alternatives considered in this EIS would require an amendment to the CDCA Plan.

The CDCA Plan establishes four multiple-use classes, multiple-use class guidelines, and plan elements for specific resources or activities, such as motorized vehicle access, recreation, and vegetation. The multiple-use classes (MUC) are defined as follows:

- Class C (Controlled Use)—About four million acres are Class C. These include 69 wilderness areas (3,667,020 acres total) created by Congress with the October 1994 passage of the California Desert Protection Act. These lands are to be preserved in a natural state; access generally is limited to non-motorized non-mechanized means, such as by foot or on horseback.
- Class L (Limited Use)—About four million acres are Class L. These lands are managed to protect sensitive, natural, scenic, ecological, and cultural resource values. They provide for generally lower-intensity, carefully controlled multiple uses that do not significantly diminish resource values.

- Class M (Moderate Use)—About 1.5 million acres are Class M. These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, energy, and utility development are allowed. Any damage that permitted uses cause must be mitigated.
- Class I (Intensive Use)—About 500,000 acres are Class I. These lands are managed for concentrated use to meet human needs. Reasonable protection is provided for sensitive natural values and mitigation of effects and rehabilitation of affected areas occur when possible.

The BLM land in the application area is located within MUC Class M – Moderate.

West Mojave Plan

Approved in 2006, the West Mojave (WEMO) Plan is an amendment to the 1980 CDCA Plan that affects this EIS in number of important ways. First, it established a comprehensive strategy to protect sensitive biological resources found in the CDCA. Second, it provides for mitigation measures that can be applied to subsequent projects. Third, it established Desert Wildlife Management Areas to focus conservation efforts where additional management would provide the highest level of species protection. Finally, it established or modified designated routes of travel.

1.4.2 Relationship to State and Local Plans, Policies, and Programs

Air Quality Management Districts

The site of the application lies within the Mojave Desert Air Quality Management District (MDAQMD). The MDAQMD (and the nearby South Coast AQMD) reviews the plans and specifications for construction projects in their area of jurisdiction. Emissions and possible air contamination resulting from construction activities (e.g., operational road dust, windblown contaminants, and emissions from construction activities) would be assessed.

California Endangered Species Act

The California Endangered Species Act allows the California Department of Fish and Game (CDFG) to authorize project proponents to “take” state-listed threatened, endangered, or candidate species if certain conditions are met. Under the California Endangered Species Act, “take" is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include “harm” or “harass,” which are terms found in the federal ESA. The permitting program administers the incidental take provisions of the California Endangered Species Act to ensure regulatory compliance and statewide consistency.

State Historic Preservation Office

Section 106 of the National Historic Preservation Action requires federal agencies to initiate consultation with the State Historic Preservation Office (SHPO) as part of the Section 106 review process. BLM actions are coordinated through the SHPO to ensure consistency with State programs and protection of cultural and historic properties listed on and eligible for listing on the National Register of Historic Places.

State of California Lake and Streambed Alteration Program

The CDFG is responsible for conserving, protecting, and managing California’s fish, wildlife, and native plant resources. To meet this responsibility, the Fish and Game Code (Section 1602)

requires an entity to notify CDFG of any proposed activity that may substantially modify a river, stream, or lake. The proposed action could modify on-site drainages.

Notification is required by any person, business, state, or local government agency or public utility that proposes an activity that would substantially divert or obstruct the natural flow of any river, stream, or lake; substantially change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground-up pavement where it may pass into any river, stream, or lake. The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

If CDFG determines that the activity may substantially adversely affect fish and wildlife resources, a lake or streambed alteration agreement would be prepared. The agreement includes reasonable conditions necessary to protect those resources and must comply with the California Endangered Species Act. The entity may proceed with the activity in accordance with the final agreement.

California Regional Water Quality Control Board

The RWQRB would certify that construction activities that result in a discharge to a water body comply with state water quality standards and would provide coverage for storm water discharges to surface waters, pursuant to the General Construction Activities Permit for Construction and Section 401 of the Clean Water Act.

Municipal Plans

The site identified in CES's application is situated wholly within the unincorporated community of Lucerne Valley, within San Bernardino County. San Bernardino County adopted the Lucerne Valley Community Plan (LVCP), prepared as an adjunct to the San Bernardino County General Plan (County of San Bernardino 2007a), which is a comprehensive, long-range declaration of purposes, policies, and programs for future development of the area. The LVCP identifies the site as "non-county jurisdiction" and the surrounding areas are designated as "RL-Rural Living". Given that the land is managed by the federal government, it would not be subject to local or county ordinances and plans, although BLM is required to be consistent with these plans to the extent possible as shown in Table 1-1.

1.5 Authorizing Actions/Use of this EIS

Federal, state, and local permits and approvals would be required before construction and operation of any action alternative could proceed. A list of the major permits, approvals, and consultations required is presented in Table 1-2. The Applicant would be responsible for obtaining all permits and approvals required to implement any authorized activities.

This EIS is intended to provide the information and environmental analysis necessary to inform public agency decision makers and the public about the potential environmental consequences of the alternatives. Specifically, the information contained in this EIS is intended to be considered by the BLM regarding making a decision regarding CES's application for a ROW grant. The document may also be considered by the responsible agencies listed in Table 1-2 with regard to their respective permits and approvals.

Table 1-1 Consistency Between Lucerne Valley Community Plan Goals and the Proposed Action

Goal Number	Text	Statement of Consistency, Non-consistency, or Not Applicable
Goal LV / LU 1	Retain the existing rural desert character of the community.	Consistent: The concentration of solar power on federal BLM lands in development corridors minimizes environmental effects and avoids desert fragmentation.
Goal LV / LU 2	Ensure that commercial and industrial development within the plan area is compatible with the rural desert character and meets the needs of local residents.	Consistent: The site chosen is within a "development corridor" located near existing roads and transmission lines. The emphasis on converting power generation from fossil fuel/thermal to renewable is consistent with California energy policy, thereby meeting the needs of local residents for zero emission power.
Goal LV / LU 3	Establish locational criteria for future development within the plan area to ensure compatibility between uses and with the character and vision that is desired for the community.	Consistent: The involvement of federal, state, and local planning agencies in choosing sites based on stakeholder feedback (for potential solar plants) is responsive to local stakeholder goals voiced from the community/grassroots level.
Goal LV / CI 4	Ensure adequate water sources and associated infrastructure to serve the needs of existing and future water users in the LVCP area.	Consistent: The alternatives under consideration would use minimal water for long-term, sporadic panel washing, thereby ensuring adequate water resources for the LVCP area.
Goal LV / CI 5	Encourage and promote water conservation.	Consistent: BMPs would encourage water conservation and reuse for long-term O&M needs.
Goal LV / CI 6	Ensure that public services are delivered and maintain capacities at acceptable levels.	Consistent: The project assets would generate annual tax revenues (from the leasehold possessory interest) that would promote public service delivery and capacities.

Table 1-2 Major Permits, Approvals, and Consultations

Agency	Required Permit or Approval	Agency Action
Federal Agencies		
BLM	Lead Federal Agency for NEPA compliance	Consider environmental effects of alternatives.
	Right-of-Way (ROW) Grant	Make a decision about granting a right-of-way.
	Notice to Proceed	Following issuance of the right-of-way grant and approval of the Construction Operation and Maintenance Plan, consider issuance of a Notice to Proceed with development and mitigation activities.
Advisory Council on Historic Preservation	Section 106 Consultation, National Historic Preservation Act (NHPA)	Has the opportunity to coordinate with BLM regarding potential affects to cultural resources that are either listed on or eligible for listing on the National Register of Historic Places
U.S. Department of Energy	Funding Consideration should a loan guarantee be sought for this project	Consider environmental effects of alternatives.
USFWS	Compliance with California and Federal Endangered Species Acts and similar regulatory requirements; development of final biological opinions by CDFG and USFWS; Section 7 consultation and biological opinion (Endangered Species Act)	Consider Lead Agency's finding of affect on federally listed or proposed species. Provide Biological Opinion if the selected alternative is likely to adversely affect federally listed or proposed species, or their habitats.
U.S. Department of Defense		Coordination of air space use.
California State Agencies		
CDFG	Compliance with California and Federal Endangered Species Acts and similar regulatory requirements; development of final biological opinions by CDFG	Review the selected alternative for potential effects to State listed species.
	Streambed Alteration Agreement (Section 1603 of the California Fish and Game Code)	Consider issuance of Section 1603 Streambed Alteration Agreement for impacts to on- drainages from construction.
	California Native Plant Protection Act	Review of mitigation agreement and mitigation plan for plants listed as rare.
California RWQCB, Colorado River Basin Region 7	Section 401 Water Quality Certification	Consider issuance of certification that construction activities that result in a discharge to a water body comply with federal and state water quality standards.
	General Construction Activity Storm Water permit for construction activities	Provide coverage for storm water discharges to surface waters, pursuant to the General Construction Activities Permit for Construction (2009-0009-DWQ)

Table 1-2 Major Permits, Approvals, and Consultations

Agency	Required Permit or Approval	Agency Action
California Dept. of Transportation (Caltrans)	Encroachment Permit	Consider issuance of permits for any activities affecting state highways or within highway easements, including placement of transmission line across, within, under or over statement highway ROW.
California SHPO	Section 106 Consultation, NHPA	Consult with BLM, the Applicant, appropriate land management agencies, and others regarding Proposed Action activities that may affect cultural resources.
Local Agencies		
MDAQMD	Dust Control Plan	Consider issuance of temporary permit for construction activities causing fugitive dust.
Nongovernmental Entities		
SCE	Interconnection Agreement Metering Service Agreement	Consider contractual agreements to allow solar generating facility to connect to SCE distribution system.

Source: CES 2009.

1.6 Planning Process

1.6.1 BLM

This document will address both planning and implementation decisions. Planning decisions differ from implementation decisions in that they allocate land uses, rather than approve a specific action. The application area is within the CDCA planning area, which requires that all proposed power-generating facilities be considered through the planning process. For the purposes of this document, the BLM would make the following planning decision:

- Should the application area remain undesignated or be designated as suitable or unsuitable for solar energy development?

BLM will make an implementation determination concerning Zircon Road.

- Should the designated route of travel, Zircon Road, be rerouted?

If the BLM designates the area as suitable for solar energy development, it would decide:

- Should the proposed ROW grant be issued as applied for; issued for a modified project, or denied?

A summary of the BLM process is given below.

1. Conduct Scoping—This is the initial phase, in which the BLM announced its intent to prepare an EIS to consider the Applicant's ROW application. The purpose of scoping is to notify the public and federal, state, and local agencies and tribal governments of that an EIS will be written for a project and to gather information on potential effects.

2. Collect Data—Based on the issues raised during scoping, all relevant resource data and management information is collected for the assessment of direct, indirect, cumulative, and residual effects.
3. Develop Alternatives—A range of reasonable alternatives is developed to meet the purpose and need for the EIS. This document will include two No Action Alternatives. One would take no action on the proposed ROW nor amend the CDCA Plan. A second No Action Alternative with CDCA Plan Amendment would reject the Proposed Action and would amend the CDCA Plan to designate the area either suitable or unsuitable for solar energy development.
4. Assess Effects—Using accepted scientific methods, the direct, indirect, cumulative and residual effects of the alternatives are assessed.
5. Circulate Draft CDCA Plan Amendment/Draft EIS (DEIS) and Hold Public Comment Period—The Draft CDCA Plan Amendment/DEIS is circulated for public and agency review and comment. Meetings are usually held to explain the findings of the Draft CDCA Plan Amendment/DEIS and to collect additional comments.
6. Revise CDCA Plan Amendment/DEIS—The document is revised based on input from the public and other agencies.
7. Circulate Proposed CDCA Plan Amendment/Final EIS (FEIS)—The BLM circulates the Proposed CDCA Plan Amendment/FEIS for a 30-day protest period. Any protests on the planning decision to designate the land as suitable or unsuitable for solar energy development would be resolved by the BLM director. The BLM does not make a decision until the protests are resolved.
8. Issue decision—The BLM's authorized officer will sign the Record of Decision (ROD), which will chose an alternative and identify all approved mitigation measures.
9. Hold appeal period—After the ROD is signed, participants in the EIS process who have legal standing can file an appeal on the approval of the ROW decision to the Interior Board of Land Appeals if they disagree with the decision of the BLM.

1.6.2 Department of Energy (DOE)

If DOE decides to enter into negotiation of a possible loan guarantee with the Applicant, then it will carry out an independent review of the FEIS, when it is complete and made available to the public by BLM, to ensure that DOE comments on the DEIS have been addressed and that DOE's proposed action is substantially the same as the action described in the FEIS. If these conditions are met, DOE may adopt the FEIS without recirculating it pursuant to CEQ NEPA regulations at 40 CFR 1506.3(c). While the FEIS is being developed, DOE would also be carrying out a detailed technical and legal evaluation of the proposed project pursuant to its procedures for loan guarantees set out at 10 CFR Part 609. DOE may reach agreement on a conditional commitment for a loan guarantee prior to completion of the FEIS; however, in this case a condition precedent will be included in the conditional commitment requiring that the NEPA review and the BLM approval be completed before DOE closes the loan guarantee transaction.

Following conclusion of the NEPA process and the BLM decision, DOE will issue a Record of Decision if a loan guarantee is approved. The loan guarantee transaction will then proceed to closing, provided that the Applicant has satisfied all the detailed terms and conditions contained

in the conditional commitment and other related documents, and all other contractual, statutory, and regulatory requirements.

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2.0 Description of Proposed Action and Alternatives

This chapter of the Environmental Impact Statement (EIS) fully describes: (1) the Proposed Action Alternative to build a 45-MW solar photovoltaic (PV) project and associated facilities at the Lucerne Valley project location, (2) a Modified Site Layout Alternative at the Lucerne Valley location, and (3) a Smaller Project Alternative for a 30-MW solar photovoltaic project at the Lucerne Valley location. Each of the action alternatives would include an amendment to the California Desert Conservation Area (CDCA) Plan. This chapter also describes two No Action Alternatives, with and without an amendment to the CDCA Plan; alternatives development; and alternatives considered but eliminated from detailed analysis.

Alternatives considered in the EIS are based on issues identified by the Bureau of Land Management (BLM) as well as comments received during the public scoping process. The BLM is required to consider in detail a range of alternatives that are considered "reasonable," usually defined as alternatives that are realistic (not speculative), technologically and economically feasible, and that respond to the purpose of and need for the Proposed Action.

This document provides information to the authorized officer to make the following decisions:

- Should a right-of-way (ROW) grant be issued?
- Should the Proposed Action area remain undesignated or be designated as suitable or unsuitable for solar energy development?
- Should Zircon Road be rerouted?

2.1 Alternatives Development

This section outlines the process used by the BLM to determine the feasibility of alternatives. Alternatives considered by the Applicant and the BLM along with those suggested by the public during the scoping process were evaluated using the following criteria:

- Does the alternative fulfill the purpose and need outlined in Chapter 1?
- Does the alternative minimize effects to human/environmental resources?
- Is the alternative feasible to construct, operate, maintain, and decommission?

Alternatives that met all of the criteria listed above were carried forward for analysis and are detailed in Section 2.2. Those that did not meet the criteria were eliminated from further analysis and are described in Section 2.3, along with the reasons for elimination.

2.2 Alternatives Considered and Carried Forward for Detailed Analysis in the Environmental Impact Statement

This section describes the two No Action Alternatives, the applicant's Proposed Action, a modified site alternative, and a smaller project alternative that satisfied the screening process. Features common to all alternatives—phasing of development, proposed CDCA plan amendments, project components, and construction methods—are then detailed. Project

features and construction methods listed in this section will serve as the basis of the environmental impact analysis in Chapter 4.

2.2.1 Alternative 1: No Action/No Plan Amendment

The No Action Alternative assumes that the ROW application is denied; that the Lucerne Valley Solar Plant and associated facilities would not be constructed and operated; and that the CDCA Plan would not be amended. Under this alternative the need would be met; the BLM would make a decision on the ROW application. Although the purpose would not be met through this alternative, it could be met through other applications for other projects on BLM lands. The adoption of Alternative 1 would leave current management practices intact and would be in conformance with the CDCA Plan.

2.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site as either suitable or unsuitable for large-scale solar development. Under this alternative the need would be met; the BLM would make a decision on the ROW application. Although the purpose would not be met through this alternative, it could be met through other applications for other projects on BLM lands.

2.2.3 Alternative 3: CES's Proposed Action

The Applicant has applied for a BLM ROW authorization to construct, operate, maintain, and decommission a 45-MW, solar PV power plant and associated facilities. The applicant's Proposed Action site is located south of Old Woman Springs Road, approximately eight miles east of the junction of Barstow Road and Old Woman Springs Road in Lucerne Valley. Specifically, the site is south of the intersection of Foothill Road and Santa Fe Fire Road. Santa Fe Fire Road traverses the site in a north-south direction (Figure 2-1).

The total ROW would span 516 acres and consists of previously disturbed desert land under the jurisdiction of the BLM in San Bernardino County, California. The legal land description is as follows:

San Bernardino Base and Meridian

Township 4 North, Range 2 East:
- Sec. 19,
  - NE ¼ SW ¼
  - S ½ SW ¼
  - NW ¼ SE ¼
  - S ½ SE ¼
- Sec. 20,
  - W ½ W ½
- Sec. 29,
  - NW ¼ NW ¼
- Sec. 30,
  - N ½ NE ¼

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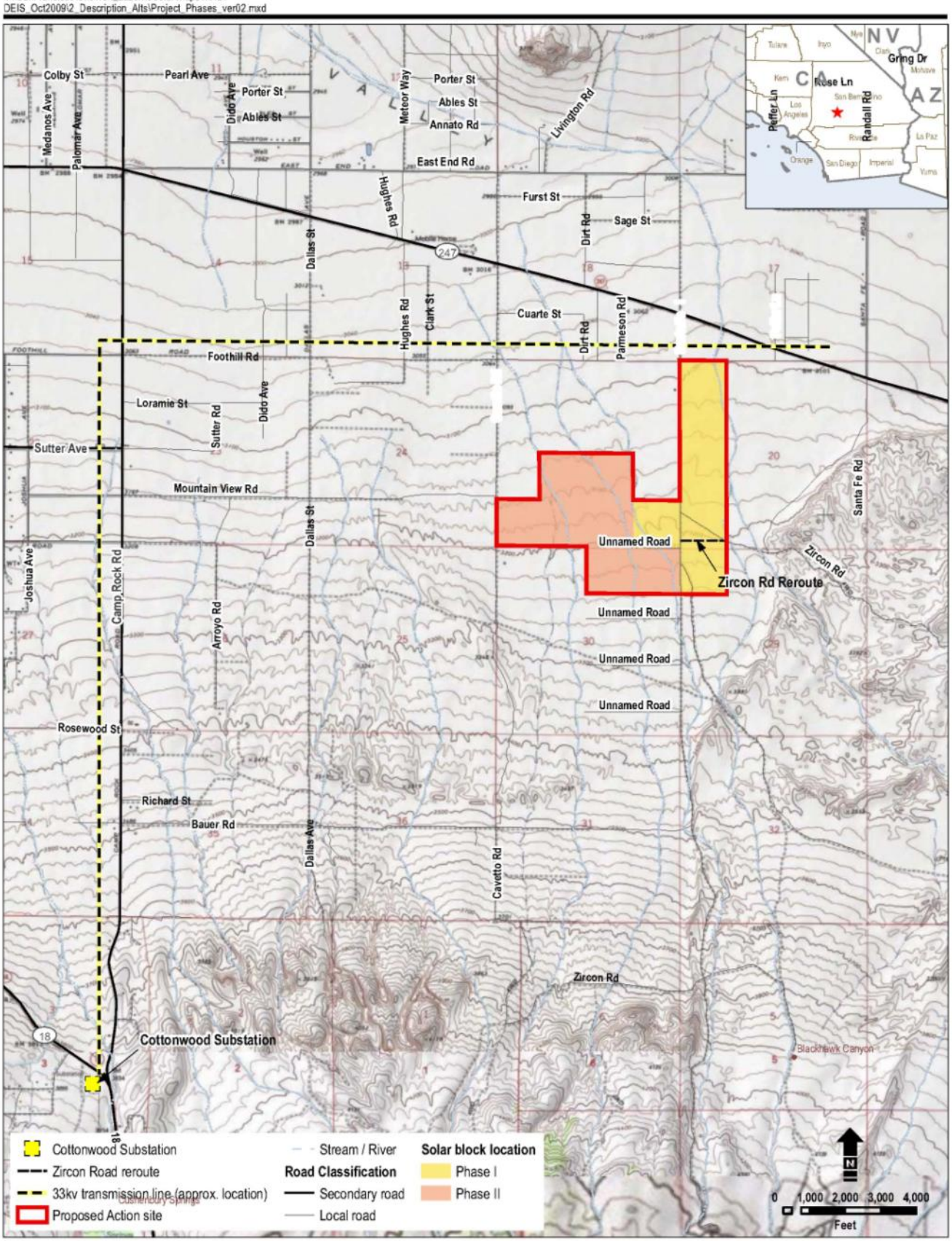

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999

Figure 2-1

Proposed Action Site Map

Lucerne Valley Solar Project

San Bernardino County, California

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2.2.3.1 Project Phasing

The proposed facilities would be built in two phases. Phase I would have an electrical generation capacity of 20 MW, with construction beginning in late 2010. Phase I would occupy approximately 180 acres (approximately 35 percent of the ROW) and would be operational in mid-2011. Phase I would interconnect to an existing Southern California Edison (SCE) 33-kilovolt (kV) distribution line and could be built without upgrading the existing line.

Phase II would have an electrical generation capacity of 25 MW and would occupy approximately 240 acres (approximately 50 percent of the ROW). It would be contingent upon available transmission capacity and future power sales. This analysis assumes that Phase II would require “reconductoring” (i.e., replacing the existing wire with a heavier wire and reusing the existing cross arms and insulators) of the existing SCE transmission line back to the Cottonwood Substation. Construction could begin in 2011 but could be delayed by several years if additional transmission facilities are required to accommodate the renewable energy generation. If transmission capacity and other issues are resolved, Phase II could begin construction as early 2011. It has not been determined if upgrades to the existing 33-kV SCE distribution line, beyond the proposed reconductoring, would be required to accommodate Phase II.

2.2.3.2 Proposed CDCA Plan Amendments

Under this Alternative, the purpose and need would be met. The site of the Proposed Action is located within a contingent utility corridor (Contingent Corridor “S”), as defined by the CDCA Plan. The site is managed in accordance with the CDCA and West Mojave (WEMO) Plans. Pursuant to Title V of FLPMA, the development of energy generation or transmission projects in areas not designated suitable as identified in the CDCA Plan (BLM 1980) must be considered through the plan amendment process. Therefore, development of renewable energy within the CDCA would require an amendment to the CDCA Plan that would change the designation within the ROW to suitable for solar energy generation. The applicant’s Proposed Action would not require an amendment to the CDCA Plan to reroute a portion of Zircon Road south of its current location to permit its continued public use. This change would be considered plan maintenance.

2.2.3.3 Project Components

An overview of all the project elements for the applicant’s Proposed Action is depicted on Figure 2-2a and Figure 2-2b. Within the proposed ROW, the solar field, control and maintenance building, and the switchyard would occupy nearly the entire site. About 85 percent of the ROW would be used for the solar panels, and the remaining area would be used for roads, power lines, switchyard, a control/maintenance building, a parking area, and undeveloped areas. The general dimensions of the project components and site disturbance are detailed in Table 2-1.

Table 2-1 Alternative 3 (Proposed Action) - Project Components, Dimensions and Site Disturbance

Project Components and Dimensions	Site Disturbance (acres)
Areas to be Graded/Developed	
Switchyard (10 ft x 12 ft)	0.003
Operations and Maintenance Building (12 ft x 20 ft)	0.006
Parking/Laydown area (250 ft x 50 ft)	0.5
Access roads within ROW (20 ft x 3 miles) *	7
Power line within project site (20 ft x 2 miles)	5
Subtotal of Areas Graded/Developed	*12.509*
Areas to be Brushed/Developed	
Solar Array for Phase I (includes inverters and transformers)	180
Solar Array for Phase II (includes inverters and transformers)	240
Subtotal of Areas Brushed/Developed	*420*
Total Area Developed	*433*
Total Area Undeveloped	*83*
TOTAL RIGHT OF WAY	**516**

* includes Zircon Road realignment

Solar Panels

The solar plant would convert sunlight to electrical power using solar PV arrays, which are composed of several PV panels. Each panel would measure about 40 inches by 55 inches and would be approximately six feet in height above ground level. Two of these panels would be placed in portrait orientation on a south-facing rack tilted at approximately a 20- to 25-degree slope (Figure 2-3 and Figure 2-4). Each PV panel would have a maximum power output of 135 watts. Three panels would be connected in a series to form a 1,000-volt-level direct current (DC) string. Ten strings (30 panels) would be bundled together in a wiring harness. Fifteen hundred strings (4,500 panels) would be connected to a single 500-kilowatt (kW) inverter. Four 500-kW inverters would convert the DC power from 18,000 PV panels to 480-volt alternating current (AC), which would then be stepped up to 33-kV by a single 2-MW transformer.

Access Roads and Parking

The site is generally bounded by Foothill Road on the north and Cavetto Road on the west. Santa Fe Fire Road bisects the site in a north-south direction. A portion of Zircon Road traverses the eastern portion of the site. Foothill Road, Santa Fe Fire Road, and Zircon Road are all designated by the BLM as open routes. This status would remain unchanged after construction.

GENERAL NOTES:

1. A SECURITY FENCE SHALL BE INSTALLED AROUND PERIMETER OF SOLAR FARM.
2. BIO ROLLS SHALL BE USED FOR PERIMETER EROSION CONTROL. WHERE CONCENTRATED STORM WATER RUNOFF FLOWS MAY OCCUR SILT FENCE AND/OR OTHER APPROVED EROSION CONTROL MEASURES SHALL BE INCORPORATED INTO PLAN.

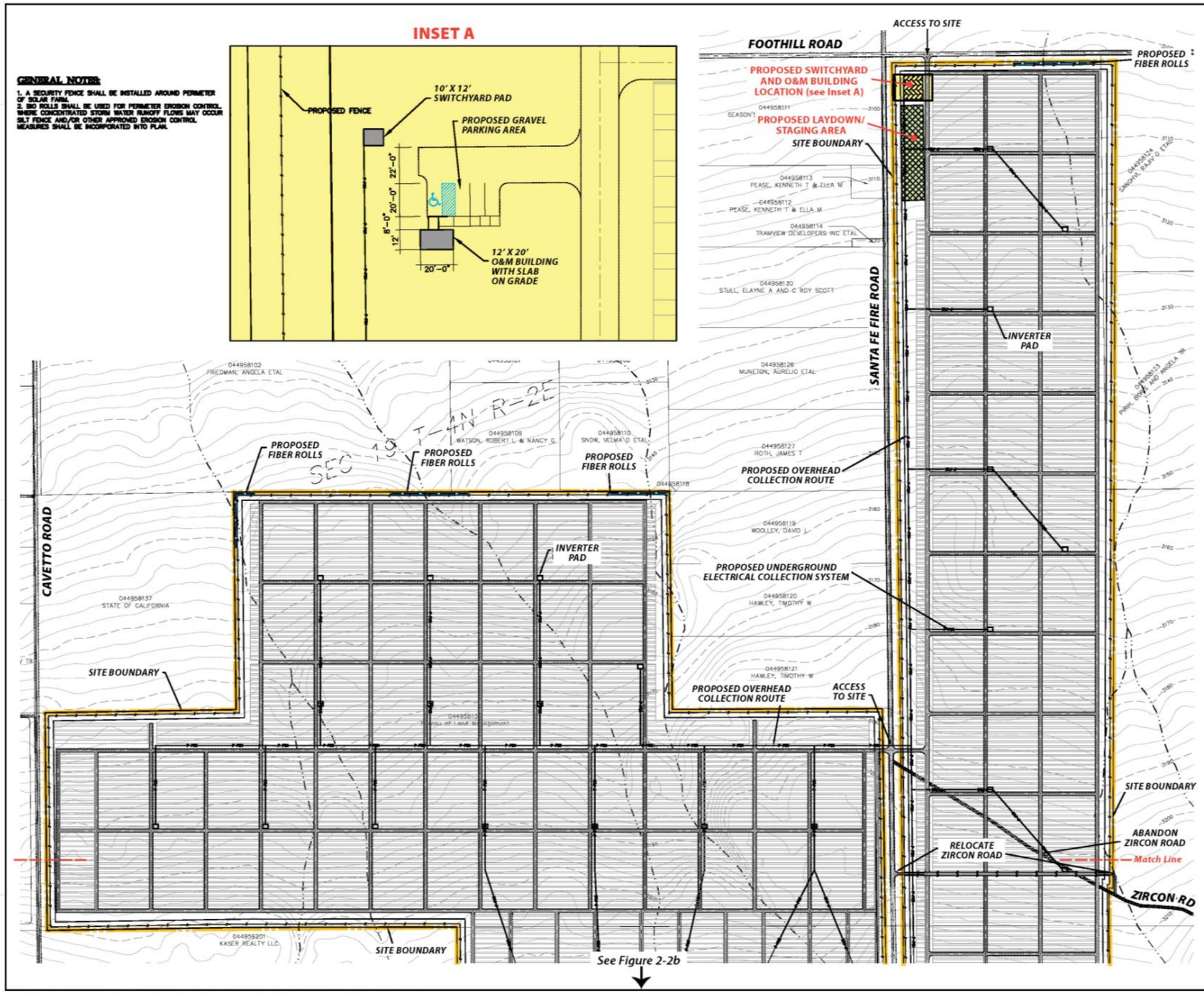

Figure 2-2a

Project Components – North

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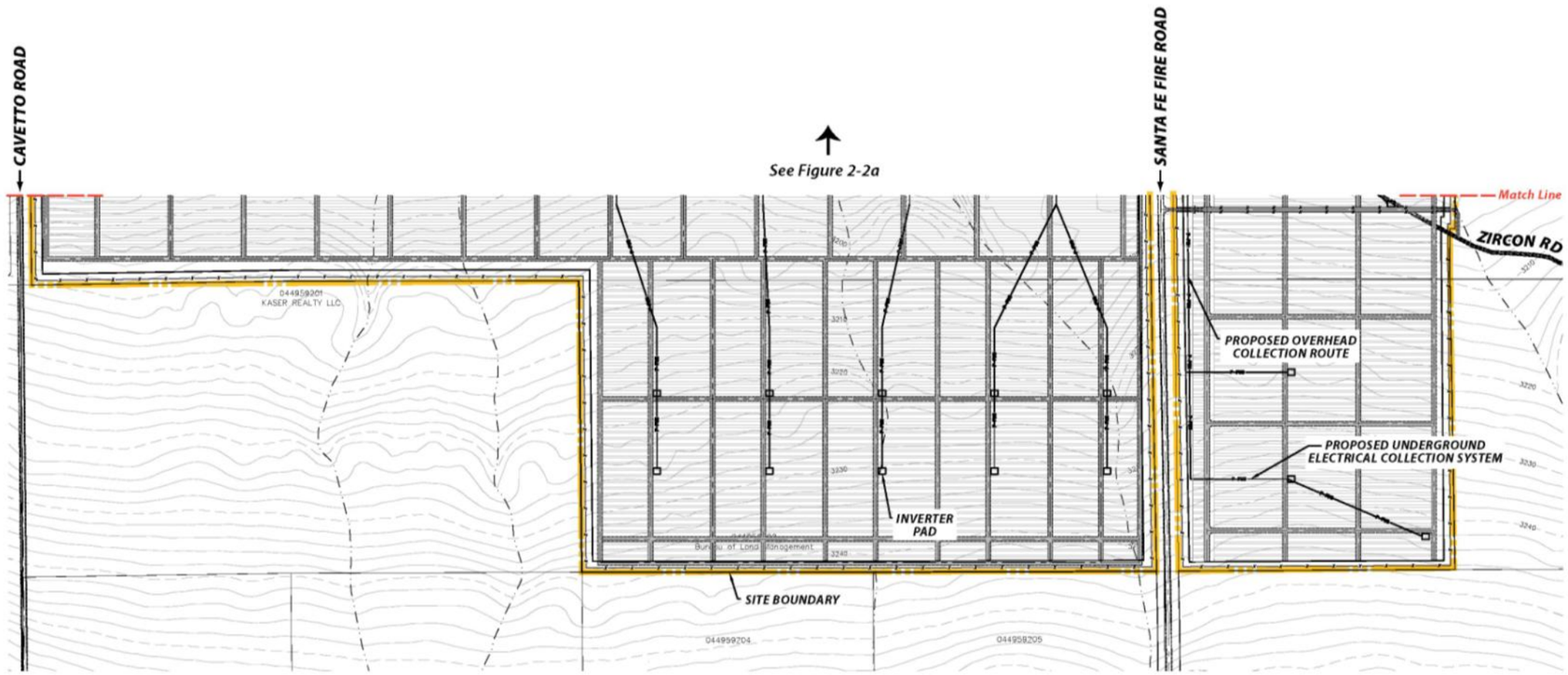

LEGEND

- SOLAR PV BLOCK LOCATION
- PROPOSED LAYDOWN/STAGING AREA
- PROPOSED SWITCHYARD AND O&M BUILDING LOCATION
- PROPOSED ACCESS ROAD
- PROPOSED SILT FENCE
- PROPOSED FIBER ROLLS
- PROPOSED GRADING LIMITS
- PROPOSED UNDERGROUND COLLECTION SYSTEM
- PROPOSED OVERHEAD COLLECTION SYSTEM
- PROPOSED FENCE
- PROPOSED 2' CONTOURS
- PROPOSED 10' CONTOURS
- PROPOSED STREAM FLOW LINE
- EXISTING PAVED ROAD
- EXISTING GRAVEL ROAD
- EXISTING 2' CONTOURS
- EXISTING 10' CONTOURS
- SETBACK LINE
- EXISTING STREAMLINE

N

0 500 1000 feet

Figure 2-2b

Project Components – South

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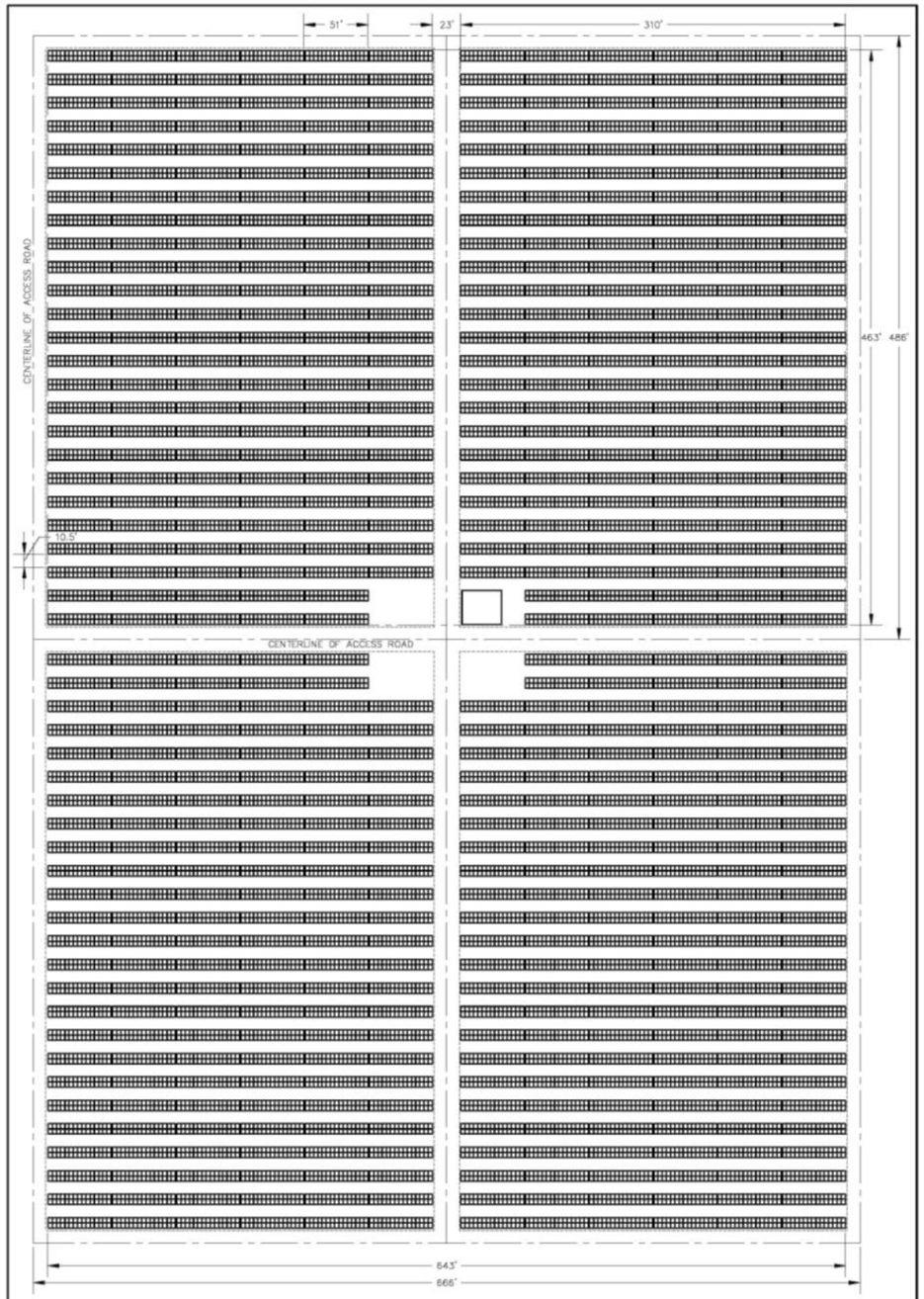
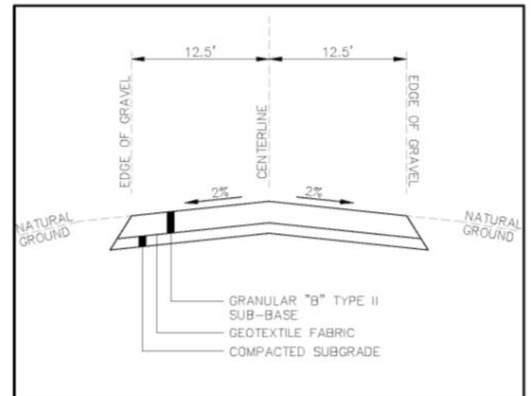
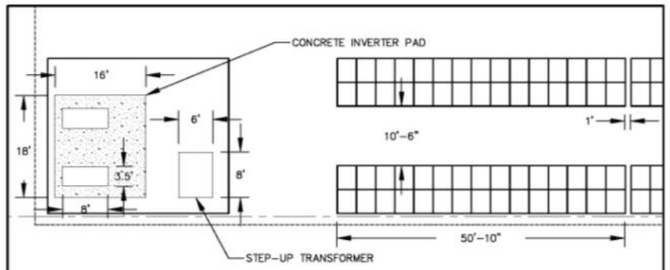


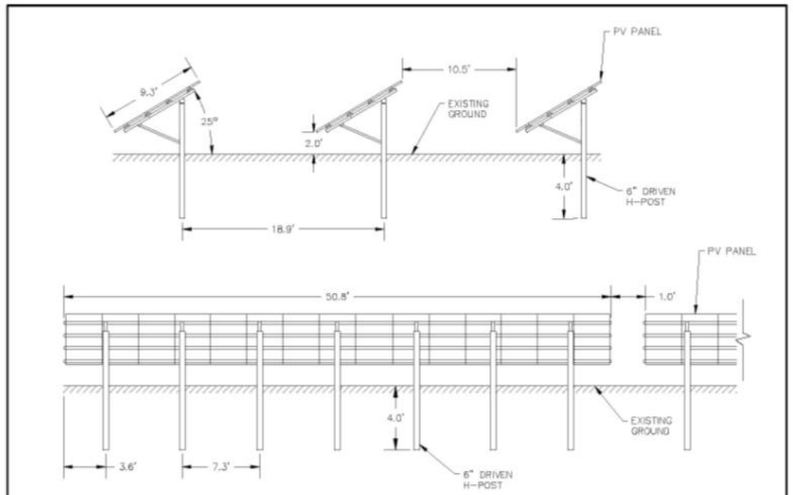
TYPICAL 2MW AC PV BLOCK CONFIGURATION



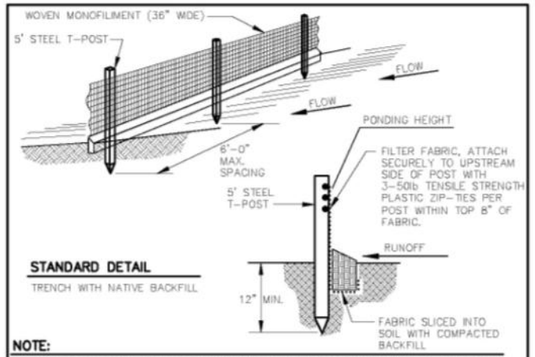
TYPICAL ACCESS ROAD CROWN SECTION



TYPICAL PV BLOCK CONFIGURATION



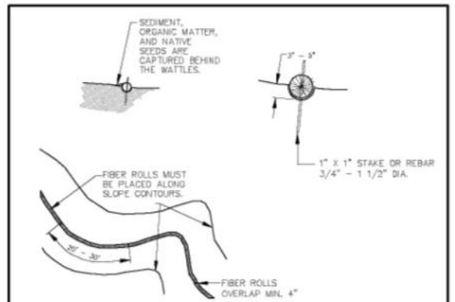
TYPICAL SINGLE-POST DRIVEN-PILE RACK



NOTE:

1. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN ACCUMULATED TO 1/3 THE HEIGHT OF THE FABRIC OR MORE.
2. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
4. ALL ENDS OF THE SILT FENCE SHALL BE WRAPPED UPSLOPE SO THE ELEVATION OF THE BOTTOM OF FABRIC IS HIGHER THAN "PONDING HEIGHT".
5. "HEAVY DUTY" IS SAME AS MACHINE SLICED ONLY HAND INSTALLED.

MACHINE SLICED SILT FENCE (Heavy Duty)



NOTE:

1. STRAW WATTLES CAN BE SUBSTITUTED FOR FIBER ROLLS.
2. STRAW WATTLES ARE TUBES MADE FROM STRAW BOUND W/ PLASTIC NETTING. THEY ARE APPROX. 8" DIA. AND 20 – 30 FT. LONG.
3. STRAW WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE WATTLE IN A TRENCH, 1" – 3" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND WATTLE.

FIBER ROLL

Figure 2-3
Project Details

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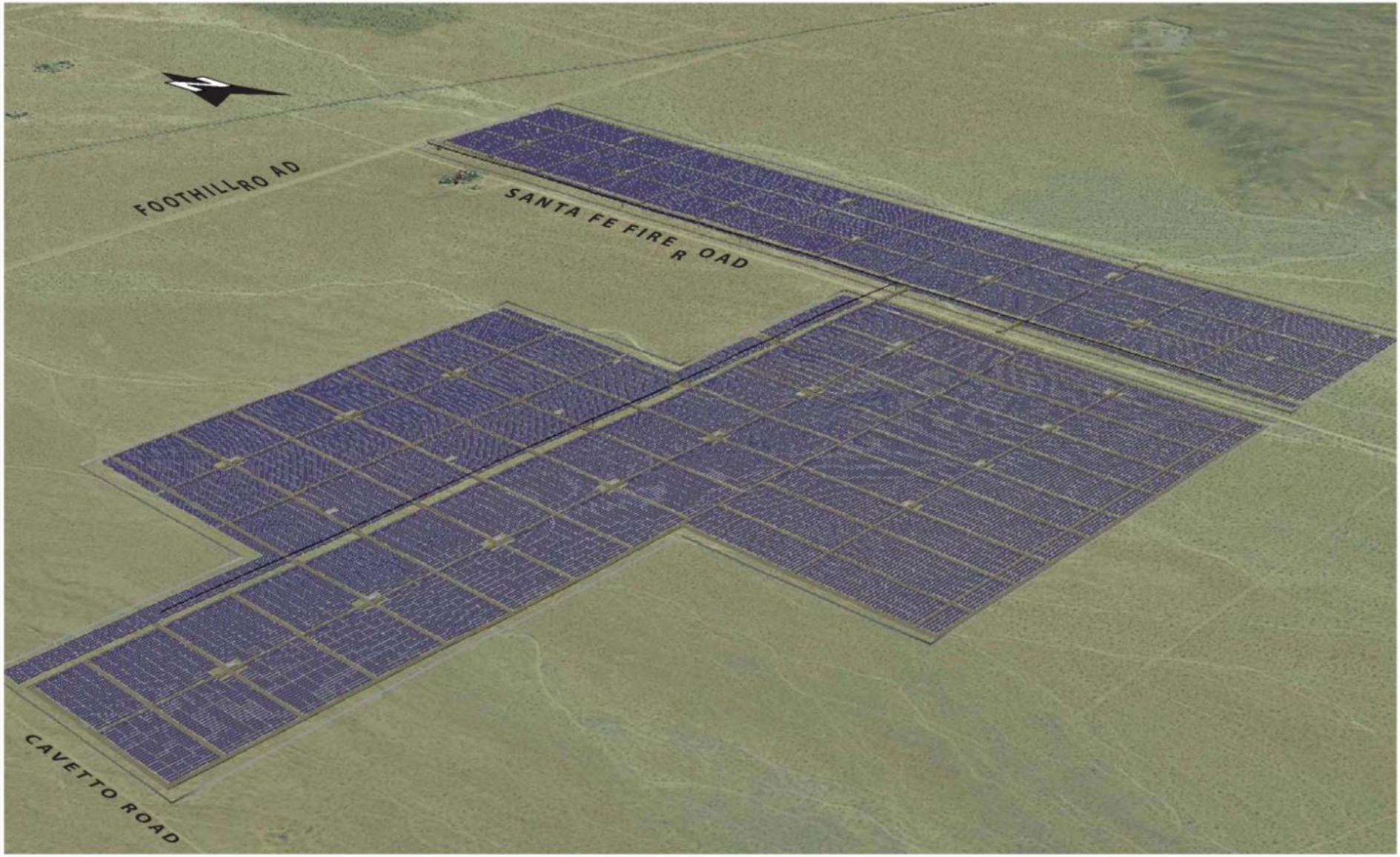
Source: CES, 2009



002868.CS35.03.g.ai (2010 Corp CD Archives - Vol 1) 01/07/2010

Figure 2-4

Simulated Aerial View of Proposed Action

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Access to the site would be provided from Foothill Road, just east of its intersection with Santa Fe Fire Road (Figure 2-2a) and from Santa Fe Fire Road, just north of its current intersection Zircon Road (Figure 2-2b). Internal access roads would be constructed between each array to allow maintenance staff access to the solar panels. That portion of Zircon Road that traverses the site would be realigned between two sets of arrays, south of its current location, and would remain available for public use. In addition, the Applicant would improve Santa Fe Fire Road and the realigned portion of Zircon Road over the length of the ROW to support construction equipment and vehicles. The road improvements include compaction and adding 4 to 6 inches of gravel as well as grading for the realigned portion of Zircon Road.

Portions of South Santa Fe Fire Road could be temporarily closed during construction of the improvements. A permanent on-site parking area would be constructed adjacent to the operation and maintenance building.

Electric Transmission and Interconnect

To deliver the renewable power generated by the solar plants to market, the Applicant proposes to build a 33-kV collector system, a switchyard and interconnection to the existing SCE 33-kV distribution line that runs next to the site on the north side of Foothill Road.

The 33-kV collector system would be composed of both buried and overhead wiring as shown on Figure 2-2a and Figure 2-2b. The majority of the electrical collection system would be installed by directional boring. The system would collect the power generated by each 2-MW transformer in the solar fields and deliver it to the switchyard. The first 20-MW phase would use the electrical output of 180,000 photovoltaic panels. The switchyard, which would serve both phases, would consist of a 10-foot by 12-foot concrete pad that would accommodate the utility metering, switchgear, and a protection breaker. Because the power would be stepped up to utility line voltage at the solar field collector system, the switchyard would not require additional step-up transformers.

The existing SCE 33-kV distribution line is fed from SCE's Cottonwood Substation, which is located at the intersection of Camp Rock Road and State Route (SR) 18 approximately 3.5 miles southwest of the site. A new 33-kV overhead transmission line would be built during Phase I and would run from the proposed switchyard, across Foothill Road, and would tie into the SCE 33-kV distribution line (the utility interconnection point). The SCE facilities system impact study indicates that the existing 33-kV line can accommodate the 20 MW from Phase I of the Proposed Action with no line modifications.

Phase II of the Proposed Action would be constructed once SCE replaces the low-capacity conductor with a new higher capacity conductor. This analysis assumes that this "reconductoring" (i.e., replacing the existing wire with a heavier wire and reusing the existing cross arms and insulators, back to the Cottonwood Substation) would not require new power poles or disturbance within the existing SCE ROW. If additional transmission facilities are required, separate environmental review for those facilities would be conducted.

Operation and Maintenance Building

An operation and maintenance building, located just south of the switchyard, would be constructed to provide maintenance and spare parts storage and would also include an office with electrical power (Figure 2-2a).

Site Communications

Site communications between the site switchyard and the Cottonwood Substation would be required. The design requirements for these new communications systems have not yet been defined by SCE. It is anticipated that a dedicated telephone line or a small, dedicated microwave communications device would be required. Communications systems would be expected to require only minimal site disturbance to implement.

Site Security and Fencing

The perimeter of the site would be fenced with an eight-foot-high security fence, and video cameras would be used to survey the perimeter. Site control would be limited to the area under construction. Within the eastern portion of the site, the fencing would run along the northern and southern edges of the realigned portion of Zircon Road to maintain public access to this route.

Site guards would be trained, uniformed, unarmed personnel. Their primary responsibility would be to control ingress and egress of personnel and vehicles during construction and theft watch during non-working hours. The guards would operate out of the operation and maintenance building located immediately southeast of the facility entrance and would only be on-site during the solar plant's non-working hours (i.e., evening hours).

Erosion Control and Stormwater Drainage

Presence of the solar field would not require significant modifications of the on-site natural drainage patterns at the site. The solar panels would be mounted in a manner that follows the existing topography and, as a result, would not substantially change the natural flow of water across the site. In general, plant root systems would be left in place, except where grading and trenching is required for placement of solar module foundations, underground electric lines, inverter and transformer pads, roads and access ways, and other facilities. Since the natural drainage patterns on the majority of the site would not be altered, additional erosion control and stormwater protection measures are deemed unnecessary at this time.

Security and tortoise fencing would be routed through the major drainages. Maintenance of both fences would be performed after major storms to remove any debris that may have accumulated against the fencing and to repair any damage to the fencing. Similarly, drainages on the east side of the property would be fenced and regularly cleared of debris on an as needed basis. For this reason, no hydraulic modeling has been completed at this stage. Only ephemeral stream crossings are present within the project area. No perennial or intermittent streams are located within the project area. Laydown areas would be located at least 100 feet away from drainages.

During construction the Applicant would implement siltation prevention measures that would be discussed in the Stormwater Pollution Prevention Plan that would be approved by the BLM and the Regional Water Quality Control Board (RWQCB).

A Streambed Alteration Agreement would be prepared and submitted to the California Department of Fish and Game (CDFG) and would describe and authorize any changes to the streambeds.

Vegetation Treatment and Weed Management

The Applicant has submitted a Draft Weed Control Plan to BLM, which provides the following:

- Monitoring, preventative, and management strategies for weed control during construction activities;
- Control and management of weeds in areas temporarily disturbed during construction where native seed will aid in site vegetation; and
- A long-term strategy for weed control and management during the operation of the project.

The objective of the Weed Control Plan is to eliminate individuals of a particular species within a specific area, reducing current infestation density, and preventing infestation expansion and spread. Weed management would occur site-wide; however, specific areas would require unique management considerations. The applicant's Proposed Action has been designed to minimize ground disturbance; only minimal grading would occur, and most root systems would be kept intact. Temporarily disturbed areas would be revegetated using a native seed mix. Permanently disturbed areas would require ongoing weed monitoring and maintenance during construction and operation, and equipment would be cleaned at wash stations prior to departing the site. Biological monitors would be on-site during construction to identify the presence of weeds and also to inspect equipment cleaning facilities for weed seed removal. During operations, weed control would be conducted at a minimum of every other week during the growing season (March through August) and once a month during the remainder of the year.

Fire Protection

The applicant's Proposed Action would have very few flammable components; however, fire alarms and portable fire extinguishers would be provided to meet fire protection requirements.

Hazardous Materials

The Applicant has submitted a Draft Spill Prevention and Response Plan to the BLM to minimize the potential for a spill, to contain any spillage to the smallest area possible, and to protect areas that are considered environmentally sensitive. It would be implemented during both the construction and operational phases of the project and provides restrictions and procedures for fuel storage, fueling activities, and construction equipment maintenance on the site; vehicle fluid spills; chemical toilet and human waste spills; herbicide spills; and discovery of an unknown hazardous material.

The hazardous materials that may be on-site during construction and operation include those usually associated with operation and maintenance of vehicles and machinery, such as diesel fuel, gasoline, hydraulic fluid, brake fluid, antifreeze, and lubricants. Other materials considered hazardous are chemicals used in portable toilets and the associated human waste and herbicides to control nonnative plant populations. All operations contractor and subcontractor personnel working on the site would be responsible for implementation of the measures and procedures defined in the Spill Prevention and Response Plan. This plan would be included in both the bid and the contract documents as contractual requirements and instructions to the contractor.

Waste Disposal

Nonhazardous solid waste would consist primarily of construction and office wastes that would be trucked to the nearest Type II landfill or to a nearby transfer station. Nonhazardous liquid waste, which would consist primarily of domestic sewage, would be disposed of by a commercial sanitary service. The closest identified solid waste landfill is the Victorville Sanitary Landfill located at 18600 Stoddard Wells Road in Victorville, California.

Dust Control

The Applicant has submitted a Draft Dust Control Plan to BLM that describes all applicable measures to be implemented for the applicant's Proposed Action. Construction of the applicant's Proposed Action would result in fugitive dust generation. Fugitive dust is particulate matter that is suspended in the air by wind or human activities and does not come from a point source. The Mojave Desert Air Quality Management District (MDAQMD) is the air quality regulatory agency for this area. Fugitive Dust is regulated under MDAQMD Rule No. 403.2, *Fugitive Dust Control for the Mojave Desert Planning Area* which requires that fugitive dust emissions be minimized through the use of control techniques.

During construction, the following measures would be implemented as part of the Dust Control Plan:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. For the purposes of this Rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
- Take actions sufficient to prevent project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than 30 days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Cleanup project-related trackout or spills on publicly maintained paved surfaces within 24 hours; and
- Reduce non-essential earth-moving activity under high wind conditions. For the purposes of this Rule, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.
- Provide stabilized access route(s) to the site as soon as is feasible. For the purposes of this Rule, as soon as is feasible shall mean prior to the completion of construction/ demolition activity;
- Maintain natural topography to the extent possible;
- Construct parking lots and paved roads first, where feasible; and
- Construct upwind portions of the project first, where feasible.

During construction, water would be required for dust control and soil compaction. It would be provided through a contract with one of the local large industrial companies or municipal water companies that have high capacity wells and water systems.

The amount of water required would vary significantly depending upon the conditions during construction of Phase I and II. To the extent that it is cost effective, polymers and flocculants would also be used for temporary dust control. The water needed for construction of the first 20 MW phase is estimated at approximately 1.75 million gallons (5.4 acre-feet). This phase is estimated to have the heaviest water use due the road construction and hardening and building construction. The second 25 MW phase is estimated to require approximately 1.25 million gallons of water (4.6 acre-feet).

Greenhouse Gases

The following measures would be used to minimize GHG emissions during construction:

- All construction equipment would be maintained according to the manufacturers' specifications;
- Fuel for all off-road and portable diesel-powered equipment would be California Air Resources Board-certified motor vehicle fuel (nontaxed version suitable for use off-road);
- All on- and off-road diesel equipment would not be allowed to idle for more than five minutes; and
- Alternatively fueled construction equipment (such as compressed natural gas or biodiesel) would be used if feasible.

2.2.3.4 Construction

Construction Phase I

Preconstruction survey work would consist of staking/flagging the Phase I area boundaries, permanent and short-term work areas, cut and fill staking, access and roads, transmission pole locations, and concrete pads and foundations. Prior to construction cacti/yucca will be flagged for salvage and removed, as feasible.

Initial construction activities would include installation of the desert tortoise and security fencing for Phase I, survey and relocation of tortoises, site clearing, and grubbing/brushing to clear the site of unwanted vegetation. Vegetation would be cut to a height of four inches or less within the solar field area. Vegetation would be cleared from roadways, access ways, and where concrete foundations are used for inverter equipment, substations, and operations and maintenance facilities. Vegetation would also be cleared for construction of the drainage controls. In general, root systems would be left in place except where grading and trenching is required for placement of solar module foundations, underground electric lines, inverter and transformer pads, roads and access ways, and other facilities. In addition, micrograding would be used to smooth out some of the drainage scarring of the site, promoting sheet drainage, and cutting access paths between the panel rows. Site work would include the following tasks:

- Earthwork, main entrance road, preparation of the storage area, and installation of temporary and permanent site utilities and
- Construction of stormwater diversion and collection channels.

All site work would take place within the fenced area. Desert tortoise fences would be constructed with 16-gauge or heavier materials suitable to resist desert environments, alkaline and acidic soils, wind, and erosion. Fence material would consist of 1-inch horizontal by 2-inch vertical, galvanized welded wire, 36 inches in height. Hog rings would be used to attach the fence material to the security fence. Fence material would be buried a minimum of 12 inches below the ground surface, leaving 22 to 24 inches above ground. Desert tortoise-proof fencing would be attached to the security fencing with hog rings placed at 12- to 18-inch intervals. After the desert tortoise fence has been installed and secured, excavated soil would be replaced and compacted to minimize soil erosion.

Rough site grading, excavation, and backfilling would be performed using heavy duty earthmoving equipment. Cut-and-fill quantities would be balanced in order to have no net export or import of materials from the site.

After the completion of site preparation activities, underground conduit, overhead transmission lines, and inverter and transformer pads would be installed. Upon completion, the PV panel supports and frames would be installed. The frames would be secured to foundation members, which are typically H-beams driven to a depth of four feet using percussive or vibration equipment in a manner similar to installing freeway guardrails. If extremely poor soil conditions are found, augured holes with steel members embedded in concrete may be required. Frame tables, consisting of bolted or riveted steel members, either built at the assembly point or shipped preassembled to the site, would then be aligned and fastened to the support members. The PV panels would then be set onto and secured to the frame tables, and licensed electricians would connect the panels and install the aboveground and underground distribution systems. The operation and maintenance building would then be constructed, including a 33-kV tie-in line, which would carry the power from the switchyard across Foothill Road to interconnect with the SCE 33-kV distribution line.

Construction Phase II

Phase II would be constructed in the same manner as Phase I, but Phase II would not require construction of permanent and temporary work areas or another switchyard or operation and maintenance building. Many of the same laydown and construction areas for Phase I would be reused for Phase II.

Re-conductoring of the SCE 33-kV distribution line from the Cottonwood Substation to the point of interconnection would occur during Phase II. The SCE facilities system impact study indicates that the existing 33-kV line can carry the 20 MW of the first phase with no line modifications. Without a detailed study, it is difficult to determine how much additional capacity is on the 33-kV line although a typical figure is approximately 5 to 6 MW. If the 33-kV line is reconductored, (i.e., replacing the existing wire with a heavier wire, reusing the same poles, cross arms and insulators, back to the Cottonwood Substation), the line capacity would typically be approximately 45 MW. The actual transmission line capacity would have to be verified by a transmission study.

Temporary Workspace, Yards, and Staging Areas

Indoor storage space would be required only for weather-sensitive components, such as control or electrical panels, or small parts that could easily be misplaced. Some space for material that requires temperature and humidity control would be provided. Other items would be stored outdoors on raised platforms with proper covers or temporary shelters. Construction area

lighting would be provided at the warehouse locations. Construction subcontractors would provide storage facilities for material they furnish at the areas designated on the site laydown plan.

Construction roads and parking would be required to provide access to construction facilities and the laydown area. Construction parking space would be provided near the construction office complex. These temporary roads would be all-weather gravel surfaced and of sufficient width and location to accommodate efficient use and traffic pattern. The parking area would have barriers to control parking pattern and locations. Construction parking areas are typically sized to accommodate approximately 100 vehicles.

Schedule

The construction period for each phase of the project is anticipated to be 240 days (8 months). Phase I would begin construction in late 2010, with a projected online date of mid-2011. Phase II would be contingent upon available transmission capacity and future power sales. Construction for Phase II could conceivably begin in 2011 but could be delayed several years if additional transmission facilities are required by either SCE or the California Independent Systems Operator to support the Proposed Action.

Construction for each phase would generally follow the sequence of staking/flagging the perimeter of the project area for each phase (five days), construction of desert tortoise and security fencing (five days), survey and relocation of tortoises (five days), construction of access roads (five days), site grading and vegetation mowing (25 days), assembly and installation of all facilities (190 days), cleanup, and site reclamation of any temporary work areas (10 days).

Installation of the switchyard, underground utilities, and inverters/transformers may proceed in parallel so that the anticipated total construction time would be approximately 240 days/ 8 months for Phase I and 240 days/8 months for Phase II.

Workers, Vehicles, and Equipment Timeframes

Prior to mobilization for construction, a detailed construction plan would be developed to define the construction supervisory and technical field organizations and required staffing levels. On average, 25 construction and supervisory personnel would be on-site for approximately eight months to construct each phase, with 45 personnel being on-site at the peak of construction. Some workers would be local (i.e., permanent residents of San Bernardino County), but it is expected that some would be migrating to the work site from outside of the area. Table 2-2 shows the number of personnel per month required for each phase.

Table 2-2 Alternative 3 (Proposed Action) - Construction Labor Force, by Month

Month	Phase I	Phase II	Total
1	12	12	24
2	15	15	30
3	15	15	30
4	15	15	30
5	45	45	90
6	45	45	90

Table 2-2 Alternative 3 (Proposed Action) - Construction Labor Force, by Month

Month	Phase I	Phase II	Total
7	45	45	90
8	10	10	20
TOTAL	**202**	**202**	**404**

Use of a variety of equipment is expected in order to accomplish installation of Phase I and Phase II. All equipment would be confined to the roadways and within the fenced area. During construction, up to 59 construction vehicles are estimated to drive in and out of the Proposed Action area in addition to approximately 20 personal vehicles. Table 2-3 shows the amount of equipment required and amount of time they would be run for each phase.

Table 2-3 Alternative 3 (Proposed Action) – Construction Equipment List and Hours of Use

Equipment Type	HP Category	Estimated Hours of Use	Estimated Hours of Use
		Phase I	Phase II
Vibratory Post Driver	100–175	4,050	4,050
Crawler Tractors/Dozer	100–175	500	500
Dump, Concrete, and Tender Trucks	On-road	120	120
Excavators	175–300	200	200
Forklifts/Aerial Lifts/Booms	50–100	6,000	6,000
Generator/Compressor	5–15	4,000	4,000
Graders	175–300	80	80
Rollers/Compactors	100–175	500	500
Scrapers	175–300	40	40
Tractors/Loaders/Backhoes	100–175	160	160
Vibratory Plate (hand-held)	10–15	40	40
Highway Tractor	On-road	80	80
Flatbed Truck with Rails	On-road	1,000	1,000
Water Truck	On-road	1,000	1,000

2.2.3.5 Operations and Maintenance

The operation of the power plant would be completely automated. The various power components would be automatically turned on in the morning and turned off at night. Maintenance activities, both scheduled and unscheduled, would require at least partial staffing throughout the life of the project. It is anticipated the plant would have a full-time staff of two to three people during normal plant operations. The main anticipated operations and maintenance needs would be inverter inspection as well as vegetation control as necessary and routine switchgear inspection. Outside contractors could be used to conduct these operations and maintenance activities.

During operation and maintenance, water would be used primarily for panel washing. The Applicant estimates that the panels would require washing once per year during the summer when power prices and, correspondingly, power production are highest. Panel washing would require between 10,000 to 20,000 gallons for Phase I and 12,000 to 25,000 gallons for Phase II,

or, correspondingly, 22,500 to 45,000 gallons per year once the entire 45-MW field is built. Water for panel washing would be provided through a contract with one of the local large industrial companies or municipal water companies that have high capacity wells and water systems. No new water sources would need to be developed.

Inverter maintenance would consist of inspection of intake air ducts, cooling fans, and refrigeration units and would be conducted on a monthly schedule (approximately). Inspection of seals, connections, and enclosures would be conducted yearly. Problems with the inverter would be resolved as necessary.

Scheduled maintenance would be contracted to a third-party operation and maintenance contractor and on occasion could involve equipment manufacturers, such as the inverter manufacturer. The following activities would be conducted regularly according to a fixed schedule to be determined when the plant begins operation:

- Solar panel cleaning (annually);
- Array visual and infrared inspection;
- Vegetation mowing (as needed);
- Inverter maintenance;
- Inspection of intake air ducts, cooling fans, and refrigeration units (monthly);
- Inspection of seals, electrical connections (torque setting), and transformer and inductor enclosure (annually);
- Switchyard maintenance;
- Inspection of perimeter fencing and repairs when needed;
- Monthly inspection and repair, if necessary, of tortoise exclusion fencing; and
- Inspection of protection devices.

Unscheduled Maintenance

Exposure to the elements and equipment failures would require the following maintenance activities:

- Solar panel replacements and
- Troubleshooting, repair, and replacement of
  - Inverters,
  - Switchyard equipment, and
  - Digital control systems.

These maintenance services would be provided by the third-party operations and maintenance contractors and the equipment manufacturers, as necessary.

Operations Workforce and Equipment

As previously stated, the plant is expected to have a staff of only two to three people during regular operations, including a security officer during non-working hours, although large

maintenance tasks, such as panel washing, would require the presence of full-time personnel for the duration of the task. Operations equipment would include all-terrain vehicles capable of going inside the array for physical inspection and parts replacement.

2.2.3.6 Decommissioning

The expected life of the project would be 30 years. Given the unique and extreme levels of solar radiation at the site, it is highly plausible that new and improved solar power generating technology would be deployed at the site to continue renewable power generation. However, should the site be removed from power generation service, the site would be made suitable for reclamation. All equipment, buildings, concrete foundations, and driven piles would be removed from the site. Consistent with BLM requirements, a detailed decommissioning plan would be developed in a manner that both protects public health and safety and is environmentally acceptable. The site would be restored to its original condition as much as feasibly possible. Materials used on-site would be reused at other locations, sold as scrap, or recycled whenever possible.

2.2.3.7 U.S. Department of Energy Loan Guarantee

The Applicant is committed to building the authorized project whether or not the Applicant receives a loan guarantee from the U.S. Department of Energy (DOE). The project would be constructed, operated, and maintained and decommissioned in the same manner whether or not a loan guarantee is approved by DOE.

2.2.4 Alternative 4: Modified Site Layout

In response to comments received during public scoping, the BLM is analyzing an alternative that reduces effects on visual resources. This alternative would be the same as the CES's Proposed Action, with three modifications to reduce environmental effects:

1. Require a 50-foot setback from Santa Fe Fire Road
2. Use natural vegetation as a screen; and
3. Design site drainage to provide a water source for the vegetative screen if feasible through the Streambed Alteration Agreement.

To reduce the visual effects, the minimum distance from the edge of Santa Fe Fire Road that the perimeter fence could be located (or set back) would be increased to 50 feet. The setback would remain unaltered by the project construction, so the existing vegetation would serve to screen the project area from nearby residents and somewhat for users of Santa Fe Fire Road. Additionally, the area immediately inside the fence could be used to replant any native vegetation that would otherwise be removed during site preparation activities. Some of the drainage for the graded area could be redirected to flow from the site into the setback, increasing the water available to the setback vegetation and salvaged plants and trees, as well as increasing the success of plant salvage efforts.

The project components, project phasing, energy generation, access roads, transmission interconnect, and construction methods would be the same as those previously described for CES's Proposed Action. About 97 percent of the ROW would be used for the solar panels, and the remaining area would be used for roads, power lines, switchyard, a control/maintenance

building, and a parking area. The general dimensions of the project components and site disturbance for Alternative 4 are detailed in Table 2-4.

Table 2-4 Alternative 4 (Modified Site Layout) – Project Components, Dimensions and Site Disturbance

Project Components	Site Disturbance (acres)
Areas to be Graded/Developed	
Switchyard (10 ft x 12 ft)	0.003
Operations and Maintenance Building (12 ft x 20 ft)	0.006
Parking/Laydown area (250 ft x 50 ft)	0.5
Access roads within project site (20 ft x 3 miles) [(a)]	7
Power line within project site (20 ft x 2 miles)	5
Subtotal of Areas Graded/Developed	*12.509*
Areas to be Brushed/Developed	
Solar Array for Phase I (includes inverters and transformers)	171
Solar Array for Phase II (includes inverters and transformers)	238
Subtotal of Areas Brushed/Developed	*409*
Total Area Developed	*422*
Total Area Undeveloped managed as BLM multiple use, not included in ROW	*94*
TOTAL RIGHT OF WAY	**422**

(a) includes Zircon Road realignment
(b) Area reduced by inclusion of buffer along Santa Fe Fire Road

Proposed CDCA Plan Amendments

Implementation of Alternative 4 would require an amendment to the CDCA Plan that would change the designation within the ROW to suitable for large-scale commercial solar energy generation. The project would not require an amendment to the CDCA Plan to reroute a portion of Zircon Road south of its existing location to allow its continued public use. This would be a plan maintenance decision.

U.S. Department of Energy Loan Guarantee

The Applicant is committed to building the authorized project whether or not the Applicant receives a loan guarantee from the U.S. Department of Energy (DOE). Alternative 4 would be constructed, operated, and maintained and decommissioned in the same manner whether or not a loan guarantee is approved by DOE.

2.2.5 Alternative 5: Smaller Project Alternative

This alternative reduces the output of the solar power plant from 45 MW to 30 MW. This alternative would also reduce the size of the developed area to 238 acres (Figure 2-5). This alternative would be developed in two phases. Phase I would be the development of the area east of Santa Fe Fire Road, similar to Phase I under Alternative 3. However, under this alternative, the area south of the relocated Zircon Road would not be developed. Therefore, 108 acres would be developed east of Santa Fe Fire Road Energy production for Phase I would be approximately 20 MW. Phase II would include development of the area west of Santa Fe Fire Road, but it would only be 120 acres in size and would produce 10 MW of energy. Under this alternative, reconductoring of the 33-kV distribution line during Phase II would not be required.

Components

The solar field, switchyard, operation and maintenance building, parking/laydown area, access roads and power lines, would occupy 238 acres. The granted ROW would be reduced to 238 acres. About 96 percent of the ROW would be used for the solar panels, and the remaining area would be used for roads, power lines, switchyard, a control/maintenance building, and a parking area. The general dimensions of the project components and the site disturbance are detailed in Table 2-5.

Table 2-5 Alternative 5 (Smaller Project Alternative) – Project Components, Dimensions and Site Disturbance

Project Components	Site Disturbance (acres)
Areas to be Graded/Developed	
Switchyard (10 ft x 12 ft)	0.003
Operations and Maintenance Building (12 ft x 20 ft)	0.006
Parking/Laydown area (250 ft x 50 ft)	0.5
Access roads within project site (20 ft x 3 miles) *	5.5
Power line within project site (20 ft x 1.7 miles)	4
Subtotal of Areas Graded/Developed	*10.009*
Areas to be Brushed/Developed	
Solar Array for Phase I (includes inverters and transformers)	108
Solar Array for Phase II (includes inverters and transformers)	120
Subtotal of Areas Brushed/Developed	*228*
Total Area Developed	*238*
Total Area Undeveloped managed as BLM multiple use, not included in ROW	*278*
TOTAL RIGHT OF WAY	**238**

* includes Zircon Road realignment

The project components would be the same as those identified for Alternative 3. The only differences are:

- Phase I would not be developed south of the relocated Zircon Road (108 versus 180 acres);
- Phase II would not be entirely developed (120 versus 240 acres);
- The water use for construction would be approximately 1.65 million gallons (5.06 acre feet) since only 55% of CES's Proposed Action (Alternative 3) footprint would be developed; and
- The 33-kV distribution line would not need to be reconductored.

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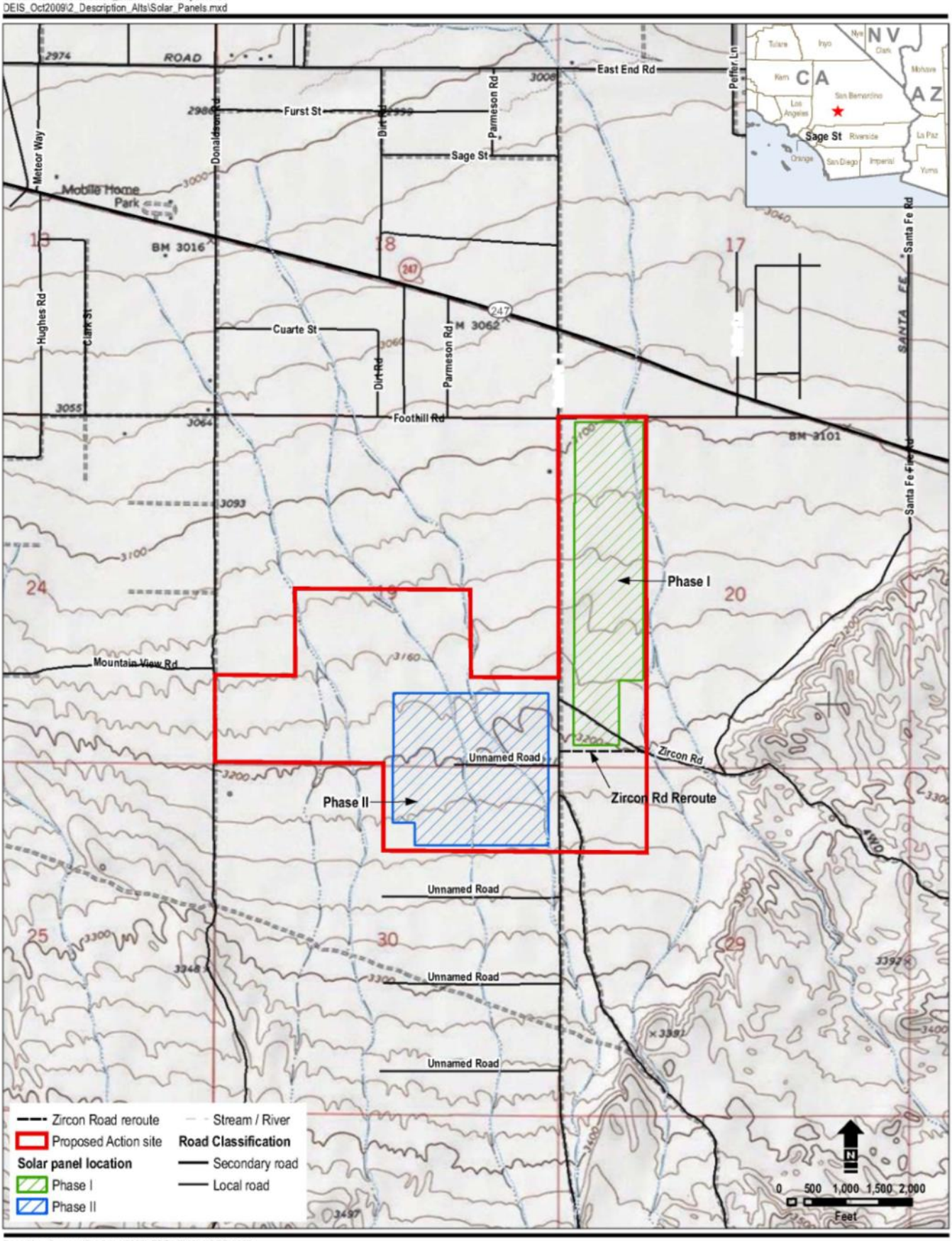
DEIS_Oct2009\2_Description_Alts\Solar_Panels.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999

Figure 2-5
Alternative 5 Site Map
Lucerne Valley Solar Project
San Bernardino County, California

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Construction

Preconstruction survey work, initial construction activities, grading, and installation of the infrastructure for Phase I would be similar to what is expected for Phase 1 of Alternative 3 with the exception being that the area south of the relocated Zircon Road is not developed.

Preconstruction survey work, initial construction activities, grading, and installation of the infrastructure for Phase II would be the same or similar to what is expected for Phase I of Alternative 3 with the exception being that only 120 acres would be developed, and the 33-kV distribution line would not be reconductored.

The construction period for Phase I of this Alternative is anticipated to take 180 days. Phase I would begin construction in late 2010, with a projected online date of mid-2011. Phase II would be contingent upon available transmission capacity and future power sales. The construction period for Phase II of this Alternative is anticipated to take 90 days. Construction for Phase II could conceivably begin in 2011 but could be delayed several years if additional transmission facilities are required by either SCE or the California Independent Systems Operator to support the Proposed Action.

The construction sequence for Phase I would generally follow the sequence of staking/flagging the perimeter of CES's Proposed Action area for each phase (five days), construction of desert tortoise and security fencing (five days), survey and relocation of tortoises (five days), construction of access roads (five days), site grading (15 days), assembly and installation of all facilities (145 days), cleanup, and site reclamation of any temporary work areas (10 days).

For Phase I an average of 24 construction and supervisory personnel would be on-site to construct the plant, with 45 personnel being on-site at the peak of construction. For Phase II an average of 34 construction and supervisory personnel would be on-site to construct the plant, with 45 personnel being on-site at the peak of construction. The number of workers by month for each phase is shown in Table 2-6. Table 2-7 shows the amount of equipment required and amount of time they would be run for each phase.

Table 2-6 Smaller Project Alternative (Alternative 5) - Staffing by Month (Phase I and II)

	Month					
	1	2	3	4	5	6
Construction Labor Force Phase I	12	15	15	45	45	10
Construction Labor Force Phase II	12	45	45			

Table 2-7 Smaller Project Alternative (Alternative 5) -Equipment List (Phase I and II)

Equipment Type	HP Category	Estimated Hours of Use Phase I	Estimated Hours of Use Phase II
Vibratory Post Driver	100–175	2,430	1,215
Crawler Tractors/Dozer	100–175	300	150
Dump, Concrete, and Tender Trucks	On-road	80	40
Excavators	175–300	120	60

Table 2-7 Smaller Project Alternative (Alternative 5) -Equipment List (Phase I and II)

Equipment Type	HP Category	Estimated Hours of Use Phase I	Estimated Hours of Use Phase II
Forklifts/Aerial Lifts/Booms	50–100	4,000	2,000
Generator/Compressor	5–15	2,400	1,200
Graders	175–300	48	24
Rollers/Compactors	100–175	300	150
Scrapers	175–300	24	12
Tractors/Loaders/Backhoes	100–175	96	48
Vibratory Plate (hand-held)	10–15	24	12
Highway Tractor	On-road	48	24
Flatbed Truck with Rails	On-road	600	300
Water Truck	On-road	600	300

Operations and Maintenance

Operations and maintenance as well as unscheduled maintenance would be the same as Alternative 3, although only 20,000 to 30,000 gallons of water would be used for annual panel washing. The operational workforce would be the same.

The decommissioning of the project under this alternative would be the same as Alternative 3.

Proposed CDCA Plan Amendments

Alternative 5 would require amending the CDCA Plan to change the ROW designation to suitable for solar energy development. The reroute of a portion of Zircon Road south of its existing location to allow its continued public use would be a plan maintenance decision.

U.S. Department of Energy Loan Guarantee

The Applicant is committed to building the authorized project whether or not the Applicant receives a loan guarantee from the U.S. Department of Energy (DOE). Alternative 5 would be constructed, operated, and maintained and decommissioned in the same manner whether or not a loan guarantee is approved by DOE.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Various technical and environmental criteria were used by the Applicant in deciding on the site of CES's Proposed Action. The Applicant first conducted an internal analysis to identify minimum project needs, such as site topography, proximity to transmission and other factors. After this study, the Applicant consulted with the BLM to identify areas with the environmental issues and management controls so that Areas of Critical Environmental Concern, Desert Wildlife Management Areas, designated off-highway vehicle areas, wilderness study areas and designated wilderness areas were avoided. This pre screening process conducted between the applicant and BLM prior to the CES's submittal of an application allowed CES to apply for a ROW on a piece of BLM managed land with out major issues of concern.

Excess capacity on existing transmission lines and proximity to existing transmission lines and substations were also prime site selection considerations. Potential sites were eliminated if they

were located near existing transmission lines that could not carry the power to market. Because of Western Electricity Coordinating Council reliability standards, the Applicant eliminated sites from further consideration if they would have required the use of corridors that were not rated for the additional power.

2.3.1 Alternative Sites Considered by Chevron

Private Land

As part of its initial study, the Applicant used several technical and business criteria to evaluate various potential sites for a solar project. These included whether the sites were located close to existing high voltage transmission lines that would allow access to the market. Because of this project's proposed generating capacity, the cost of building long interconnection lines would make it economically infeasible to construct.

The Applicant determined that if it pursued the private land option, it would need to enter into several agreements with landowners to assemble a large enough tract to build its facility. This would have required the Applicant to enter into long-term leases without assurance that the necessary permits and approvals would be issued, which it did not believe was economically feasible. Therefore, private lands were eliminated from further consideration.

Alternate BLM Land

During the pre-application phase, the Applicant consulted with the BLM to identify areas that would be subject to significant environmental concerns, such as critical habitat, or contained sensitive resources. BLM encouraged the Applicant to locate its project on public land with the fewest potential conflicts.

Several locations on BLM managed land were evaluated, but each was rejected for one or more reasons. The location of the alternative sites considered is shown on Figure 2-6. The Palen Site, located over 100 miles to the southeast of the proposed site in Riverside County (Figure 2-6), is a 640-acre property that was dismissed from CES's full consideration because it lacked suitable transmission capacity. The tract consisted of Sonoran creosote brush scrub. Additionally, one federally-listed species, the Harwoods' milkvetch, is located near to the site (CEC 2009).

A second location, Cottonwood Site 1 (Figure 2-6), located about three miles to the southwest of the proposed site, is a 160-acre property for which the BLM had concerns about the potential for effects to biological resources. It is located within an area that is home to carbonate endemic plants, which thrive in dry carbonate soils on the lower slopes of the San Bernardino National Forest and BLM land. The area is home to several federally protected plant species including the endangered Cushenbury oxytheca (BLM 2010.)

A third alternative location, Cottonwood Site 2, located about four miles to the southwest of the proposed site next to Cottonwood 1 (Figure 2-6) is an 80-acre property that was deemed too small and had prohibitive drainage concerns. The area contains arroyos and shows susceptibility to severe erosion during flood events. Because of the topography and its size, this site was deemed to be an undesirable location to build a solar plant.

BLM did not fully consider any of these alternatives initially considered by CES because they were not included in a formal ROW application. (See Alternative BLM Land section below for further discussion on this issue.)

2.3.2 Alternatives Considered by BLM

Alternate BLM Land

BLM does not consider alternate sites when processing a specific application for a specific site. BLM must make a decision to grant the ROW requested in the application or to deny the ROW requested in the application. Identifying alternative land is beyond the scope of this EIS. BLM's purpose and need is to process a ROW application. BLM does not have a need to identify alternative locations for energy development. BLM recognizes that there are numerous acres of BLM managed land that could produce renewable energy. However, for this EIS, BLM's purpose and need is to process a specific application. Should BLM decide to deny the ROW, the Applicant can pursue any other energy development methods, technology, and locations that the Applicant desires, including applying for a different BLM land parcel.

Alternate Power Generating Technologies

While BLM does not advocate specific energy technologies, it is does consider the relative effects of various technologies when evaluating applications to utilize the public lands. The following descriptions summarize information from the *Best Management Practices & Guidance Manual: Desert Renewable Energy Projects*, Developed collaboratively among the California Energy Commission, California Department of Fish and Game, BLM, and the U.S. Fish and Wildlife Service. October, 2009 (CEC-700-2009-016-SD).

Concentrating Solar Power Technologies

The Applicant did not propose using solar thermal technology for the project because of the long-term costs inherent in maintenance and operations. Solar thermal arrays require more water and personnel to maintain optimal energy production efficiency.

In addition to the PV technology included in CES's Proposed Action, concentrating solar power (CSP) is another solar energy technology potentially suitable for use in utility-scale applications. Use of either technology requires large areas for solar radiation collection. For example, a 200-MW concentrating parabolic trough solar thermal power plant will generally require two square miles or 1,280 acres of land (CES 2009).

CSP technologies use mirrors to concentrate (focus) the sun's light energy and convert it into heat to create steam to drive a turbine that generates electrical power. The power plants consist of two parts: one that collects solar energy and converts it to heat and another that converts the heat energy to electricity. CSP plants are thermal electric generating power plants and thus produce waste heat that must be dissipated to the atmosphere. Some use forced-draft wet cooling towers that release the waste heat to the ambient atmosphere by the evaporation of water. Forced-draft wet cooling towers use large fans to provide air movement upward through falling water and are rectangular, box-like structures. Some use dry cooling radiators that have large fans to draw air through the radiator to reject the waste heat. Dry cooling towers have lower efficiency and higher energy consumption than wet, evaporative cooling towers, due to the required fans.

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Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999

Figure 2-6
Alternative Sites Considered but not Analyzed in Detail
Lucerne Valley Solar Project

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Generally, three types of CSP technologies are expected to be sited in the desert region including parabolic trough, power tower systems, and dish/engine systems.

1. Parabolic trough systems use large, curved (parabolic) reflectors (focusing mirrors) that have oil-filled pipes running along their focal point. The mirrored reflectors track the sun on a single axis and focus sunlight on the pipes to heat the oil inside to as much as 750°F. The hot oil is sent to a heat exchanger to heat water into high temperature steam to run conventional steam turbines and generators.
2. Power tower systems, also called central receivers, use many large, flat heliostats (mirrors) to track the sun on two axes and focus its rays onto a receiver. The receiver sits on top of a tall tower in which concentrated sunlight heats water into steam or a fluid, such as molten salt, to temperatures as hot as 1,050°F. The molten salt can be used immediately in a heat exchanger to make high temperature steam for electricity generation, or it can be stored for later use.
3. Dish/engine systems use mirrored dishes from 20 to 40 feet across to focus and concentrate sunlight onto a receiver. The receiver is mounted at the focal point of the dish. To capture the maximum amount of solar energy, the dish assembly tracks the sun across the sky on two axes. The receiver is integrated into a high-efficiency "external" combustion engine. The engines use hydrogen or helium gas as the working fluid to move piston(s) to generate electricity. The receiver, engine, and generator comprise a single, integrated assembly mounted at the focus of the mirrored dish.

None of the CSP technologies described above would substantially reduce the size of the site required to generate 45 MW of renewable energy. Ground disturbance and the associated effects would not be reduced. In addition, the structures required would be larger than those identified for CES's Proposed Action and would not reduce visual effects. Since the mirrors must be maintained in a clean state to function properly, this technology consumes a much greater volume of water than CES's Proposed Action. Therefore, an alternative power generating technology was eliminated from further consideration

Wind Energy

Modern wind energy development uses utility-sized turbines that typically range from 100 kW up to 5 MW to convert the wind's kinetic energy to electricity. These turbines primarily are grouped into large wind farms, which produce power for the electric grid. Turbines catch the wind's energy with their propeller-like blades. Usually, two or three blades are mounted on a shaft to form a rotor. A blade acts much like an airplane wing. When the wind blows, the rotor spins like a propeller, and the turning shaft spins a generator to make electricity.

The largest installed wind turbines in the country can stand up to 300-feet tall and have rated capacities of up to 5 MW. The length of the blades and height of the wind turbines vary according to site-specific location and wind-speed. Larger, taller turbines capture winds at higher elevations and are more powerful because of the larger swept-area of the blades. Wind energy developments, also called "wind farms," typically occur on ridgelines, mountain passes, foothills, or flatter, open desert lands to take advantage of the higher wind speeds. The farms include roads, buildings, equipment yards, electrical substations and related transmission lines.

National Renewable Energy Laboratory data identified this area as "poor to marginal" for wind energy potential (DOE 2010.) Based on the local wind energy potential at the site, this technology was not fully analyzed.

Residential Roof Top Solar Panels

One comment received during scoping discussed alternative renewable power generation, including the use of roof top solar panels on residences instead of CES's Proposed Action. In California, construction of roof top solar panels on homes requires electrical upgrades to interconnect the panels to the local distribution lines to allow sales of excess energy to the grid and installation of meters. It also requires an agreement between the property owner and utility to buy back the excess power, which has to be renewed when the property is sold. This alternative is beyond the scope of this EIS. BLM's purpose and need is to process a ROW application. BLM does not have a need to locate alternative methods of energy development. BLM recognizes that roof top solar panels could produce renewable energy and supports that type of energy development. However, for this EIS, BLM's purpose and need is to process a specific application. Should BLM decide to deny the ROW, the Applicant can pursue any other energy development methods, technology, and locations that the Applicant desires, including using roof top solar panels for energy development.

2.4 Comparison of Alternatives

Table 2-8 is a comparison of the features of each alternative.

2.4.1 Preferred Alternative

The BLM has identified the Alternative 4 – Modified Site Layout as the Preferred Alternative. The Preferred Alternative would include all of the Best Management Practices listed in Section 2.2.2.3 and the mitigation measures identified in Chapter 4 of this EIS.

Table 2-8 Comparison of Project Components and Project Features

	Alternative 1 No Action	Alternative 2 No Action w. CDCA Plan Amendment	Alternative3 CES's Proposed Action	Alternative 4 Modified Site Layout	Alternative 5 Smaller Project Alternative
Project Components					
Renewable Energy Generation	0 MW	0 MW	45 MW	45 MW	30 MW
Areas to be Graded/Developed (acres)					
Switchyard: (10 ft x 12 ft)	0	0	0.003	0.003	0.003
Operations & Maintenance Bldg (12 ft x 20 ft)	0	0	0.006	0.006	0.006
Parking/Laydown area (250 ft x 50 ft)	0	0	0.5	0.5	0.5
Access roads within project site (a)	0	0	7	7	5.5
Power line within project site	0	0	5	5	4 (d)
Subtotal of Areas Graded/Developed	0	0	*12.509*	*12.509*	*10.009*
Areas to be Brushed/Developed (acres)	0	0			
Solar Array for Phase I (includes inverters and transformers)	0	0	180	171 (b)	108
Solar Array for Phase II (includes inverters and transformers)	0	0	240	238 (b)	120
Subtotal of Areas Brushed/Developed	*0*	*0*	*420*	*409*	*228*
Total Area Developed (acres)	0	0	*433*	*422*	*238*
Total Area Undeveloped (acres)	0	0	*83*	*0 (e)*	*0 (e)*
TOTAL RIGHT OF WAY	0	0	**516**	**422**	**238**
Construction Length (days)	0	0	240	240	180
Max Number of Workers (c)	0	0	45	45	45
Estimated Water Use					
Construction – Phase I (acre-feet)	0	0	5.4	5.4	5.4
Construction – Phase II (acre-feet)	0	0	4.6	4.6	2.3

Table 2-8 Comparison of Project Components and Project Features

	Alternative 1 No Action	Alternative 2 No Action w. CDCA Plan Amendment	Alternative3 CES's Proposed Action	Alternative 4 Modified Site Layout	Alternative 5 Smaller Project Alternative
Estimated Water Use (continued)					
Panel Washing (gallons per year for Phases I & II)	0	0	22,500 to 45,000	22,500 to 45,00	13,500 to 27,000
Project Features			S		
CDCA Plan Amendment	No	Yes	Yes	Yes	Yes
Solar Panels	No	No	Yes	Yes	Yes
Access Roads	No	No	Yes	Yes	Yes
Transmission and Interconnect	No	No	Yes	Yes	Yes
Reconductoring of existing SCE Transmission Line	No	No	Yes	Yes	No
Operation and Maintenance Building	No	No	Yes	Yes	Yes
Site Communications	No	No	Yes	Yes	Yes
Site Security and Fencing	No	No	Yes	Yes	Yes
Erosion Control and Stormwater Drainage	No	No	Yes	Yes	Yes
Stream Alteration Agreement/ 401 Water Quality Certification	No	No	Yes	Yes	Yes
Vegetation Treatment and Weed Management	No	No	Yes	Yes	Yes
Fire Protection	No	No	Yes	Yes	Yes
Hazardous Materials	No	No	Yes	Yes	Yes
Waste Disposal	No	No	Yes	Yes	Yes
Dust Control	No	No	Yes	Yes	Yes
Vegetative Screen	No	No	No	Yes	No

Notes:
(a) includes Zircon Road realignment
(b) reflects setback areas along Santa Fe Fire Road
(c) During Peak Construction Month.
(d) Alternative 5: Length of power line ~1.7 miles.
(e) Undeveloped area managed as BLM multiple use, not included in ROW

3.0 Affected Environment

Introduction

This chapter describes the existing conditions of the physical, biological, cultural, socioeconomic, and other resources that have the potential to be affected by activities related to the Proposed Action and alternatives discussed in Chapter 2. These resources include those that occur within the Proposed Action area or are adjacent to or otherwise associated with the area, as well as those identified during the scoping process and BLM interdisciplinary team review. More detailed information on existing conditions for air quality, biological, cultural, and paleontological resources is documented in the technical reports used for these analyses in Volume II of this DEIS.

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3.1 Air Quality and Climate

This section identifies existing air quality and climatic conditions within and adjacent to the Proposed Action site and discusses applicable regulations. Information in this section is largely based on calculations for mechanized equipment use, as well as input received from members of the public during the scoping process.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following issues related to air quality were raised during scoping: (1) fugitive dust emissions; (2) recovery of soils capacity to prevent wind erosion and fugitive dust; (3) fugitive dust suppression at the Proposed Action site and access roads; (4) emissions of air quality criteria pollutants; (5) potential to reduce or increase greenhouse gas (GHG) emissions and capacity for carbon storage; and (6) potential influence of climate change on the Proposed Action. These comments are addressed in the discussion of existing conditions (Section 3.1.2) and impacts analysis (Section 4.1).

3.1.1 Applicable Plans, Policies, and Regulations

3.1.1.1 Federal

Environmental Protection Agency

The Environmental Protection Agency (EPA) implements and enforces the requirements of most federal environmental laws. EPA Region 9 administers federal air programs in California. The Clean Air Act (CAA), most recently amended in 1990, provides the EPA with the legal authority to regulate air pollution from stationary and mobile sources.

The EPA has authority over State Implementation Plan (SIP) general conformity in areas that do not meet federal air quality standards, and the federal land managers have review authority over any new projects that may affect federal Class I areas, as defined in 40 CFR, Part 51.166,40 CFR, Part 51, Subpart W, and 40 CFR, Part 93, Subpart B: General Conformity. These regulations ensure that federal actions conform to state and local plans for attainment. As federal lead agency, the BLM must complete a conformity determination for the Proposed Action before it can be approved. The General Conformity Rule prohibits federal agency approval of activities that conflict with an applicable implementation plan. When applicable, a program for mitigating effects must be developed.

The Proposed Action requires a ROW across BLM lands, thus triggering NEPA and the BLM's involvement in the NEPA process. Additionally, the BLM is involved in the conformity determination if emissions would exceed the applicability (de minimis) threshold for each nonattainment pollutant as described in the General Conformity Rule.

The General Conformity Rule was designed to require federal agencies to ensure that projects conform to the applicable SIP. General Conformity regulations apply only to direct and/or indirect emissions for a proposed action that occurs in areas designated as non-attainment or maintenance areas. The BLM is required to analyze emissions from the Proposed Action to determine if the General Conformity Rule applies. If the Proposed Action is subject to General

Conformity, then the BLM would prepare a General Conformity Determination for public comment. The General Conformity Determination would outline the methodology by which Proposed Action emissions would conform to the SIP, such as:

- Emissions would be specifically identified and accounted for in the SIP, or
- Emissions would be fully offset, or there would be a similarly enforceable measure that reduces emissions so that there would be no net increase in emissions.

The portion of the Mojave Desert Air Basin (MDAB) where the proposed activities would occur is designated as a federal PM_{10} and ozone non-attainment area. The emissions of these pollutants would need to be analyzed for each corresponding non-attainment area/maintenance area to determine applicability to the General Conformity Rule.

BLM California Desert Conservation Area Plan: Air Quality Element

The CDCA Plan contains provisions and guidance for public land use management in the California Desert District under the BLM's jurisdiction. Since its first date of publication in 1980, the CDCA Plan has been amended in order to incorporate public concerns and congressional mandates in regards to the use of desert resources, such as the provisions of the California Desert Protection Act of 1994. The CDCA Plan also specifies that the Federal Land Policy and Management Act and the CAA of 1977, along with Executive Order 12088 of 1978, "Federal Compliance with Pollution Control Standards," require the BLM and other federal land-management agencies to preserve and protect air quality-related values on federal lands.

The CDCA Multiple Land Use Class Guidelines require that all land uses within the CDCA be managed to protect air quality and visibility, in accordance with the Class II objectives of Part C of the CAA Amendments, unless they are designated another class by the State of California as a result of the BLM air quality management plan recommendations. Additionally, the CDCA Plan considers air quality monitoring as a key parameter in programs established in the CDCA Plan elements related to wildlife and energy production and utility corridors, as well as one of the support requirements for implementation.

BLM West Mojave Plan: Air Quality Element

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species, such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area. Given the air quality conditions of the WEMO Area, the WEMO Plan includes air quality monitoring as part of the key monitoring elements to be considered for implementation.

In particular, the WEMO Plan identifies emissions containing particulate matter of ten microns in diameter or less (PM_{10}) as the most important air pollutant in the WEMO Area and refers to the Mojave Desert Planning Area (MDPA) Federal Particulate Matter Attainment Plan, issued and administered by the Mojave Desert Air Quality Management District (MDAQMD 1995), as the ruling guidance for PM_{10} emissions control in the WEMO Area. The MDPA includes the Victor Valley, Morongo Basin, Barstow, and the Lucerne Valley.

BLM Fugitive Dust Emissions Control Strategy for the Mojave Desert Planning Area

The BLM Fugitive Dust/PM_{10} Emissions Control Strategy—or BLM Dust Control Strategy—outlines procedures for (1) complying with the CAA and (2) implementing regulations within the MDPA non-attainment area for particulates in accordance with (a) the MDPA Attainment Plan approved in July 1995 and (b) the implementing rule for the MDPA Attainment Plan approved by

MDAQMD in July 1996. In addition, federal regulations (43 CFR, Part 52.850) also require specific procedures to be undertaken for protection of air quality in non-attainment areas during consideration of activities and projects. This strategy identifies how the above procedural requirements would be met (BLM 1997).

Besides ensuring compliance with the MDPA Attainment Plan approved by MDAQMD, the BLM Dust Control Strategy aims to establish the process for Conformity Determinations for public lands activities and a process for determining Reasonably Available Control Measures (RACM) based on the attainment plan and conformity determinations. RACM vary according to the scope and type of activity. Appendix C of the BLM Dust Control Strategy provides lists of RACM recommended for different types of activities (BLM 1997).

The BLM Dust Control Strategy also provides guidance regarding emissions estimations from activities conducted on public lands, including the identification of types of activities on public lands and recommended emission factors to estimate total fugitive dust emissions.

EPA Regulatory Initiatives on GHG

Proposed Endangerment and Cause or Contribute Findings for GHG under the CAA

On April 2, 2007, in *Massachusetts v. EPA*, 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the CAA. The Court held that the EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA was required to follow the language of Section 202(a) of the CAA. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental and renewable energy organizations and other entities (EPA 2009b).

After a thorough examination of the scientific evidence on the causes and effects of current and future climate change, as well as other effects of GHGs, the EPA concluded that the science compellingly supports a positive endangerment finding for both public health and welfare. The EPA relied heavily upon the major findings and conclusions from recent assessments of the U.S. Climate Change Science Program and the Intergovernmental Panel on Climate Change. The EPA proposed this endangerment finding after considering both observed and projected future effects of climate change, key uncertainties, and the full range of risks and effects to public health and welfare occurring within the United States.

On April 17, 2009, the EPA proposed to find that GHGs in the atmosphere threaten the public health and welfare of current and future generations. The EPA is also proposing to find that GHG emissions from new motor vehicles and new motor vehicle engines are contributing to the concentration of GHGs in the atmosphere.

This action is being taken under Section 202(a) of the CAA, and the proposal has been signed with two distinct findings regarding GHGs under this section:

- **Endangerment Finding:** The EPA is proposing to find that the current and projected concentrations of the following six key GHGs in the atmosphere threaten the public health and welfare of current and future generations: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

- **Cause or Contribute Finding:** The EPA is further proposing to find that the combined emissions of CO_2, CH_4, N_2O, and HFCs from new motor vehicles and motor vehicle engines contribute to the atmospheric concentrations of these key GHGs and hence to the threat of climate change.

The Proposed Action, as well as any final action in the future, would not itself impose any requirements on industry or other entities. An endangerment finding under a provision of the CAA would not by itself automatically trigger regulation under the entire act. The proposed rule was published in the *Federal Register* on April 24, 2009, under Docket ID No EPA-HQ-OAR-2009-0171. The public was able to comment on the proposed endangerment and cause or contribute findings for 60 days following publication in the *Federal Register* (EPA 2009b).

It is important to point out that this ruling is specifically related to automobile emissions. However, additional federal regulations concerning GHG are currently under discussion and likely to come from the legislature in the near future (e.g., the Waxman-Markey Bill).

Mandatory Reporting of Greenhouse Gases Rule

On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. Under this rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA. The gases covered by the proposed rule are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers (EPA 2009c). This rule requires that facilities classified as general stationary fuel combustion sources, including electricity services (North American Industry Classification System [NAICS] Code 221) report emissions if annual rates equal or exceed 25,000 metric tons of GHG. However, the rule does not set specific reporting requirements for electric power generation from solar resources (NAICS Code 221119).

BLM Guidance on Greenhouse Gases

For EIS preparation, Department of the Interior (DOI) Secretarial Order 3289 (signed September 14, 2009), requires each bureau and office of the DOI to consider and analyze potential climate change impacts when making decisions regarding potential use of resources under the Department's purview.

Mojave Desert Air Quality Management District

The MDAQMD is charged with oversight of air quality and related matters within its jurisdiction. Under the CAA, the MDAQMD has adopted a variety of attainment plans for ozone and PM_{10}. The MDAQMD attainment plans applicable to the Proposed Action area are indicated in Table 3.1-1.

The MDAQMD reviews projects proposed within its jurisdiction to ensure that they would not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan. For this purpose, the MDAQMD has established significance criteria for evaluating potential effects from projects on the background conditions within the MDAB. These significance criteria include emissions thresholds given as daily and annual values and are fully described in Section 4.1.1.

Table 3.1-1 MDAQMD Attainment Plans Applicable to the Proposed Action Area

Name of Plan	Date of Adoption	Applicable Area	Pollutants targeted
1991 Air Quality Attainment Plan	08/26/1991	San Bernardino County	NO_x,[a] VOC[b]
Mojave Desert Planning Area Federal Particulate Matter Attainment Plan	07/31/1995	Mojave Desert Planning Area	PM_{10}[c]
Triennial Revision to the 1991 Air Quality Attainment Plan	01/22/2006	Entire district	NO_x, VOC
2004 Ozone Attainment Plan (state and federal)	04/26/2004	Entire district	NO_x and VOC

Source: MDAQMD 2009

Notes:

[a] NO_x = oxides of nitrogen
[b] VOC = volatile organic compound
[c] PM_{10} = particulate matter with less than 10 microns in diameter

Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan

On January 20, 1994, the EPA designated a major portion of San Bernardino County as a moderate non-attainment area with respect to the National Ambient Air Quality Standards (NAAQS) for PM_{10}. This redesignation required the MDAQMD to develop a revision to the SIP in order to bring the area into compliance with federal law. The MDPA Federal Particulate Matter (PM_{10}) Attainment Plan—issued by the MDAQMD in July 1995—provides a planning tool for reducing PM_{10} pollution in the MDPA and sets forth an air quality improvement program for the region that has to be implemented by both the public and private sectors (MDAQMD 1995).

Rule 2002 General Federal Actions Conformity

This rule implements Section 176(c) of the CAA §176 (c) (42 U.S.C. § 7506[c]) and regulations under 40 CFR, Part 51, Subpart W, related to the conformity of general federal actions in non-attainment and maintenance areas under the applicable implementation plan. This rule sets forth policy, criteria, and procedures for demonstrating and ensuring conformity of such actions. The detailed requirements for total direct and indirect emissions from federal actions are presented in Section 4.1.1.

MDAQMD Rule 403.2 Fugitive Dust within the Mojave Desert Planning Area

Adopted in July 1996, this rule aims to ensure that the NAAQS for PM_{10} would not be exceeded due to anthropogenic sources of fugitive dust within the MDPA and to implement the control measures contained in the MDPA Federal PM_{10} Attainment Plan. This rule applies to activities on BLM land and presents a list of requirements for identified sources of fugitive dust, such as storing, handling, and processing bulk materials; conducting earthmoving, construction, and demolition activities; and moving vehicles on unpaved roads. This rule also set the requirement for the BLM to prepare a dust control plan (BLM 1997).

Rule 403.2 requires any construction or demolition source to:

- Use periodic watering for short-term stabilization of disturbed areas to minimize fugitive dust emissions. The rule recommends the use of a water truck to maintain moist disturbed surfaces and to spread water during visible dusting episodes;
- Take actions to prevent project-related visible bulk materials deposited on paved public roadways (trackout);

- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days;
- Clean up project-related bulk material releases or spills on public paved roadways;
- Reduce non-essential earthmoving activity under high wind conditions.

In addition, under Rule 403.2 any construction source disturbing 100 or more acres is required to: (1) prepare and submit to the MDAQMD—prior to starting construction activities—a dust control plan that describes all applicable measures to be implemented for the Proposed Action; (2) provide stabilized access routes to the Proposed Action site as feasible; (3) maintain natural topography to the extent possible; (4) construct parking lots and paved roads first, where feasible; and (5) construct upwind portions of the Proposed Action first, where feasible.

Furthermore, Rule 403.2 prohibits the operator of a site undergoing weed abatement activity to disrupt the soil crust to the extent that visible fugitive dust is created due to wind erosion.

3.1.1.2 State

California Health and Safety Code § 41700

The Health and Safety Code is implemented by the local air quality management districts and prohibits the discharge of air pollutants that cause injury, detriment, nuisance, or annoyance to the public.

California Clean Air Act, California Health and Safety Code § 42300 et seq.

The California Clean Air Act (CCAA) of 1988 provides for air quality planning and regulation independent of federal regulations. The California Air Resources Board (CARB) is the state's lead air quality agency and adopts standards for the California Ambient Air Quality Standards (CAAQS), some of which are more stringent than NAAQS. CARB is responsible for overseeing the attainment and maintenance of NAAQS and CAAQS, overseeing the operation of local air quality districts, and monitoring motor vehicle air pollution control. CARB also assists the individual air districts with air quality monitoring as well as planning activities, such as performing air pollutant emission inventories and air quality modeling. Under delegation from the EPA, CARB and the individual air districts have the primary authority for managing air quality in California.

CARB Off-Road Mobile Sources Emissions Reduction Program

The CCAA mandates that CARB achieve the maximum degree of emission reductions from all off-road mobile sources (including construction equipment) in order to attain the CAAQS. Tier 1 standards for large compression-ignition engines used in off-road mobile sources went into effect in California in 1996, requiring unregulated construction equipment of model year 2000 and later to achieve exhaust standards for oxides of nitrogen (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO), and PM_{10}. For later model years—Tier 2 (2003 and later) and Tier 3 (2007 and later)—the standards are increasingly stringent. CARB implements a control measure to reduce diesel particulate matter emissions as well as NO_x from in-use (existing) off-road diesel equipment throughout California. Owners and operators of such equipment must report and meet fleet emissions targets in 2010. The intention of this rule is to help ensure that relatively low emitting equipment will be used for construction equipment. The rules for in-use off-road diesel vehicles also include idling limits (California Code of Regulations Title 12, Chapter 9, Article 4.8, Section 2449, et seq.).

California Global Solutions Act: Assembly Bill 32

Assembly Bill (AB) 32 mandates that the state report and verify its GHG emissions in order to reduce GHG emissions statewide to 1990 levels by the year 2020. To facilitate this, CARB is required to adopt a statewide emissions limit, adopt regulations to reduce the amount of GHG emissions, and monitor compliance. CARB is the lead agency for implementing AB 32, which set the major milestones for establishing the program.

Although CO_2 is the largest contributor to climate change, AB 32 references five additional GHGs: CH_4, N_2O, SF_6, HFCs, and PFCs. Key elements of California's recommendations for reducing its GHG emissions to 1990 levels by 2020 include the following:

- Setting targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard;
- Imposing targeted fees on high global warming potential (GWP) gases;
- Implementing additional measures to address emissions from industrial sources. These proposed measures would regulate fugitive emissions from oil and gas recovery and transmission activities; and
- Imposing a high GWP mitigation fee, which is anticipated to promote the development of alternatives to GWP chemicals and improve recycling and removal of these substances when older units containing them are dismantled.

In recognition of the critical role local governments will play in the successful implementation of AB 32, CARB recommended a GHG reduction goal for local governments of 15 percent below current levels by 2020 to ensure that their municipal and community-wide emissions match the state's reduction target. AB 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHGs. It also makes CARB responsible for monitoring and reducing GHG emissions and continues the existing Climate Action Team to coordinate statewide efforts. Additional requirements for CARB include the following:

- Establishing a statewide GHG emissions cap for 2020 based on 1990 emissions;
- Adopting mandatory reporting rules for significant sources of GHGs;
- Adopting a plan that indicates how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions;
- Adopting regulations to achieve the maximum technologically feasible and cost-effective reductions in GHGs, including provisions for using both market mechanisms and alternative compliance mechanisms;
- Convening an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB;
- Evaluating several factors prior to imposing any mandates or authorizing market mechanisms, including, but not limited to, impacts on California's economy, the environment, and public health; equity between regulated entities; electricity reliability

and conformance with other environmental laws, as well as ensuring that the rules do not disproportionately impact low-income communities;

- Adopting a list of discrete, early action measures to be implemented before January 1, 2010; and
- Ensuring public notice and opportunity for comment on all CARB actions.

In addition, the Climate Change Scoping Plan, the state's roadmap to reaching GHG reduction goals, considers the following key strategies:

- **Cap-and-Trade Program:** Broad-based to provide a firm limit on emissions; covers 85 percent of California's emissions: electricity generation, large industrial sources, transportation fuels, and residential and commercial use of natural gas, and provides regional linkage with the Western Climate Initiative, allowing greater environmental and economic benefits.
- **Transportation:** GHG emission standards for cars, low-carbon fuel standard (10 percent by 2020), better land-use planning (Senate Bill 375), and more efficient delivery trucks, heavy duty trucks, and goods movement.
- **Electricity and Energy (imported included):** Improved appliance efficiency standards and other aggressive energy efficiency measures, 33 percent renewables by 2020, increased use of efficient "combined heat and power", million solar roofs, solar hot water heating, green buildings, and water efficiency.
- **Industry (including cement):** Audit of the 800 largest emission sources in California to identify GHG reduction opportunities; regulations on refinery flaring and fugitive emissions; considerations for cement to address "leakage."
- **High GWP Gases:** Capture refrigerants and other high GWP gases already in use; reduce future impact through leak-resistant equipment, restrictions on use, and fees.
- **Forestry:** Preserve forest sequestration and voluntary reductions possible from forestry projects.
- **Agriculture:** More efficient agricultural equipment, fuel use, and water use through transportation and energy measures; reductions from manure digesters; fewer impacts on productivity of crops and livestock.
- **Waste and Recycling:** Reduce CH_4 emissions from landfills and move toward high recycling and zero waste.

3.1.2 Existing Conditions

Climate affects air quality in that it affects the movement of air from source to receptor. It also has an effect on the formation of ozone, and rain affects airborne dust. The Proposed Action would be located in Lucerne Valley, on the southeastern edge of the Mojave Desert in San Bernardino County, within the MDAB. Climate in the Proposed Action area is classified as a dry-hot desert (BWh), influenced by topographical barriers created by mountain ranges with long broad valleys that often contain dry lakes (MDAQMD 2009).

Climatic conditions of the area are characterized by high daytime temperatures; occasional high winds; sand, dust, and thunderstorms; and hot, dry summers and mild winters with minimal annual rainfall average (Figure 3.1-1). Average high temperatures in the summer reach over

100 degrees Fahrenheit (°F), while average high temperatures in the winter are between 30° and 50° F (Western Regional Climate Center [WRCC] 2009).

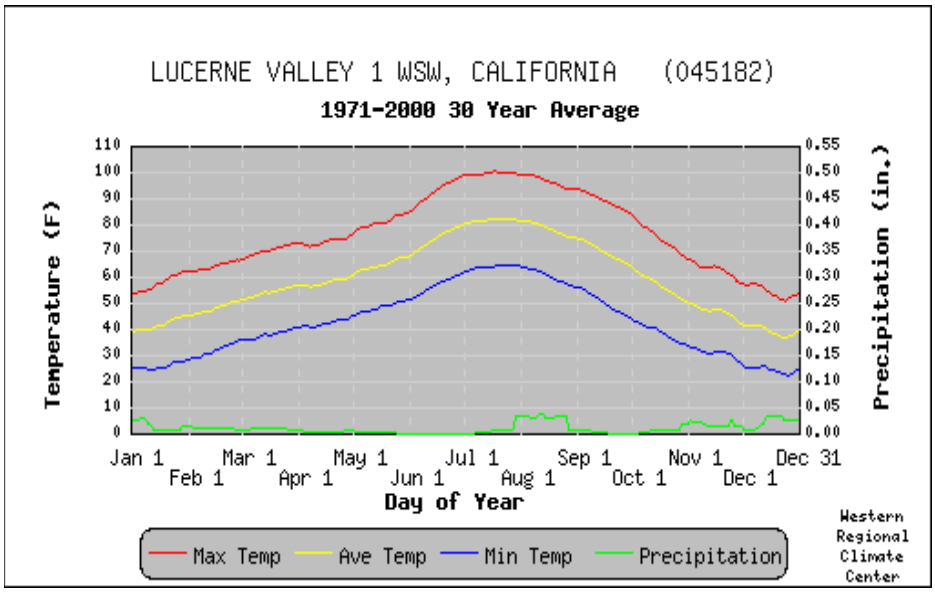

Figure 3.1-1 Historic Temperature and Precipitation Data from Lucerne Valley, California (WRCC 2009)

Average precipitation levels in the MDAB have been reported between three and seven inches per year, with 16 to 30 days with at least 0.01 inches of precipitation. Flash floods occurred 40 times over the past 60 years in southern California, with three flash flood events occurring in Lucerne Valley (NOAA 2007). Additionally, the prevailing winds in the MDAB are out of the west and southwest, resulting in a general west to east flow across the basin. Winds greater than 25 miles per hour occur five percent of the time (Webmet 2010). Wind direction and speed are key factors influencing the dispersion and transport of air pollutants (MDAQMD 2009). The Proposed Action area also receives significant sunshine throughout the year, which is an additional factor influencing thermal turbulence and dispersion of pollutants (MDAQMD 2008a).

Desert climate is also characterized by the presence of biological soil crusts (also named as cryptobiotic, cryptogamic, or microbiotic crusts) that aid in erosion control, water retention and in minimizing airborne dust generation. These soil crusts are thin veneers of microbial-rich plant material that live on the surface of many soils in desert areas that stabilize the soil and create an environment for higher plants to inhabit harsh environments (USGS 2002). If this layer of microbes is altered, it can take 5 to 250 years to reproduce, depending on rainfall conditions. Loss of these crusts can reduce infiltration by precipitation, leave the soil susceptible to erosion by wind and water, and alter the vegetative cover and habitat of the disturbed area for many years.

In addition, deserts or drylands have a potential for carbon storage in soils rather than in their vegetation. The carbon storage potential for drylands ranges from greater than 400 to less than 100 metric tons per hectare, although the majority of desert soils can store less than 225 metric tons per hectare (World Resources Institute 2003). While deserts generally store less carbon than forests on a carbon/unit area basis, the total amount of carbon that desert soils can store is potentially significant due to the extensive areas of these ecosystems.

Existing Ambient Air Quality

Air quality is regulated by federal, state, and local agencies. Pursuant to the CAA, the EPA has established NAAQS for seven criteria air pollutants. 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, damage to animals, crops, vegetation, and buildings (EPA 2008a). The seven criteria air pollutants for which NAAQS have been promulgated are:

- Sulfur dioxide (SO_2);
- Nitrogen dioxide (NO_2);
- PM_{10};
- PM with diameters less than or equal to 2.5 microns ($PM_{2.5}$);
- Carbon monoxide;
- Ozone (O_3); and
- Lead.

Ozone is not emitted directly from emission sources but is created at near-ground level by a chemical reaction between NO_x and volatile VOCs in the presence of sunlight. As a result, NO_x and VOCs are often referred to as ozone precursors and are regulated as a means to prevent ground-level ozone formation. Criteria air pollutant descriptions and health effects are summarized in Table 3.1-2.

Table 3.1-2 Major Criteria Air Pollutant Descriptions and Health Effects

Pollutant	Description and Health Effects
O_3	High ozone levels result from VOCs and NO_X (oxides of nitrogen) emissions from vehicles and industrial sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight. Health effects include: • Aggravation of respiratory and cardiovascular diseases; • Impairment of cardiopulmonary function; and • Eye irritation.
NO_2	NO_2 emissions are primarily generated from the combustion of fuels. Health effects include risk of acute and chronic respiratory disease
CO	CO is a product of incomplete combustion, principally from automobiles and other mobile sources of pollution. Wood-burning stoves and fireplaces can also be measurable contributors. Health effects include: • Impairment of oxygen transport in the bloodstream; • Aggravation of cardiovascular disease; • Impairment of the central nervous system; • Fatigue, headache, confusion, dizziness; and • Death at high levels of exposure.
SO_2	SO_2 is produced when any sulfur-containing fuel is burned. Natural gas contains trace amounts of sulfur, while fuel oils contain much larger amounts. Health effects include: • Aggravation of respiratory disease; • Reduced lung function; and • Eye irritation.

Table 3.1-2 Major Criteria Air Pollutant Descriptions and Health Effects

Pollutant	Description and Health Effects
PM_{10} and $PM_{2.5}$	Particulates in the air are caused by a combination of wind-blown fugitive or road dust, particles that come from fuel combustion in motor vehicles and industrial sources, residential and agricultural burning, and from the reaction of NO_X, sulfur oxides (SO_X), and organics. Health effects include: • Aggravation of respiratory disease; • Reduced lung function; • Cough irritation; and • Lung irritation.
Lead	Lead gasoline additives, nonferrous smelters, and battery plants were historically significant contributors to atmospheric lead emissions. Legislation has since reduced lead emissions. Health effects include impairment of central nervous system.
VOCs	A portion of total organic compounds or gases, excluding CH_4, ethane, and acetone (due to low photochemical reactivity). These compounds are regionally important due to their involvement in the photochemical reaction that produces ozone. Health effects include: • Impairment of central nervous system; • Eye, nose, and throat irritation; and • Fatigue, headache, confusion, and dizziness.

Source: CARB 2005

Under the CCAA, the State of California has established additional or more stringent ambient air quality standards for some of these criteria pollutants, as well as ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. NAAQS and CAAQS are summarized in Table 3.1-3.

Table 3.1-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
O_3	8 Hours	0.07 ppm[e]	0.075 ppm	0.075 ppm
	1 Hour	0.09 ppm	— [e]	— [e]
CO	8 Hours	9.0 ppm	9 ppm	—
	1 Hour	20 ppm	35 ppm	—
NO_2	Annual Average	0.03 ppm	0.053 ppm	0.053 ppm
	1 Hour	0.18 ppm	—	—
$S0_2$	Annual Average	—	0.030 ppm	—
	24 Hours	0.04 ppm	0.14 ppm	—
	3 Hours	—	—	0.5 ppm
	1 Hour	0.25 ppm	—	—
$PM_{2.5}$	Annual Geometric Mean	12 µg/m^3	15 µg/m^3	15 µg/m^3
	24 Hours	—	35 µg/m^3	35 µg/m^3
PM_{10}	Annual Arithmetic Mean	20 µg/m^3	—	—
	24 Hours	50 µg/m^3	150 µg/m^3	150 µg/m^3
Lead	30-Day Average	1.5 µg/m^3	—	—
	Rolling 3-Month Average[f]	—	0.15 µg/m^3 [f]	0.15 µg/m^3 [f]
Sulfates	24 Hours	25 µg/m^3	—	—
Hydrogen sulfide	1 Hour	0.03 ppm	—	—

Table 3.1-3 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Vinyl chloride	24 Hours	0.010 ppm	—	—

Source: CARB 2008; EPA 2009a
Notes:

[a]California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

[b]National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 pg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[c]National Primary Standards represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d]National Secondary Standards represent the levels of air quality necessary to protect the environment, including public welfare, from any known or anticipated adverse effects of a pollutant.

[e]On June 15, 2005, the 1-hour ozone standard of 0.12 parts per million (ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact areas (which do not yet have an effective date for their 8-hour designations.)

[f]Final rule signed on October 15, 2008.

ppm = parts per million by volume
µg/m^3 = micrograms per cubic meter

The EPA and CARB classify an area as attainment, unclassified, or non-attainment, depending on whether the monitored ambient air quality data show compliance, insufficient data available, or non-compliance with the federal and state ambient air quality standards. The current state and federal air quality attainment status designations for the MDAB are summarized in
Table 3.1-4.

Table 3.1-4 Attainment Status in the Mojave Desert Air Basin (San Bernardino County)

Pollutant	State Designation[a]	Federal Designation
Ozone (8-hour)	Non-attainment	Severe Non-attainment[b]
Ozone (1 hour)	Non-attainment Moderate	n/a[c]
PM_{10}	Non-attainment	Non-attainment
$PM_{2.5}$	Non-attainment	Unclassified/Attainment[d]
CO	Attainment	Attainment
NO_2	Attainment/Unclassified	Attainment/Unclassified
SO_2	Attainment/Unclassified	Attainment/Unclassified
Sulfates	Attainment	n/a
Lead	Attainment	n/a
Hydrogen Sulfide	Unclassified	n/a

Table 3.1-4 Attainment Status in the Mojave Desert Air Basin (San Bernardino County)

Pollutant	State Designation[a]	Federal Designation
Visibility Reducing Particles	Unclassified	n/a

Source: CARB 2006, 2009a; EPA 2008b; MDAQMD 2009

Notes:

CO = carbon monoxide

n/a = not applicable

NO_2 = nitrogen dioxide

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

PM_{10} = particulate matter less than 10 microns in diameter

SO_2 = sulfur dioxide

[a]Based on CARB 2006 State Area Designations, effective since July 26, 2007.

[b]Federal standard 84 ppm· Classified Severe-17 (portion of MDAQMD outside of Western Mojave Desert Ozone Non-attainment Area is unclassified/attainment)

[c]On June 15, 2005, the 1-hour ozone standard of 0.12 ppm was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) areas. (Those areas do not yet have an effective date for their 8-hour designations.)

[d]Portion of MDAQMD outside of Western Mojave Desert Ozone Nonattainment Area is unclassified/attainment

The MDAQMD is responsible for leading the regional effort in the MDAB to attain federal and state standards and has developed and implemented the Mojave Desert Air Quality Management Plan to reduce emissions, including emissions from industries and some mobile sources and consumer products. Air Quality Monitoring Stations near the Proposed Action site within the MDAB are shown in Figure 3.1-2. Existing background concentrations and exceedances of air quality standards at the closest monitoring stations are summarized in Tables 3.1-5 and 3.1-6.

Hazardous air pollutants, also referred to as toxic air contaminants, are pollutants that are known or suspected to cause acute or long-term serious health effects, such as cancer, reproductive effects or birth defects, neurological damage, or other related issues. The EPA manages a list of hazardous air pollutants, and CARB oversees contaminants defined in California's AB 1807 and AB 2588. Diesel particulate matter, benzene, and 1,3-butadiene are the three pollutants, all largely from mobile sources, that contribute the most to baseline ambient risks. Ambient air quality standards, in general, have not been established for these pollutants. However, federal, state, and local regulations and guidelines have been established to reduce their release to the atmosphere. These substances are managed on a case-by-case basis, depending on the quantity and type of emissions and proximity of potential receptors.

Existing Sources of Air Pollutants

Major sources and estimated annual average emissions of air pollutants within the MDAB in San Bernardino County (tons per day) and a list high emitting facilities located in the same air basin as the Proposed Action are summarized in Tables 3.1-7 and 3.1-8. The largest particulate matter emitter within the Proposed Action area is a Mitsubishi Cement Plant located in Lucerne Valley—approximately five miles southwest of the Proposed Action site. This facility emits the highest levels of PM_{10} and $PM_{2.5}$ in the MDAB (1,468 and 928 tons per year, respectively).

Table 3.1-5 Regional Background Air Quality Concentrations in the Proposed Action Area

Location	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)		SO_2 (ppm)			CO (ppm)		NO_2 (ppm)	Ozone (ppm)	
	24-hour (1*)	Annual	24-hour (1)*	Annual	24-hour (1)*	3-hour (1)*	8-hour (1)*	1-hour (1)*	Annual	8-hour (1)*	1-hour (1)*
Barstow, San Bernardino County, California	50	--	--	--	--	--	1.1	1.3	0.08	0.09	0.096
Phelan, San Bernardino County, California	--	--	--	--	--	--	--	--	--	0.099	0.116
Victorville, San Bernardino County, California	121	8.43	11	0.001	0.002	0.004	0.9	1.4	0.073	0.089	0.104
Mojave National Preserve, California	--	--	--	--	--	--	--	--		0.086	0.097
Hesperia, San Bernardino County, California		--	--	--	--	--	--	--	--	0.098	0.117

Source: EPA 2008b

Notes:

CO = carbon monoxide

m^3 = cubic meters

NO_2 = nitrogen dioxide

ppm = parts per million

PM_{10} = particulate matter less than 10 microns in diameter

$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

(1) ***The average concentrations listed are the fourth-highest daily maximums.**

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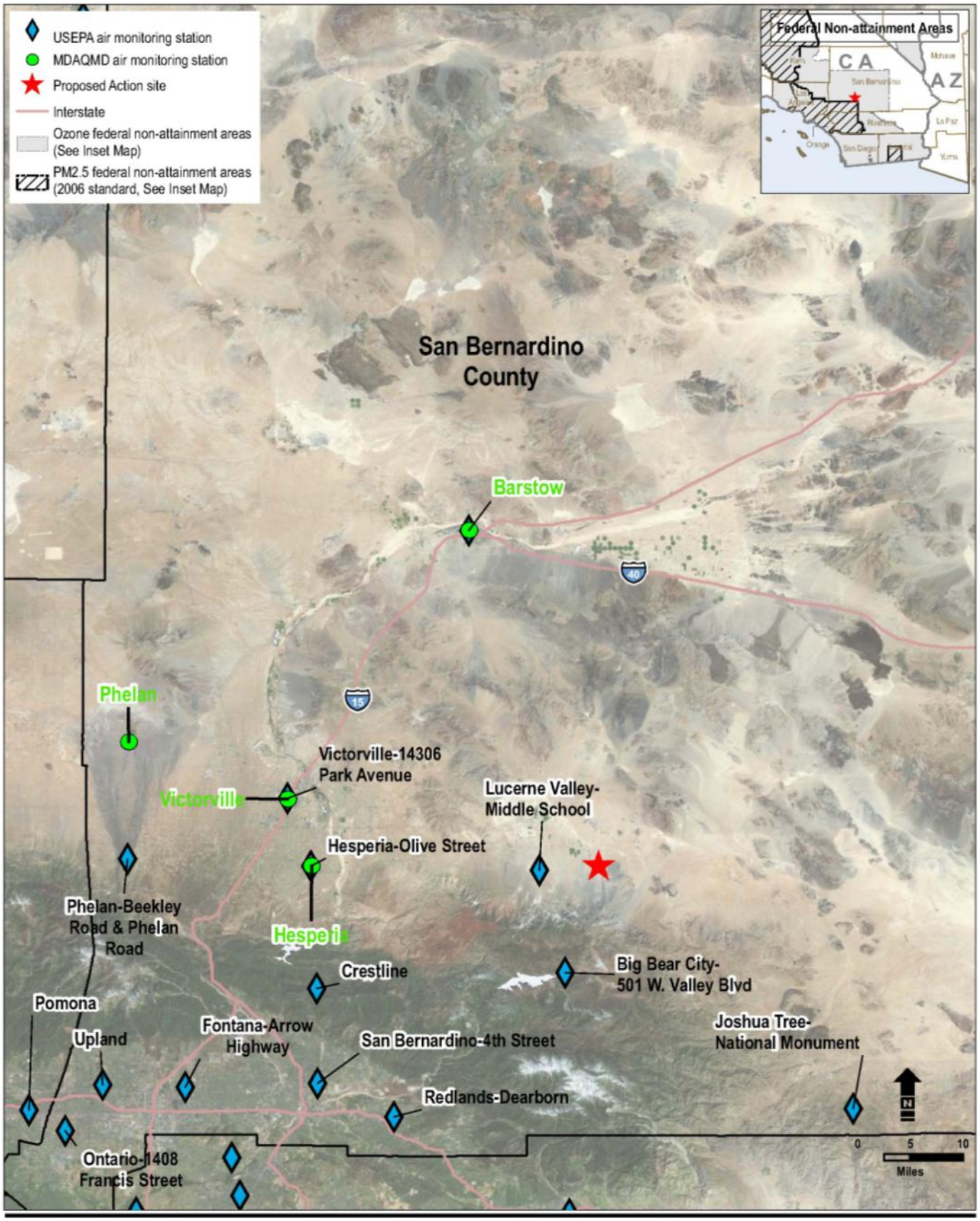

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards 2007; Mohave Desert Air Quality Management District 2008.

Figure 3.1-2
Air Monitoring Stations
Lucerne Valley Solar Project
San Bernardino County, California

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Table 3.1-6 Exceedances of Air Quality Standards and Existing Maximum Concentrations near the Proposed Action Area (2008)

Station	Ozone					CO					Nitrogen Oxide			Sulfur Oxide				PM_{10}			
	Days over state 1h/8h	Days over federal	Max 8h ppm	Max 1h ppm	Avg 1h ppm	Days over state 1h/8h	Days over federal	Max 8h ppm	Max 1h ppm	Avg 1h ppm	Days over state	Max 1h ppm	Avg 1h ppm	Days over state 24h/8h	Max 24h ppm	Max 1h ppm	Avg 1h ppm	Max 1h PM10 ($\mu g/m^3$)	Max daily PM10 ($\mu g/m^3$)	Days avg over 50$\mu g/m^3$	Monthly avg PM10 ($\mu g/m^3$)
Barstow	5/23	7	0.097	0.104	0.033	0/0	0/0	1.2	1.4	0.111	0	0.081	0.019	na/na	na	na	na	NM	NM	NM	NM
Hesperia	29/80	58	0.107	0.132	0.041	na/na	na/na	na	na	na	na	na	na	na/na	na	na	na	NM	NM	NM	NM
Phelan	32/73	50	0.106	0.130	0.046	na/na	na/na	na	na	na	na	na	na	na/na	na	na	na	NM	NM	NM	NM
Trona	3/23	7	0.094	0.100	0.037	NM	NM	NM	NM	NM	0	0.062	0.004	0/0	0.004	0.036	0.001	886	157	22	31
Victorville	16/58	32	0.098	0.109	0.035	0/0	0/0	1.0	2.2	0.167	0	0.064	0.016	0/0	0.002	0.006	0.001	927	266	23	31

Source: MDAQMD 2008b

Notes:

Exceedances of other air criteria pollutants listed on Table 3.1-3 ($PM_{2.5}$, sulfates, lead, hydrogen sulfate and visibly reducing particles) were not reported by the MDAQMD during 2008.
CO = carbon monoxide
na = Non available
NM = No measurement
PM_{10} = particulate matter less than 10 microns in diameter

Table 3.1-7 Estimated Annual Average Air Pollutant Emissions in San Bernardino County (2008)

Air Basin	Emission Source	Estimated Annual Average Emissions (tons per day)						
		ROG*	CO	NO_X	SO_X	PM	PM_{10}	$PM_{2.5}$
Mojave Desert Air Basin	*Stationary sources*							
	Fuel combustion	0.6	5.1	18.4	1.3	7.7	4.8	3.6
	Waste disposal	0.2	0.1	0.1	0.1	0.0	0.0	0.0
	Cleaning and surface coatings	2.1	-	-	-	0.2	0.2	0.2
	Petroleum production and marketing	3.0	0.0	0.0	-	0.0	0.0	0.0
	Industrial processes	1.8	9.4	37.3	2.5	40.1	23.3	13.1
	Total stationary sources	7.7	14.6	55.8	3.9	48.1	28.3	16.8
	Area-wide sources							
	Solvent evaporation	4.8	-	-	-	-	-	-
	Miscellaneous processes	2.7	14.1	1.3	0.0	160.5	83.6	12.9
	Total area-wide sources	7.5	14.1	1.3	0.0	160.5	83.6	12.9
	Mobile sources							
	On-road motor vehicles	13.7	142.2	73.5	0.1	3.6	3.6	3.0
	Other mobile sources	24.7	76.1	32.6	0.5	1.8	1.8	1.5
	Total mobile sources	38.4	218.3	106.1	0.6	5.4	5.3	4.5
	Total San Bernardino County in Mojave Desert	**53.6**	**247.0**	**163.1**	**4.6**	**214.1**	**117.2**	**34.2**

Source: CARB 2009b

*ROG = reactive organic gases

Table 3.1-8 High Emitting Facilities in the Mojave Desert Air Basin (2008)

Facility Name	City	Highest Annual Emissions (tons per year)			
		ROG	NO_X	PM_{10}	$PM_{2.5}$
Mitsubishi Cement 2000	Lucerne Valley		2,770	1,468	928
Cemex Black Mountain Quarry	Apple Valley		4,754	277	183
TXI Riverside Cement Company	Oro Grande		4,111	755	344
California Portland Cement	Mojave		2,975	329	171
Searles Valley Minerals	Trona		2,001	285	213
National Cement	Lebec		1,300	309	205
PG&E Topock Compressor Station	Needles		1,140		
Lehigh Southwest Cement	Monolith		888		127
Southern California Gas	Needles		808		
Reliant Energy	Dagget		665		
PG&E Hinkley Compressor Station	Hinkle	135			
Antelope Valley Aggregate	Little Rock			691	257
Granite Construction	Little Rock			297	
U.S. Borax	Boron			292	116
High Desert Power Project	Victorville				105
Total Reported by High Emitting Facilities		**135**	**21,412**	**4,703**	**2,649**

Source: CARB 2009c

*ROG = reactive organic gases

Sensitive Receptors

Residences, schools, day care centers, playgrounds and medical facilities are considered sensitive receptor land uses for criteria air pollutants (MDAQMD 2009). The Proposed Action site is located within a very sparsely populated area with no sensitive receptors within a one-mile radius of the proposed site. No schools, hospitals, day care centers, or nursing homes were identified within this radius, and there are only seventeen residential receptors identified, with the closest residence located less than 0.1 mile immediately west of the Proposed Action site, at the southwest corner of Foothill Road and Santa Fe Fire Road.

Greenhouse Gases

Climate change refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (e.g., decades or longer). Climate change may be affected by a number of factors, including natural cycles (e.g., changes in the sun's intensity or earth's orbit around the sun), natural processes within the climate system (e.g., changes in ocean circulation), and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

California is a substantial contributor to global GHG emissions as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). GHGs include:

- CO_2
- CH_4
- NO_x
- HFCs
- PFCs
- SF_6

According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, increased atmospheric levels of CO_2 are correlated with rising temperatures; concentrations of CO_2 have increased by 31 percent above pre-Industrial levels since 1750 (Figure 3.1-3). Climate models show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8 °C between 1990 and 2100. Much of the uncertainty in this increase results from not knowing future CO_2 emissions, but there is also some uncertainty about the accuracy of climate models. The IPCC concluded in a statement released February 2, 2007, that "the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone" (IPCC 2007).

GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases. It is a relative scale that compares the gas in question to that of the same mass of CO_2. CO_2 equivalence (CO_2e) is a measure used to compare the emissions from various GHGs based on their GWP, when measured over a specified timescale (generally 100 years). CO_2e is commonly expressed as million metric tons (MMT) of carbon dioxide equivalents ($MMTCO_2e$). The CO_2e for a gas is obtained by multiplying the mass (in tons) by the GWP of the gas. For example, the GWP for CH_4 over 100 years is 25. This means that the emission of one MMT of CH_4 is equivalent to the emission of 25 MMT of CO_2, or 25 $MMTCO_2$ e.

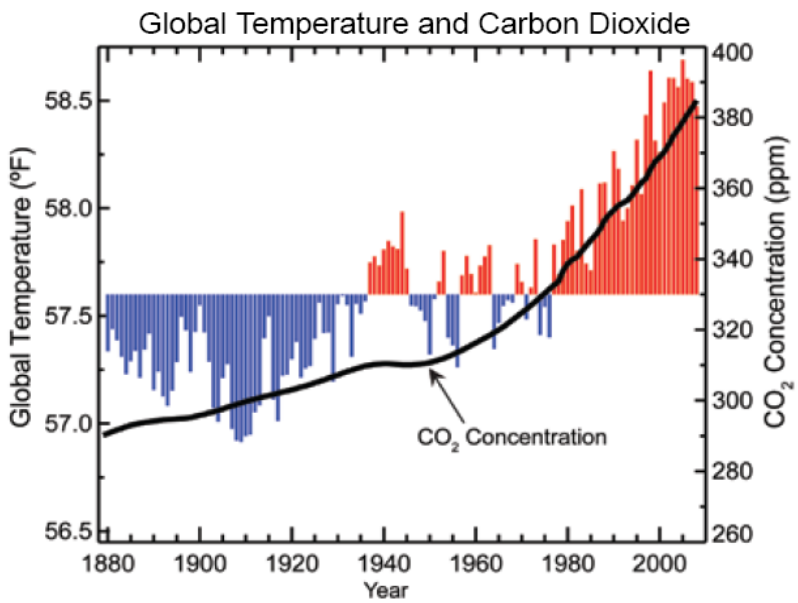

Figure 3.1-3 Relationship Between Global Temperature and Carbon Dioxide (IPCC 2007)

Potential Effects of Climate Change

In November 2004, the California Climate Action Team (CAT) was formed, comprising 14 agencies and 11 subgroups to assist CARB with the Climate Change Scoping Plan. According to the 2006 California CAT Report, the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

- A diminishing Sierra snowpack, declining by 70 to 90 percent, threatening the state's water supply;
- Increasing temperatures from 0.5 °F to 5.8 °F under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
- Increased vulnerability of forests due to pest infestation and increased temperatures; and
- Increased electricity demand, particularly in the hot summer months.

Existing Greenhouse Gas Emissions

Statewide emissions of GHG from relevant source categories in 1990 and later years are summarized in Table 3.1-9. Specific contributions from air basins such as MDAB are not currently specified as part of the state inventory. Emissions of CO_2 occur largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. Other GHG emissions, such as CH_4 and N_2O, are also tracked by state inventories but occur in much smaller quantities.

Table 3.1-9 California Greenhouse Gas Emissions ($MMTCO_2e$)

Emission Inventory Category	1990	2000	2001	2002	2003	2004	2005
Residential Fuel Combustion (CO_2)	29.7	30.25	27.21	27.32	26.40	27.86	--
Commercial Fuel Combustion (CO_2)	14.4	15.63	12.04	17.84	15.06	12.1	--
Industrial Fuel Combustion (CO_2)	103.0	76.17	80.48	71.53	65.47	67.2	--
Transportation Fuel Combustion (CO_2)	150.7	181.68	182.49	190.19	180.64	187.95	--
Electricity Generation, in-State (CO_2)	49.0	55.87	61.35	47.78	45.92	55.10	49.0
Methane (all CH_4 shown as CO_2e)	--	26.32	26.62	27.07	27.49	27.80	--
Nitrous Oxide (all N_2O shown as CO_2e)	--	31.43	30.76	34.48	33.85	33.34	--
Electricity Transmission and Distribution (SF_6 shown as CO_2e)	2.6	1.14	1.10	1.04	1.01	1.02	--
Total California GHG Emissions without Electricity Imports	**371.1**	**440.47**	**446.35**	**444.86**	**423.20**	**439.19**	**--**
Electricity Imports (CO_2e)	61.6	40.48	47.37	51.73	56.44	60.81	--
Total California GHG Emissions with Electricity Imports	**433.29**	**480.94**	**493.72**	**496.59**	**479.64**	**500.00**	**--**

Source: CPUC 2008

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3.2 Noise

This section discusses applicable plans, policies, and regulations for noise and identifies the existing levels and sources of noise, as well as sensitive receptors. During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to noise were raised: (1) effects of industrial development on pristine public lands, and (2) cumulative effects on desert habitat. These comments are addressed in the discussion of existing conditions (Section 3.2.2) and analysis of direct and indirect effects (Section 4.2).

Noise and Vibration Fundamentals

Noise is defined as unwanted sound. Noise can be described in terms of three variables: amplitude (loud or soft), frequency (pitch), and time pattern (variability), and its potential effects can be described in terms of a noise generating source, a propagation path, and a receiver (Federal Transit Administration [FTA] 2006). The ambient sound level of a region is defined by the total noise generated within the specific environment and is usually composed of sound emanating from natural sources and from human activities. Ambient sound levels vary with time of day, wind speed and direction, and level of human activity. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Excessive noise exposure has been shown to cause interference with human activities at home, work, or recreation, community annoyance, and hearing loss, affecting people's health and well-being. Even though hearing loss is the most clearly measurable health hazard, noise is also linked to other psychological, sociological, physiological, and economical effects, either temporary or permanent (EPA 1974). Potential human annoyance and health effects associated with noise may vary depending on factors such as: (1) the difference between the new noise and the existing ambient noise levels; (2) the presence of tonal noise, noticeable or discrete continuous sound, such as hums, hisses, screeches, or drones; (3) low frequency noise; (4) fluctuating, intermittent, or periodic sounds, such as backup alarms; and (5) impulsive sounds (Brüel and Kjær 2000). In some cases, noise can also disrupt the normal behavior of wildlife. Although the severity of the effects varies depending on the species being studied and other conditions, research has found that wildlife can suffer adverse physiological and behavioral changes from intrusive sounds and other human disturbances (National Park Service 2009).

The amplitude of sound is usually described by the decibel (dB), which is a logarithmic measure of the sound pressure level. Pressure variations in the air cause the eardrum to vibrate, which is interpreted as sound by the brain. The stronger the pressure variation, the louder the sound is heard. The level of noise is measured objectively using a sound level meter normally set on the A-weighted scale, which was developed to mimic the way the human ear responds to pressure variations in the air. Since humans are less sensitive to low frequencies (less than 250 hertz [Hz]) than mid-frequencies (500 to 1,000 Hz), and they are most sensitive to frequencies in the 1,000- to 5,000-Hz range, sound measurements are adjusted, or weighted, as a function of frequency to account for human perception and sensitivities.

In terms of human response, it is widely accepted that people are able to begin to detect sound level increases of 3 dB, while an increase in noise level of 10 dB is generally perceived as being twice as loud. However, a five-dB change is generally considered to be a substantially noticeable change above the existing noise environment. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud), as described in Table 3.2-1.

Table 3.2-1 Typical Sound Levels Measured in the Environment and Industry

Noise source at a given distance	A-Weighted Sound Level (dBA)
Military jet takeoff	140
Threshold of pain	130
Front row at rock concert	110
Headphones at maximum volume	100
Vacuum cleaner	80
Busy street traffic	70
Normal conversation	60
Whisper	20
Rustling leaves	10
Threshold of hearing	0

Source: Caltrans 2009

The decrease in sound level due to distance from any single sound source normally follows the inverse square law, i.e., the sound pressure level changes in inverse proportion to the square of the distance from the sound source. In a large open area with no obstructive or reflective surfaces, it is a general rule that at distances greater than 50 feet, the sound pressure level from a point source of sound drops off at a rate of 6 dB with each doubling of distance away from the source. The drop-off rate also varies with both terrain conditions and the presence of obstructions in the sound propagation path. In addition, sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound.

To characterize the average ambient noise environment in a given area, noise level descriptors are commonly used. The L_{eq} (sound level equivalent) is generally used to characterize the average sound energy that occurs during a relatively short period, such as an hour. Two other descriptors, the L_{dn} (Day-Night Level) and CNEL (Community Noise Equivalent Level), would be used for an entire 24-hour period. Both the L_{dn} and CNEL noise metric descriptors place a stronger emphasis on noise that occurs during nighttime hours (10 p.m. to 7 a.m.) by applying a 10-dB “penalty” to those hours, with the difference being that the CNEL also applies a 5-dB penalty to the evening hours of 7 p.m. to 10 p.m.

Vibration is a phenomenon related to noise. It is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration (FTA 2006). The groundborne energy of vibration has the potential to cause structural damage and annoyance; it can be felt outdoors, but the perceived intensity of vibration effects are much greater indoors due to the shaking of structures. Several land uses are sensitive to vibration—for example, hospitals, libraries, residential areas, schools, offices, and cultural resources.

Vibration particle velocity (measured in inches or millimeters per second) and/or vibration velocity level in decibels (VdB) are typically used to describe vibration. For residential uses, the background vibration level is usually 50 VdB or lower, while 75 VdB is generally considered intrusive (Table 3.2-2). Typical outdoor sources of perceptible groundborne vibration are trains, construction-related activities such as blasting, pile-driving, and heavy earth-moving equipment, and traffic on rough roads (FTA 2006).

Table 3.2-2 Typical levels of Groundborne Vibration

Vibration Velocity Levels (VdB) [a]	Human/Structural Response	Typical Sources (50 feet from the source)
100	Threshold of minor damage to fragile buildings	Blasting from construction projects
90–100	Difficulty with tasks, such as reading display screens	Bulldozers and other heavy tracked construction equipment
80–90	Residential annoyance, infrequent events	Rapid transit (upper range)
70–80	Residential annoyance, frequent events	Rapid transit (typical), bus, or truck over bump
60–70	Limit for vibration sensitive equipment. approximate threshold for human perception	Bus or truck (typical)
50	Typical background vibration level	Typical background vibration

Source: FTA 2006
Notes:
[a]Vibration velocity level in dB or VdB relative to 10^{-6} inches/second, which is the vibration reference level used as equal to 0 VdB (Lref).

3.2.1 Applicable Plans, Policies, and Regulations

Federal, state, and local bodies of government establish regulations and guidance to control excessive noise and reduce disturbance due to noise to a level that is acceptable within their jurisdiction. While federal and state laws regulate transportation noise, establish “normally” and “conditionally” acceptable exterior noise limits based on land-use type, and establish maximum acceptable interior noise limits for residences, no federal or state provisions regulate noise levels due to temporary construction activity. This type of noise is generally regulated at the local or county level.

Federal

Noise and land use guidelines have been produced by a number of federal agencies, including the Federal Highway Administration, EPA, Department of Housing and Urban Development, and American National Standards Institute. These guidelines are all based upon statistical noise criteria, such as L_{eq}, L_{dn}, or CNEL. The EPA identified outdoor and indoor noise levels to protect public health and assets. An $L_{eq(24)}$ of 70 dB (sound level equivalent, 24-hour average) was identified as a level of environmental noise that would not lead to measurable hearing loss over a lifetime. An L_{dn} of 55 dBA outdoors and 45 dBA indoors were identified as noise levels that would not result in activity interference or annoyance (EPA 1974).

California Desert Conservation Area Plan

The CDCA Plan (BLM 1980) contains provisions for public land-use management in the California Desert District under the BLM’s jurisdiction. Since its first date of publication in 1980, the CDCA Plan has been amended in order to incorporate public concerns and congressional mandates in regard to the use of desert resources, such as the provisions of the California Desert Protection Act of 1994.

In particular, noise-related guidelines established in the CDCA Plan include long-term monitoring of effects of vehicle noise on wildlife (Chapter 3, Wildlife Element) and implementation of land use compatibility standards within limited (vehicle use) areas in order to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands (Chapter 3, Motorized Vehicle Access). The CDCA Plan also identifies energy and utility corridors within the California Desert District, which

are part of the effect analysis framework, particularly in terms of alternatives analysis and cumulative effects.

West Mojave Plan

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area (BLM 2005). Section 3.3.2.5 of the FEIS for the WEMO Plan identifies noise and vibration as part of the 22 effects that may affect desert tortoises and their habitats, as indirect mortality factors for this species within the WEMO planning area. Other noise-related issues discussed as part of the environmental review of the WEMO Plan are noise effects from off-highway vehicles (OHVs) circulating within the Motorized Vehicles Access Network. Special attention is given to noise mitigation measures within these recreational areas, such as careful trail planning and construction of berms to impede or dissipate sound (BLM 2005).

State

The California Department of Health Services has established the Office of Noise Control, which has prepared studies associated with noise levels and their effects on various land uses. Based upon these studies, the state has established interior and exterior noise standards by land use category and standards for the compatibility of various land uses and noise levels (Table 3.2-4). For low density residential areas, such as the rural environment where the Proposed Action would be located, the maximum normally acceptable noise level established under this guidance is a CNEL of 60 dBA. New construction or development would conditionally reach a maximum noise level of 70 dBA only after a detailed analysis of the noise requirements is made and needed noise insulation features are included in the design.

Table 3.2-4 Noise/Land Use Compatibility Matrix for Community Noise Environments

Land Use Category	Community Noise Exposure Level (CNEL, dBA)						
	50	55	60	65	70	75	80
Residential: low density single-family, duplex, and mobile homes							
Residential: multi-family							
Transient lodging: hotels, motels							
Schools, libraries, churches, hospitals, nursing homes							
Auditoriums, concert halls, amphitheaters							
Sport arenas, outdoor spectator sports venues, amusement parks							

Table 3.2-4 Noise/Land Use Compatibility Matrix for Community Noise Environments

Land Use Category	Community Noise Exposure Level (CNEL, dBA)						
	50	55	60	65	70	75	80
Playgrounds, neighborhood parks							
Golf courses, riding stables, cemeteries							
Office and professional buildings, retail commercial, banks, restaurants							
Industrial, manufacturing, utilities, service stations, warehousing, agriculture							

Source: Office of Planning and Research 2003

Normally acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally acceptable: New construction or development should be undertaken only after a detailed analysis of the noise requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air systems or air conditioning, normally suffices.

Normally unacceptable: New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made, and needed noise insulation features must be included in the design.

Clearly unacceptable: New construction or development should generally not be undertaken.

In addition, noise limits for highway vehicles are regulated under the California Vehicle Code, §§ 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

County of San Bernardino

The County of San Bernardino Development Code establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating land uses.

Table 3.2-5 (San Bernardino County Noise Standards for Stationary Noise Sources) describes the noise standard for emanations from a stationary noise source as it affects adjacent properties. San Bernardino County also has the following noise limit categories in which no person shall operate, or cause to be operated, a source of sound at a location or allow the creation of noise on property owned, leased, occupied, or otherwise controlled by the person who causes the noise level, when measured on another property, either incorporated or unincorporated, to exceed any one of the following (San Bernardino County 2007):

(A) The noise standard for the receiving land use as specified in Subsection B (Noise-impacted areas), above, for a cumulative period of more than 30 minutes in any hour.

(B) The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

(C) The noise standard plus 10 dBA for a cumulative period of more than five minutes in any hour.

(D) The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour.

(E) The noise standard plus 20 dBA for any period of time.

Table 3.2-5 San Bernardino County Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7 am-10 pm L_{eq}[a]	10 pm-7 am L_{eq}
Residential	55 dB(A)[b]	45 dB(A)
Professional Services	55 dB(A)	55 dB(A)
Other Commercial	60 dB(A)	60 dB(A)
Industrial	70 dB(A)	70 dB(A)

Source: San Bernardino County 2007.
Notes:
[a]Leq = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a timevarying signal over a given sample period, typically 1, 8 or 24 hours.
[b]dB(A) = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

The County of San Bernardino Development Code does not have standards concerning acceptable noise levels for construction.

The County of San Bernardino has also adopted the following standards regarding vibration.

(a) Vibration standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

(b) Vibration measurement. Vibration velocity shall be measured with a seismograph or other instrument capable of measuring and recording displacement and frequency, particle velocity, or acceleration. Readings shall be made at points of maximum vibration along any lot line next to a parcel within a residential, commercial and industrial land use zoning district.

(c) Exempt vibrations. The following sources of vibration shall be exempt from the regulations of this Section.

(1) Motor vehicles not under the control of the subject use.

(2) Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays.

3.2.2 Existing Conditions

The Proposed Action would be located within a rural desert environment that is characterized by the predominance of large lots, limited commercial development, and the prevalence of agricultural and animal raising uses in the area (County of San Bernardino 2007). Main land uses located in the proximity of the Proposed Action area include rural living, resource conservation, agriculture, and recreation. The closest airport runway is located 10 miles south of the site at the Big Bear City Airport (Google Earth 2009).

Noise Sources

Noise sources within the Proposed Action area are related to vehicular traffic on local roads, OHV use, agricultural equipment, and wildlife noises. Additionally, noise from operations and maintenance of existing utility and energy facilities located within the BLM utility corridors near the Proposed Action area may contribute as temporary or permanent noise sources, depending on the frequency and nature of activities. Because the closest airport (Big Bear City Airport) is located approximately 10 miles south of the Proposed Action, noise from airport operations are not considered a noise source for the Proposed Action.

Light vehicle traffic along roads identified in Table 3.2-6 represents the major noise source within the Proposed Action area. Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The loudness of traffic noise can also be increased by defective mufflers or other faulty equipment on vehicles. The level of highway traffic noise depends on: (1) the volume of the traffic; (2) the speed of the traffic; and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks (Federal Highway Administration 2006).

Table 3.2-6 Major Noise Sources Located near the Proposed Action

Major Noise Sources	Relative Location to Proposed Action	Direction
Foothill Road	Adjacent (boundary)	North
Santa Fe Fire Road	Traverses the site	North to south
Zircon Road	Traverses eastern portion of the site	East
Old Woman Springs Road (SR-247)	0.25 mile	North

Sources: Chevron Energy Solutions 2009; Google Earth 2009

Annual average daily traffic (ADT) data for State Route (SR) 247 indicates a range of 2,650 vehicles in 2008 (Caltrans 2009). A volume of traffic below 5,000 ADT is common in rural areas, such as the Proposed Action site. The FTA maximum sound exposure level (L_{max}) for automobiles and vans at 50 feet from roadways is 74 dBA (FTA 2006); however, these levels are further reduced by distance and the presence of barriers. Considering the distance between SR-247 and the site (approximately 1,300 feet), noise levels from traffic at the Proposed Action boundary would be lessened to a range between 59 and 62 dBA L_{max}.[1]

In addition to regular vehicle traffic on roads, OHVs are an additional source of noise within the Mojave Desert. According to the WEMO Plan, specific design and construction techniques, such as trail planning and construction of berms have been recommended to impede or dissipate sound from OHVs in the Mojave Desert (BLM 2005).

Noise Levels

Existing ambient sound levels in the Proposed Action area are typical of wilderness areas or rural environments, where background noise levels typically range from between 35 and 45 dBA L_{dn} (Department of State 2007). At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week. The variation is caused for different reasons, for example, changing weather conditions, the effects of seasonal vegetative cover, and human activities.

[1] According to the FTA (2006), for vehicles passing along a track or roadway (called line sources), divergence with distance is estimated as 3 dB per doubling of distance for L_{eq} and L_{dn}, and 3 to 6 decibels per doubling of distance for L_{max}.

Sensitive Receptors

Noise- and vibration-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound or vibration could adversely affect the designated land uses. Typically, sensitive receptors on noise-sensitive lands include residences, hospitals, places of worship, libraries and schools, nature and wildlife preserves, and parks. Several land uses are especially sensitive to vibration, including concert halls, hospitals, libraries, vibration-sensitive research operations, residential areas, schools, and offices.

Certain human activities and sensitive land uses (e.g., residences, schools, and hospitals) generally require lower noise levels. A noise level of L_{dn} 55 to 60 dB on the exterior is the upper limit for speech communication to occur inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin to occur at L_{dn} 55 dB (FTA 2006).

Noise sensitive land uses located in the vicinity of the Proposed Action are primarily rural residences (very low density residential), as well as recreational and special management areas (special designations). Seventeen residential receptors have been identified within a one-mile radius of the site, most of them located on the northern and northwestern side of the property upper boundary (Table 3.2-7 and Figure 3.2-1). Twelve of these residential receptors (70 percent) are located in the proximity of SR-247, which is considered the main noise source in the area. One residential receptor is located less than 0.1 mile immediately west of the Proposed Action area at the southwest corner of Foothill Road and Santa Fe Fire Road.

Table 3.2-7 Noise Sensitive Residential Receptors Located within a One-Mile Radius of the Proposed Action Area

Noise sensitive land use	Distance to Noise Sensitive Receptor (miles)	Figure 3-2-1 Map No.
Rural (very low density) residential	0.95	1
	0.64	2
	0.59	3
	0.72	4
	0.90	5
	0.73	6
	0.93	7
	0.98	8
	0.92	9
	0.83	10
	0.90	11
	0.83	12
	0.95	13
	0.94	14
	0.86	15
	0.85	16
	0.59	17
	< 0.1	18

Source: Ecology and Environment, Inc. 2009

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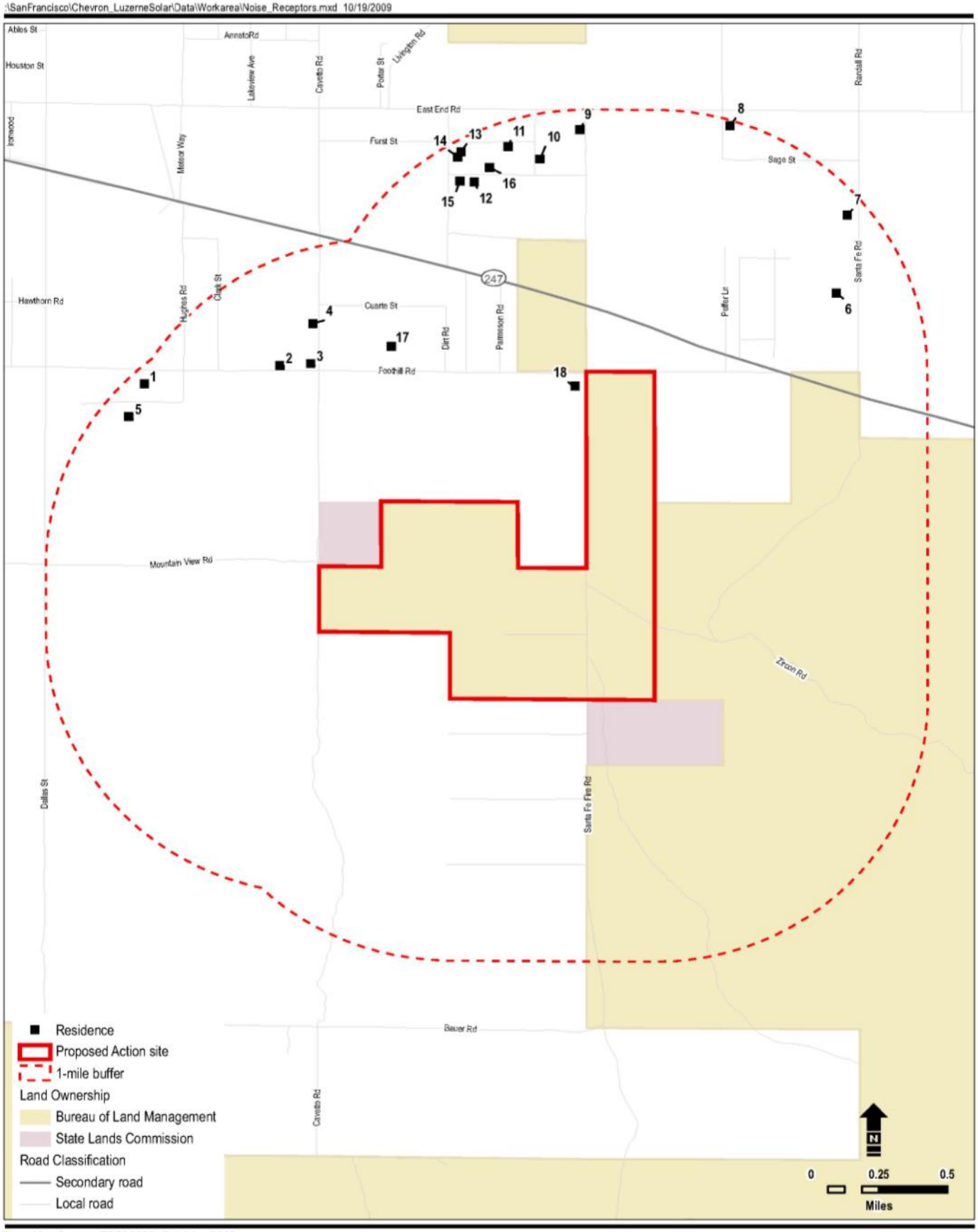

Base Map Source: ESRI 2009; Cal-Atlas 2009;
Ecology & Environment, Inc 2009

Figure 3.2-1

Sensitive Noise Receptors within 1 Mile of the Proposed Action Site

Lucerne Valley Solar Project

San Bernardino County, California

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Additionally, special management or special designation areas would be sensitive to noise effects on sensitive species. The closest sensitive area is located at 2.1 miles from the site boundary (Table 3.2-8). However, noise sensitive species occur in areas where recreational and motorized vehicle noise is present throughout the Mojave Desert. Detailed discussion of specific land uses in the proximity of the Proposed Action area, as well as recreational and special interest lands close to or crossed by the site, are presented in Sections 3.9, “Land Use and Realty”; 3.10, “Special Management Areas”; and 3.11, “Recreation.”

Table 3.2-8 Noise Sensitive Uses Within 10 Miles of the Proposed Action Area

Noise sensitive land use	Distance to Noise Sensitive Receptor (miles)
Critical Biological Areas:	
Gold Mountain	8.53
Bertha Ridge	9.52
South Baldwin Lake	9.66
Wilderness Area:	
Bighorn Mountain	6.49
Rangeland Management Unit:	
Herd Management Unit	3.77
Special Interest Area:	
Arrowhead Landmark	6.15
Arrastre Creek	6.39
Areas of Critical Environmental Concern:	
Upper Johnson Valley Yucca Rings	7.99
Soggy Dry Lake Creosote Rings	5.98
Carbonate Endemic Plants	2.08
Ord-Rodman DWMA	7.12

Source: Ecology and Environment, Inc. 2009

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3.3 Geology, Topography, and Geologic Hazards

This section identifies the geology, topography, and geologic hazards within and adjacent to the site of the Proposed Action and discusses applicable regulations. During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. With regard to geology, topography, and geologic hazards, a comment about the location of active faults was raised. This comment is addressed in the discussion of existing conditions.

3.3.1 Applicable Plans, Policies, and Regulations

3.3.1.1 Federal

Federal Land Policy and Management Act of 1976, as amended

The FLPMA establishes policies and goals to be followed in administration of public lands by the BLM. FLPMA specifies policies for conveyance of mineral resources.

3.3.1.2 State

Alquist-Priolo Earthquake Fault Zoning Act

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. The law resulted from structural damage associated with the 1971 San Fernando Earthquake. While this act does not specifically regulate solar development projects, it does help define areas where fault rupture is most likely to occur. This act groups faults into categories of active, potentially active, and inactive. Historic and Holocene age faults are considered active, late Quaternary and Quaternary age faults are considered potentially active, and pre-Quaternary age faults are considered inactive. These classifications are qualified by the conditions that a fault must be shown to be “sufficiently active” and “well defined” by detailed site-specific geologic explorations in order to determine whether building setbacks should be established.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (Public Resources Code, Chapter 7.8, Division 2) directed the California Department of Conservation, Division of Mines and Geology (now called California Geological Survey [CGS]) to delineate Seismic Hazard Zones. The purpose of this 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. The act requires that site-specific geotechnical investigations be performed prior to permitting most urban development projects within seismic hazard zones.

California Building Code

The California Building Code (CBC 2007) is based on the 2006 International Building Code, with the addition of more extensive structural seismic provisions. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

3.3.1.3 Local

San Bernardino County General Plan

The Safety Element of the San Bernardino County General Plan (County of San Bernardino 2007) provides for mitigation of geologic hazards through a combination of engineering, construction, land use, and development standards. The plan addresses the geologic hazards present within the county, including fault rupture, ground shaking, liquefaction, seismically generated subsidence, seiche and dam inundation, landslides/mudslides, nonseismic subsidence, erosion and volcanic activity. The county has prepared hazard overlay maps to address fault rupture, liquefaction hazards, and landslide hazards. Special consideration, including possible engineering/geologic evaluation, is required for development of sites designated on the maps.

3.3.2 Existing Conditions

3.3.2.1 Topography

The site of the Proposed Action lies on a relatively flat area of land in the Lucerne Valley of the Mojave Desert physiographic province, just north of the Transverse Ranges and San Bernardino Mountains. The Transverse Ranges Province is east trending, and the San Gabriel Mountains form the central part and the San Bernardino Mountains form the eastern part of the Transverse Ranges.

The Mojave Desert is a broad interior region of southeastern California characterized by isolated north-trending mountain ranges separated by broad expanses. The Mojave Desert forms the western portion of the larger Basin and Range Province within the Great Basin. The Mojave Desert is a late Tertiary- and Quaternary-aged infilled basin, bounded to the south and west by the San Andreas Fault Zone and on the north and northwest by the Garlock fault and Basin and Range Province near the California-Nevada state line and the Death Valley National Park region. Interior enclosed drainage and many alluvial fans and playas are characteristic of the Mojave Desert.

3.3.2.2 Geologic Setting

The Lucerne Valley stretches east-west from Deadman's Point to Old Woman Springs and north-south from the Granite and Ord Mountains to the San Bernardino Mountains. The geology and topography of the Lucerne Valley is illustrated in Figure 3.3-1.

Sedimentary Precambrian rocks were metamorphosed during the Mesozoic era. During this era a layer of limestone approximately one mile thick was also deposited. Explosive invading magma broke through the surface, producing the blue granite seen at Cougar Buttes. The Cenozoic period marked an era of large inland lakes and hot springs. Geothermal venting related to the hot springs concentrated metals into vein deposits in the area. Movement from the San Andreas Fault system during the Pliocene Epoch formed the San Bernardino Mountains. The late Miocene/Pliocene Old Woman Sandstone underlies most of the Lucerne Valley and comprises the groundwater basin. The unit is estimated to reach thicknesses of between 600 and 1,000 feet.

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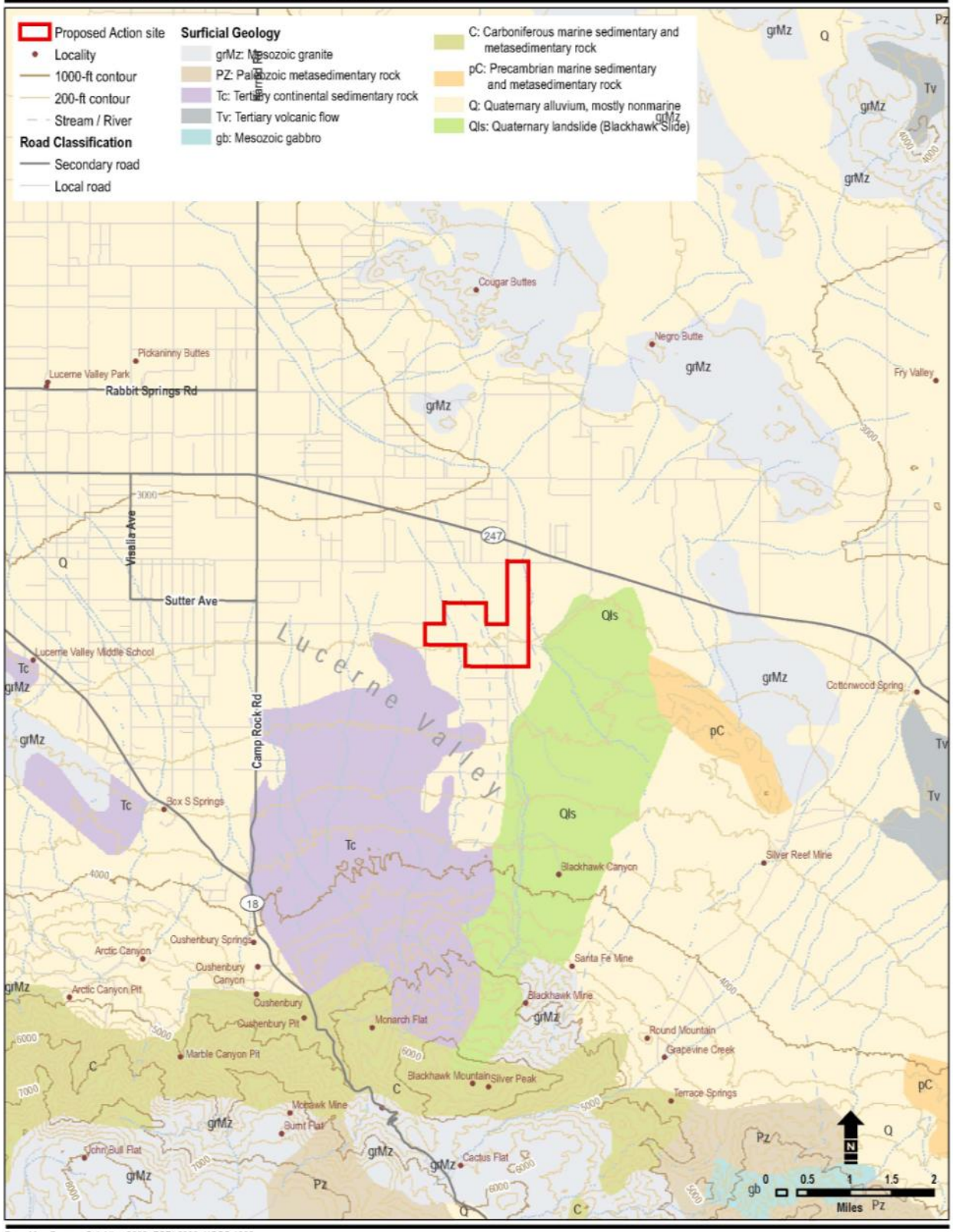

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999; California Department of Conservation, Division of Mines and Geology; U.S. Geological Survey 1977.

Figure 3.3-1

Geology and Topography of Lucerne Valley

Lucerne Valley Solar Project

San Bernardino County, California

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The surface of the Lucerne Valley is composed of Quaternary alluvium deposits. The Pleistocene alluvium consists of gravels and sand fragments derived from surrounding hills. The deposits are estimated to be of Pleistocene in age and to reach thicknesses of up to several hundred feet. The unconsolidated surface sediments consist of Holocene-age coarse material, younger alluvium, and playa deposits that are unconformable above older formations. The coarse materials are exposed along the base of the San Bernardino Mountains and along other mountains as large fragments derived from surrounding hills, which grade into younger alluvial deposits. The alluvium is composed of gravel, sand, and clay that is also derived from adjacent hills. Younger deposits range in thickness from a few inches to approximately 100 feet. The playa deposits, which are concentrated in the Lucerne (dry) Lake and Rabbit Springs (dry) Lake regions, consist predominantly of fine sand, clay, and silt 100 to 150 feet thick.

The Blackhawk Slide is located southeast of the Proposed Action area. It was likely triggered by an earthquake about 17,000 years ago, when 400,000,000 tons of Blackhawk Mountain fell vertically nearly 3,000 feet and horizontally 25,000 feet onto the valley floor. The force generated by this event would have equaled a moderate sized nuclear explosion. The site is studied by geologists from around the world.

Table 3.3-1 provides the description and extent of each Quaternary surficial unit within the site. The term “Quaternary” indicates that these sediments were deposited in the recent past, specifically within the past 2.6 million years. The location of surficial units is illustrated in Figure 3.3-2. The Lucerne Valley is composed of a series of alluvial fan deposits. Alluvial fans are wedge- or fan-shaped slopes at the base of mountain ranges created through depositions of thousand to millions of years of eroded material (United States Geological Survey [USGS] 2001). These are deposits of loose sediments that have not been cemented into rock. Due to the loose nature of alluvial fans, they are subject to constant hydrologic reworking. Stream channels migrate over time and continually change the landscape. During heavy precipitation, alluvial fan deposits can be subject to rapid flow changes, resulting in debris flows, landslides, and flash floods. Extreme rain events can suspend sand, gravel, or even boulders and transport them downstream or downslope, resulting in damage to structures impacted by flood waters (USGS 2001).

Table 3.3-1 Quaternary Surficial Units within the Proposed Site

Geologic Label	Name	Description	Acres within Site
Qmof	Moderately old alluvial fan deposits, middle Pleistocene	Cemented sandstone and conglomerate.	3.36
Qof	Old alluvial fan deposits, late Pleistocene	Sand and pebbly to cobbly gravel. Well developed pavement with moderately to strongly varnished pebbles.	19.73
Qvodf	Very old debris flow fan deposits, middle or early Pleistocene	Unsorted; massive. Angular, matrix-supported pebble- to cobble-sized clasts in sand matrix; angular to subrounded clasts. Very well cemented.	28.94
Qvos	Very old slope wash and alluvial deposits, middle or early Pleistocene	Pervasively chalky-cemented sand and pebbly sandstone; firm to hard; poorly sorted; cemented to well cemented.	0.28
Qw	Active wash deposits, late Holocene	Unconsolidated medium- to coarse-grained sand and sandy gravel with subordinate fine sand and silt; white; bar and swale morphology.	34.86

Table 3.3-1 Quaternary Surficial Units within the Proposed Site

Geologic Label	Name	Description	Acres within Site
Qyas	Young alluvial and slope wash deposits, Holocene	Alluvial and slope wash apron on flanks of inselbergs. Unit includes sand and pebbly sand deposited by channelized flow on small alluvial fans and in small washes, and by unconfined overland flow across older surfaces.	0.02
Qyf_3	Young alluvial fan deposits, unit 3, late and (or) middle Holocene	Unconsolidated to slightly consolidated sand and gravel, poorly to moderately sorted. Sand is medium- to coarse-grained; gravel includes mostly pebbles and cobbles.	125.67
Qyf_4	Young alluvial fan deposits, unit 4, late and (or) middle Holocene	Unconsolidated to slightly consolidated sand and gravel, poorly to moderately sorted. Sand is medium- to coarse-grained; gravel clasts are mostly pebbles with scattered cobbles.	70.98
$Qyfw_4$	Young alluvial fan feeder wash deposits, unit 4, late and (or) middle Holocene	Sand and gravel deposited in feeder channels to young alluvial fans of unit 4.	8.48
$Qyso_{s3}$	Young slope wash and alluvial deposits, oxidized, substrate 3, Holocene and latest Pleistocene	Oxidized slope wash and alluvium deposited on substrate of moderately old and (or) very old fan deposits on the middle to upper piedmont of the San Bernardino Mountains.	213.31
Qyw	Young wash deposits, late Holocene	Unconsolidated to slightly consolidated medium- to coarse-grained sand and sandy gravel with subordinate fine sand and silt.	12.39

Source: USGS 2000

3.3.2.3 Seismicity

Faults

The site of the Proposed Action lies in terrain with a long history of complex Mesozoic and Cenozoic tectonics associated with mountain building and development of basins and linear valleys. Throughout the late Tertiary and Quaternary, extensive linear faults (strike-slip) and vertical faults (thrust and normal) developed in the wake of the San Andreas transform fault system, becoming the boundary between the mobile North American Plate and Pacific Plate. As a result, many faults were abandoned as others newly formed to transfer or accommodate upper crustal movements throughout the Quaternary. The major Quaternary fault zones consist of strike-slip faults with some reverse and normal faults. Major fault zones near the site are shown on Figure 3.3-3.

Eastern California Shear Zone

The site of the Proposed Action lies in the Eastern California Shear Zone (ECSZ). The ECSZ extends northerly across the western half of the Mojave Desert Province, is bounded to the west by the Helendale-South Lockhart Fault Zone and to the east near the Calico-Hidalgo and Pisgah-Bullion Fault Zones (Figure 3.3-3). The Mojave Desert encompasses north- to northwest-trending dextral shear, rigid-block boundary conditions, accompanied by extensional normal faulting and conjugate east striking sinistral faults.

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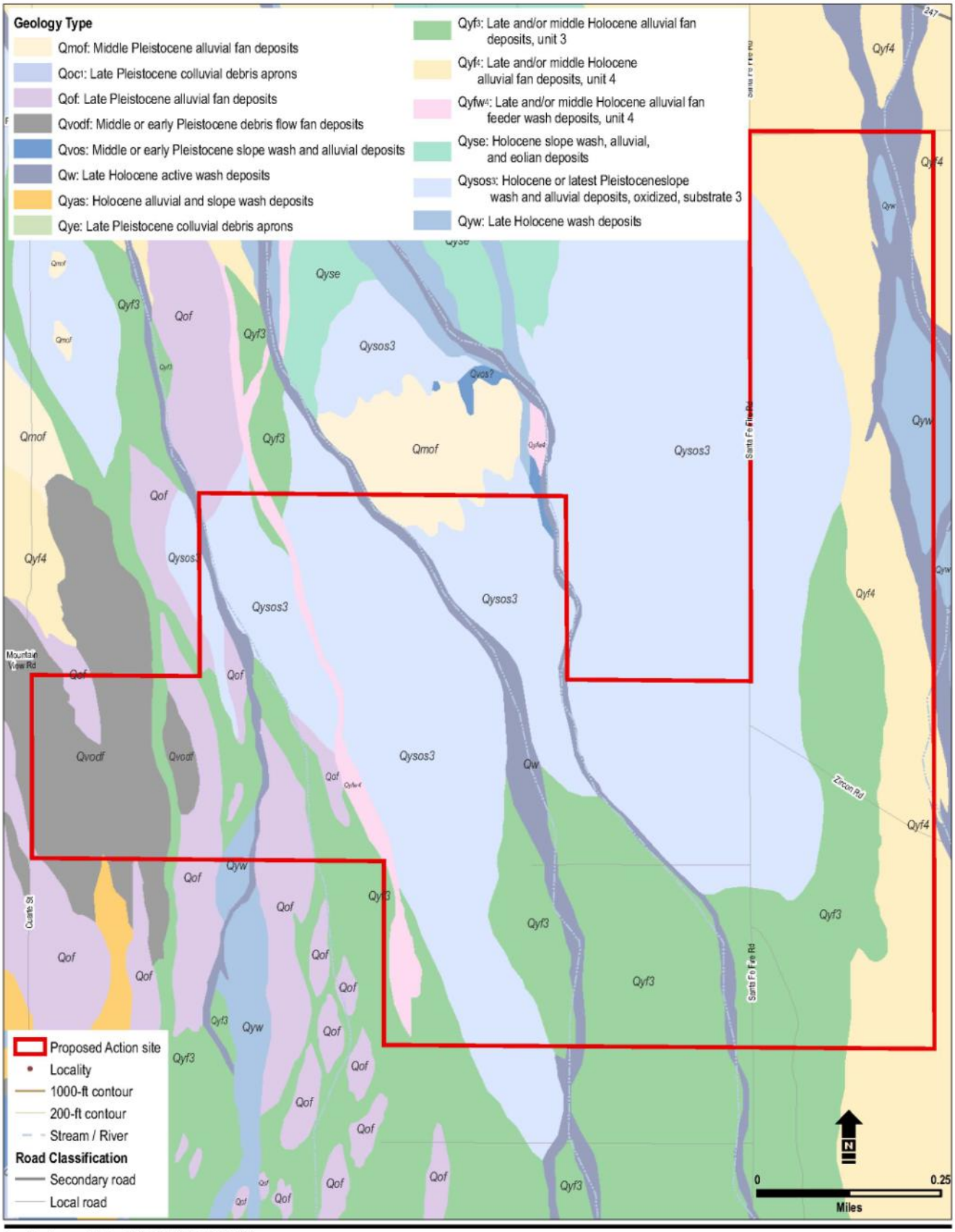

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999; California Department of Conservation, Division of Mines and Geology; U.S. Geological Survey 1977.

Figure 3.3-2

Surficial Geology of the Proposed Action Site

Lucerne Valley Solar Project

San Bernardino County, California

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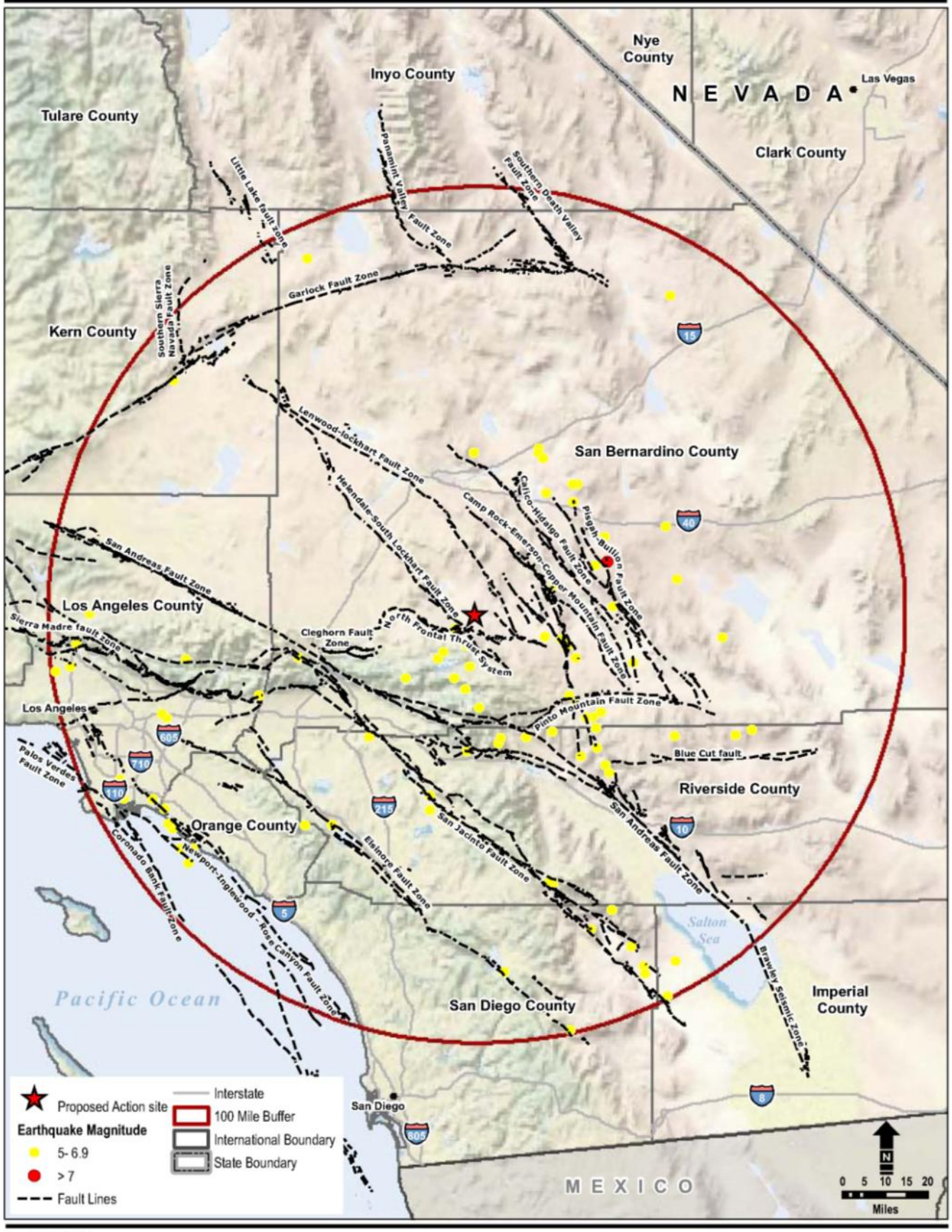

Source: USGS 2004

Figure 3.3-3

Fault Zones and Epicenters of M ≥ 5.0 Earthquakes Since 1900 Within 100 Miles of the Proposed Action Site

Lucerne Valley Solar Project

San Bernardino County, California

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The structural domains of the Mojave Desert, described by Miller et al. (2005) relates the transfer of Quaternary strain and accumulation into fault related belts. The faults include, from west to east, the northwest striking Helendale-South Lockhart Fault Zone, the Lenwood-Lockhart Fault Zone, and Harper-Camp Rock Fault Zone (Figure 3.3-3). Kinematic models indicate that structural blocks bounded by northwest-striking dextral faults have undergone little rotation. The blocks bounded by the east-striking sinistral faults have undergone as much as 60 degrees clockwise rotation (Miller et al. 2005). These blocks have accumulated strain in the middle to upper crust because the Miocene are evolving in the Quaternary to form new faults and transfer strain across these rigid blocks from one major dextral fault to the next.

Earthquakes

Since 1900, there have been 106 earthquakes with a magnitude (M) of 5.0 or higher on the Richter scale that have occurred within 100 miles of the proposed route (USGS 2005). Figure 3.3-3 shows the regional distribution of these data. Two earthquakes above 7.0 M have occurred within 100 miles of the site. These two earthquakes and associated damage are described below.

The 7.3 M Landers earthquake occurred in June 1992, approximately 25 miles southeast of the site in the Camp Rock-Emerson-Copper Mountain Fault Zone (USGS 2005). The earthquake resulted in two deaths due to heart attacks and more than 400 injured persons. Surface fault displacements along the 70-kilometer segment amounted to up to 5.5 meters of lateral movements and 1.8 meters of vertical movement (USGS 2009a).

The 7.2 M Hector Mine earthquake occurred in October 1999, approximately 32 miles northeast of the site in the Pisgah-Bullion Fault Zone (USGS 2005). This earthquake was the result of a fault rupture resulting in 5.2 meters of lateral movement. Very strong shaking and moderate damage were reported immediately surrounding the epicenter. In Lucerne Valley, strong shaking and light damage were reported (USGS 2009b). Overall, damage was minimal due to the remote location of the earthquake (Southern California Earthquake Data Center 2009).

Seismic Shaking

Seismic activity may cause hazards that can cause damage and loss of life. Such hazards include ground shaking, landslides, rock falls, and surface faulting. In general, ground shaking produces the most widespread damage because it can affect large areas. The USGS produces seismic hazard maps of peak horizontal acceleration (ground shaking), and the unit of measure is percent of gravity. Peak acceleration is the largest ground acceleration recorded by a particular station during an earthquake (USGS 2008a).

The site is categorized as having peak ground acceleration (PGA) for a 10 percent probability of exceedance in 50 years of 30 percent gravity. This PGA is associated with “moderate” shaking resulting in “low to moderate damage” to structures (USGS 2008b). The data are derived from seismic hazard curves calculated on a grid of sites across the southwestern United States that describe the frequency of exceeding a set of ground motions. The ground motions relate the source characteristics of the earthquake and propagation path of the seismic waves to the ground motion at a site.

3.3.2.4 Landslides

A landslide is the movement of soil, rock, or other earth material downhill in response to gravity (USGS 2004). Several natural events can precipitate landslides, including earthquakes, volcanic eruptions, and most commonly, rainfall. In addition, human activity can cause landslides.

The National Landslide Hazards Program prepared an overview map of landslide incidence and susceptibility by evaluating the geologic map of the United States and classifying the geologic units according to high, medium, or low landslide incidence (number of landslides) and high, medium, or low susceptibility to landslides. The site is categorized as having low susceptibility to and incidence of landslides (Godt 2001).

3.3.2.5 Liquefaction

Liquefaction is a phenomenon in which loose to medium dense, saturated, granular materials undergo matrix rearrangement, develop high pore water pressure, and lose shear strength because of cyclic ground vibrations induced by earthquakes. This rearrangement and strength loss is followed by a reduction in bulk volume of the liquefied soils. The secondary effects of liquefaction can include the loss of load-bearing capacity below foundations, settlement in level ground, and instability in areas of sloping ground (also known as lateral spreading). Typically, liquefaction occurs over a high water table, within 32 feet of the ground surface (Dennen and Moore 1986). Liquefaction risk is anticipated to be low based on the relatively deep occurrence of groundwater at 350 feet (see Section 3.5, “Water Resources/Hydrology”).

3.4 Soils

This section identifies the soil conditions within and adjacent to the Proposed Action site and discusses applicable regulations. Information in this section is largely based on existing data from the State Soil Geographic database (STATSGO) and Natural Resources Conservation Service (NRCS) county soil survey maps. The NRCS Soil Survey Geographic database does not cover this region.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Comments and concerns related to soils resources were raised about fugitive dust and cryptobiotic soils and about erosion. These comments are addressed in the discussion of existing conditions (Section 3.4.2) and the analysis of direct and indirect effects (Section 4.4.2).

3.4.1 Applicable Plans, Policies, and Regulations

Federal and state regulations pertaining to agricultural land and soils include the Farmland Protection Policy Act, the California Land Conservation Act (Williamson Act), and the California Department of Conservation Farmland Mapping and Monitoring Program. The program identifies and designates lands according to categories defined in the Farmland Protection Policy Act (7 United States Code, Section 4201, et. seq.). Agricultural regulations, however, do not pertain to the Proposed Action because the site is not located on prime farmland (Fahnestock 2009; Federal Surface Mining Control and Reclamation Act 1977; NRCS 2005).

3.4.2 Existing Conditions

Wasco-Rosamond-Cajon soils occur throughout the Proposed Action site. The association consists of very deep, nearly level to slightly sloping, well-drained, sandy-loam soils. Wasco soils are found on alluvial fans and floodplains formed within the last 15,000 years. Rosamond soils are found on the lower margin of the alluvial fans between the sloping fans and the playas. Cajon soils are found on alluvial fans and river terraces. The soils of this association are unsuitable for cultivation, and their use is restricted to grazing, forestland, or wildlife. The soil limitation in this unit is erosion, which may be an issue unless low-growing plant cover is maintained (U.S. Department of Agriculture [USDA] 1984). Further information is provided in Table 3.4-1.

Table 3.4-1 Summary of Soil Types and Limitations by Percent of the Proposed Action Site

Percent of Total	Acres	Soil Association	Texture Class	Capability Class (Non-irrigated)[a, b]	Capability Subclass (Non-irrigated)[c]	Drainage Class	Hydric Class	Slope Percent
100	517.6	Wasco-Rosamond-Cajon	Sandy Loam	7	e	Well drained	Non hydric	2–5

Source: STATSGO 2006
Notes:
[a]Irrigated capability-class and subclass data were available but not included in this table because none of the Proposed Action site is classified as prime farmland.
[b]Capability Class 7 definition: Soils have very severe limitations that make them unsuitable for cultivation.
[c]Capability Subclass "e" definition: Limitation due to erosion unless low-growing plant cover is maintained.

Erosion

As stated above, soil erosion may be an issue on the Proposed Action site unless certain erosion control measures are implemented. The Proposed Action site is ranked in Wind Erodibility Group 2 (STATSGO 2006), indicating that the soils are very highly erodible, and crops can only be grown if intensive measures are used to control wind erosion (USDA 1984).

Cryptobiotic Crusts

Cryptobiotic crusts (biological soil crusts) are thin layers of microbial-rich plant material that live on the surface of many soils types in desert areas. Other names for cryptobiotic crusts include cryptobiotic, cryptogamic, and microbiotic soil crusts. These biological communities serve a number of functions in stabilizing the soil and creating an environment for plant species to inhabit harsh environments. The thin crusts on the soil help control erosion and retain water. If the layer of microbes is altered, it can take from 5 to 250 years to regenerate, depending on rainfall levels. Cryptobiotic soils exist in the Mojave Desert area but are uncommon. According to local NRCS experts, coverage near the Proposed Action site is less than five percent and not critical for dust suppression (Fahnestock 2009; U.S. Geological Survey 2002).

3.5 Water Resources/Hydrology

This section identifies water resources within and adjacent to the site of the Proposed Action, discusses existing conditions, and identifies applicable regulations. Water resources that would be used during construction, operation and maintenance, and decommissioning are discussed.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to water resources were raised: (1) flash flooding; (2) drilling of new wells; (3) water use and volume for various construction and operation activities (e.g., dust suppression and panel cleaning); (4) water rights; and (5) water quality impairment. These comments are addressed in the discussion of existing conditions (Section 3.5.2) and the analysis of direct and indirect effects (Section 4.5.2).

3.5.1 Applicable Plans, Policies, and Regulations

3.5.1.1 Federal

Clean Water Act

In 1972, Congress passed the Federal Water Pollution Control Act, which was reauthorized in 1977, 1981, 1987, and 2000 as the Clean Water Act (CWA). The goal of the law is to eliminate pollution in the nation's waters by imposing uniform standards on all municipal and industrial wastewater sources based on the best available technology.

Sections 301 and 402 Permitting

Sections 301 and 402 of the CWA prohibit the discharge of pollutants from point sources to "Waters of the U.S.," unless authorized under a National Pollutant Discharge Elimination System (NPDES) permit. NPDES permits can be issued by the EPA or by agencies in delegated states. The NPDES permit program has been delegated in California to the State Water Resources Control Board (SWRCB).

Safe Drinking Water Act

This act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources: rivers, lakes, reservoirs, springs, and groundwater wells. This act authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water. The act also mandates a groundwater/wellhead protection program be developed by each state in order to protect groundwater resources that serve as a source for public drinking water.

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. The NFIP is a federal program enabling property owners in participating communities to purchase insurance protection against losses from flooding. Participation in the NFIP is based on an agreement between local communities and the federal government, which states that if a community adopts and enforces a floodplain management ordinance to reduce future flood risks

to new construction in Special Flood Hazard Areas, the federal government makes flood insurance available within the community as a financial protection against flood losses.

In support of the NFIP, FEMA identifies flood hazard areas throughout the United States and its territories by producing flood hazard boundary maps, flood insurance rate maps, and flood boundary and floodway maps. Several areas of flood hazards are commonly identified on these maps. One of these areas is the special flood hazard area or high-risk area, defined as any land that would be inundated by a flood having a one percent chance of occurring in any given year (also referred to as the base flood).

3.5.1.2 State

State water quality standards allow water bodies to be managed by establishing goals based on 1) designated uses of the water, 2) criteria set to protect human and aquatic organism health, and 3) antidegradation requirements to prevent current water quality from deterioration. Waters listed as impaired do not fully support their designated uses. Section 305(b) of the CWA requires states to submit water quality reports to the EPA every two years that provide a state-wide assessment of all waters. Section 303(d) requires states to provide a list of impaired waters only, identifying possible pollutants and prioritizing those waters for further pollution controls.

California Porter-Cologne Water Quality Control Act

This act was passed in 1969, and regulates surface water and groundwater within the state and also assigns responsibility for implementing CWA Sections 401, 402, and 303(d) in California. It established the SWRCB and divided the state into nine regions, each overseen by a Regional Water Quality Control Board (RWQCB). The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies, but much of its daily implementation authority is delegated to the nine RWQCBs. In California, San Bernardino County programs are administered by the Lahontan RWQCB, Region 6; the Colorado River Basin RWQCB, Region 7; and the Santa Ana RWQCB, Region 8. The regional boards govern the protection of surface waters by assessing the attainment of designated beneficial uses, and currently 23 uses are established for surface waters within the state.

Construction General Permit

CWA Section 402 regulates construction-related stormwater discharges to surface waters through the NPDES program. In California, the SWRCB has been delegated the authority by the EPA to administer the NPDES program through the RWQCBs and has developed a general permit for Storm Water Discharges Associated with Construction Activities, the Construction General Permit (Water Quality Order 99-08-DWQ). However, since the Proposed Action is schedule to begin construction in late 2010, the Applicant will have to obtain coverage under the Construction General Permit Order 2009-0009-DWQ which will be effective on July 1, 2010. This requirement is for all dischargers (California SWRCB 2009).

Because the Proposed Action would discharge stormwater, the Applicant is required to obtain an NPDES Construction General Permit Order 2009-0009-DWQ from the Colorado River Basin RWQCB, which would require them to prepare a Stormwater Pollution Prevention Plan (SWPPP) or obtain individual stormwater permits. The SWPPP must contain information about proposed site layout and topography, stormwater collection and discharge points, and drainage patterns across the site. It must also list Best Management Practices (BMPs) that would be used to protect stormwater runoff and visual, chemical, and sediment monitoring programs.

The Proposed Action area is under the jurisdiction of the Colorado River Basin RWQCB, which would need to be notified of the Applicant's intention to proceed. No specific California SWRCB regulations exist pertaining to the treatment of fuel spills during construction, although petroleum contaminated materials must be disposed of in accordance with applicable state and local regulations.

Groundwater Protection Areas and Wellhead Protection

The California Department of Public Health established the Drinking Water Source Assessment and Protection Program, which provides guidance to local level agencies for source protection of surface water and groundwater drinking water supplies. The California Department of Pesticide Regulation's Groundwater Protection Program is charged with identifying areas sensitive to pesticide contamination and develops mitigation measures and regulations to prevent pesticide movement into groundwater systems.

3.5.1.3 Local

Basin management for the Lucerne Valley is administered by the Mojave Water Agency in San Bernardino County. A Regional Water Management Plan was developed in 1994 and is still in place (California Department of Water Resources [DWR] 2004). One of the primary mandates of the agency is to ensure long-term public water supply through the protection of surface water and groundwater resources, including supply, storage, recharge capability, and chemical quality. The Applicant would confer with the Mojave Water Agency during implementation of the Proposed Action to ensure protection of groundwater resources and compliance with any established groundwater management plans and, if necessary, to secure permits needed for encroachment on water district easements.

San Bernardino County

Floodplain Management

The San Bernardino County Flood Control District was formed for the preservation and promotion of public peace, health, and safety in the aftermath of disastrous 1938 floods. The District exercises control over all main streams in the county, acquires a ROW for all main channels, constructs channels, and carries out an active program of permanent channel improvements in coordination with the U.S. Army Corps of Engineers. The district administers encroachment permits needed for flood channel crossings or any work within its ROW, should they be required.

Stormwater Management

The unincorporated areas of San Bernardino County, its 16 incorporated cities, and the San Bernardino Flood Control District are included as permittees in the NPDES Municipal Stormwater Permit. The Municipal Stormwater Permit and Section 4 of the Report of Waste Discharge, dated April 1995, require the development and adoption of New Development/Redevelopment Guidelines.

These guidelines are to be used by the permittees of the San Bernardino County Stormwater Program as a supplement to the Drainage Area Management Program and the Report of Waste Discharge. The purpose of preparing the guidelines was to identify pollutant prevention and treatment measures that could be incorporated into development projects. The guidelines recommend which BMPs should be required as standard practice. The guidelines provide information on stormwater quality management planning, general conditions, special conditions, and construction regulatory requirements.

The guidelines also define structural and non-structural BMPs and lists the BMPs that are considered standard practice for new developments. A major philosophy of the county's NPDES stormwater quality program is a regional approach to stormwater quality planning and management on a watershed basis (Camp Dresser and McKee 2000).

Currently, the County of San Bernardino follows state standards for water quality and does not have its own specific standards. During construction, projects are required to obtain coverage under the California's General Permit for Construction Activities, which is administered by the RWQCB. Stormwater management measures are required to be identified and implemented that would effectively control erosion and sedimentation and other construction-based pollutants during construction. Other management measures, such as construction of detention basins, are required to be identified and implemented that would effectively treat pollutants expected for the post-construction land uses.

Because projects are subject to regulatory requirements, effects on water quality standards or waste discharge requirements related to implementation of the County of San Bernardino General Plan are considered less than significant. All future individual construction projects over one acre that are implemented under the County of San Bernardino General Plan would be required to have coverage under the California's General Permit for Construction Activities (County of San Bernardino 2007). As required in the General Permit for Construction Activities, during and after construction, BMPs would be implemented to reduce or eliminate adverse water quality effects resulting from development. In addition, a SWPPP would have to developed, approved, and implemented.

3.5.2 Existing Conditions

3.5.2.1 Surface Water Resources and Flooding

The site of the Proposed Action is located with the Mojave River Watershed and Blackhawk Canyon and Cougar Buttes subbasins (Cal-Atlas 2009). Annual precipitation in the watershed is low, ranging from four to eight inches. Surface water within the watershed drains into Lucerne Dry Lake, an ephemeral lake northwest of the site (DWR 2004).

The surface of the site is characterized by desert scrub vegetation, desert washes, and disturbed soils. Approximately 96 percent of the site is sparsely to moderately vegetated, with the remaining area made up of desert wash channels (three percent) and disturbed areas (one percent), consisting of roads and sediment berms scattered throughout. Alluvium in the site area is composed of clay, sand, and gravel material and is a few inches up to 100 feet thick (Chambers Group 2009). The soils and alluvium are highly erosional, as evidenced by the incised scouring and presence of unconfined drainage channels. There are seven larger drainages on the site, with numerous smaller drainages scattered throughout the area. The few dirt roads on the site are relatively small (less than five feet in width). The sediment berms appear to be remnants of historic hand-dug mining activity.

The desert washes, which are typical in the Mojave Desert, are braided in plan view. These streams flow only intermittently during seasonal precipitation events, are unstable, and can migrate laterally during significant runoff. They can also carry destructive bedloads (boulders and gravels) during rain events. Significant desert wash systems are present in the central portion of the site and along the eastern edge. There are no perennial streams, wetlands, or water bodies located on or near the site. Modeling done by the Applicant on the major drainages suggests that these channels could experience high flows during episodic rain

events. Although no floodplain studies or mapping exercises have been conducted to date for this area to assess flooding hazards (DWR 2009); during the public scoping process, residents and resource agencies noted that this area is subject to intense flooding events, including flash floods (Appendix A). The site is identified by FEMA as Zone D, indicating that there are possible but undetermined flood hazards in the area.

Geologically, the site is located on the distal (downgradient) portion of an alluvial fan that forms a large cone-shaped sedimentary deposit. This is a common depositional environment in this region (Reading 1980). The entire Proposed Action area is an alluvial fan, meaning that it has had significant amounts of flowing water carrying and subsequently depositing sediments across its entire extent. The processes that occur on alluvial fans can be random and difficult to model.

Sediments, which can range from clay to large boulders, are transported across alluvial fans by water in channels, debris flows, and sheet floods. Water flows on alluvial fans in arid climates are triggered by significant precipitation events. Specific to the Mojave Desert region these would include the random summer cloud bursts, which occur infrequently but can supply a large amount of water to a localized area, or a larger storm, such as a tropical storm that occurs on a 100-year time scale.

Another approach to understand and assess flood hazards on alluvial fans has been developed for arid alluvial fans in Nevada. This approach uses geologic mapping to determine active and inactive portions of alluvial fans. Physical features, such as stratigraphic relationships, topography, drainage patterns, soil development, and surface morphology, are used to determine active and inactive portions of fans (House 2005). This approach may improve the accuracy of surface water modeling on alluvial fans and reduce the associated flood hazards.

Surface Water Quality

Although ephemeral streams and washes do not have beneficial use designations assigned by the State of California, these systems do provide natural distribution of water and sediments on floodplains, as well as providing recharge for groundwater in the region. No information is available as to the surface water quality present on the site during rain events, but due to the nature of flooding that occurs, resulting flood waters would be high in turbidity and contain any contaminants that had been present on the soil surface. As this is a rural, undeveloped area, anthropogenic contaminants on the surface are expected to be low to nonexistent.

3.5.2.2 Ground Water Resources

The site of the Proposed Action lies within the Basin and Range Physiographic Province, which has the following principal aquifer media: volcanic rocks, carbonates, and basin-fill sediments. Together these aquifers are called the Basin and Range Aquifer System. The Basin and Range Physiographic Province is broken down at the regional level, depending on geologic drainage features, such as the drainage boundaries of a large river or stream, into hydrographic basins. The site is underlain by the Lucerne Valley Groundwater Basin in the northwest part of the Colorado River Hydrologic Region (DWR 2004). This groundwater basin provides important water supply functions and provides two-thirds of the water supply needed for non-potable and potable public uses in the watershed (USGS 2008). Recharge to the basin is highly seasonal and comes primarily from runoff from the San Bernardino, Granite, Ord, and Fry mountain ranges (DWR 2004). As with surface drainage, the recharge ground waters flow toward Lucerne Dry Lake. Since 1917, the withdrawal of groundwater from the basin, combined with slow recharge, has frequently resulted in overdraft conditions in many parts of the basin (DWR 2004).

Groundwater Quality

One USGS monitoring well, which has been monitored since October 1994, is present in the site area. Typical well elevations are between 350 and 360 feet below ground surface. Water supply well locations within one mile of the site are provided by DWR, as shown on Figure 3.5-1. Other specific data regarding these wells (e.g., owner, depth, well logs, production rate, static water level) was not available from DWR.

3.5.2.3 Water Use and Discharge Related to the Proposed Action

The Proposed Action would require water for both construction and operation purposes. The Applicant has specified that approximately 10,000 gallons per year would be used (Chevron Energy Solutions 2009) for washing the solar panels. This water would either be supplied from new or existing on-site wells or from off-site sources as yet to be specified.

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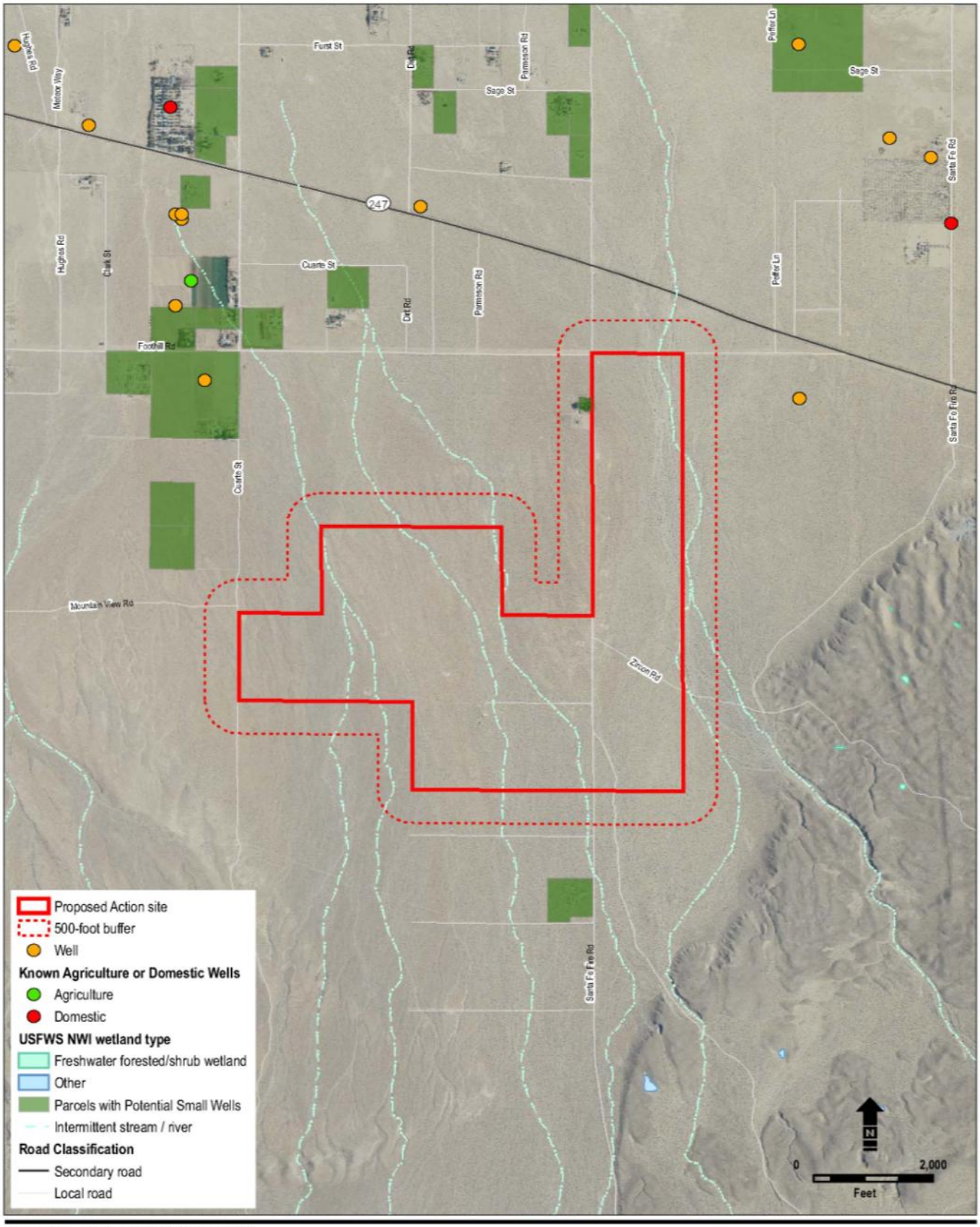

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; USFWS 1999; NHD 1993; Bing Aerial 2009

Figure 3.5-1
Hydrologic Features
Lucerne Valey Solar Project
San Bernardino County, California

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3.6 Biological Resources

This section identifies biological resources within and adjacent to the site of the Proposed Action and discusses applicable regulations. This section is based largely on the final biological assessment for the Proposed Action (Appendix C) and the Comprehensive Biological Resource Assessment for the Chevron Solar Project Site Community of Lucerne Valley, California (Appendix D).

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Comments related to biological resources generally concerned effects on desert habitats and plants and animals found on the site, including those afforded greater legal protection owing to heightened concern for conservation status (e.g., desert tortoise [*Gopherus agassizii*]). Wildlife movement corridors and effects on connectivity among habitats were additional concerns.

3.6.1 Applicable Plans, Policies, and Regulations

3.6.1.1 Federal

Federal Endangered Species Act

The Federal Endangered Species Act (ESA) of 1973, as amended, provides for federal protection of plant and animal species listed as threatened or endangered by the federal government. The United States Fish and Wildlife Service (USFWS) administers the ESA on behalf of the United States. The major components of the ESA are as follows:

1. Provisions for the listing of threatened and endangered species;
2. The requirement for consultation with the USFWS on federal projects;
3. Prohibitions against “take” of listed species. Under the ESA, the definition of “take” is to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct”; and
4. Provisions to allow the incidental taking of threatened and endangered species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act prohibits “take” (i.e., killing, harassing, trapping, or attempting to do so) of native migratory bird species. Take also includes the destruction of active nests.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act makes it illegal to take bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), or to trade in eagle parts, eggs, or feathers.

3.6.1.2 State and Regional

California Endangered Species Act

The California Endangered Species Act establishes legal protection for state listed threatened and endangered plants and wildlife. The protection is administered under the authority of the California Department of Fish and Game (CDFG), which also identifies species of concern as

those that may become listed as threatened or endangered due to loss of habitat, limited distributions, and diminishing population sizes, or because the species is deemed to have scientific, recreational, or educational value. The CDFG recognizes that plants on California Native Plant Society Lists 1A, 1B, and 2 and some of the plants on Lists 3 and 4 qualify for listing under Sections 2062 and 2067 of the California Endangered Species Act.

California Fish and Game Code Sections 3503 and 3503.5

Code Section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Code 3503.5 makes it unlawful to take, possess, or destroy any birds in the order *Falconiformes* or *Strigiformes* (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird. Construction disturbance during the breeding season that results in the incidental loss of fertile eggs or nestlings, or otherwise leads to nest abandonment, is considered take. Disturbance that causes nest abandonment and/or loss of reproductive effort is also considered take by the CDFG.

California Fish and Game Code Sections 3511 and 5050

Code Sections 3511 and 5050 prohibit the taking and possession of birds and reptiles listed as "fully protected." The administering agency is the CDFG.

California Food and Agriculture Code Sections 7270–7224

The California Commissioner of Agriculture is granted the authority to investigate and control nonnative invasive weeds.

West Mojave Plan

The WEMO Plan amends the California Desert Conservation Area Plan and sets forth Areas of Critical Environmental Concern and Desert Wildlife Management Areas.

San Bernardino County Development Code

Removal of any native tree or plant requires a removal permit (provision 89.0115). Desert native plants cannot be harvested or removed except under a permit issued by the Agricultural Commissioner or other applicable county reviewing authority (provision 89.0415).

San Bernardino County General Plan

The County General Plan requires the retention of existing native vegetation for new development projects, particularly Joshua trees (*Yucca brevifolia*), Mojave yuccas (*Yucca schidigera*), creosote (*Larrea tridentata*) rings, and other species protected by the Development Code and other regulations. Conservation practices in the management of grading, replacement of ground cover, protection of soils and natural drainage, and the protection and replacement of trees are encouraged.

City of Victorville General Plan

The City General Plan requires preservation of native Joshua tree woodlands and specimens where possible (Resource Element, Policy 1.5). The City General Plan is implemented in Victorville Municipal Code (Chapter 1333), which prohibits the cutting, damaging, destroying, digging up, or harvesting of any Joshua tree without the written consent of the Director of Parks and Recreation.

3.6.2 Existing Conditions

Wildlife and birds were identified in March 2009 and during avian point-count transect surveys (Table 3.6-2; Chambers Group 2009) conducted in spring 2009 during four consecutive weeks on March 26 and 27 and April 1, 2, 9, and 17.

3.6.2.1 Vegetation

Vegetation consists of both the plant communities and individual plant species. Vegetation communities and plant species detected during site surveys were characteristic of the existing site conditions of relatively flat terrain with both undisturbed and disturbed areas. Vegetation communities and individual plant species were identified during a reconnaissance-level survey in March 2009 and during focused protocol-level surveys conducted in May 2009 (Chambers Group 2009).

Thirty-seven plant species were observed on the site during the one-day reconnaissance level survey, including the creosote bush, white bursage (*Ambrosia dumosa*), Nevada ephedra (*Ephedra nevadensis*), pincushion (*Chaenactis* sp.), scale-broom (*Lepidospartum squamatum*), devil's lettuce (*Amsinckia tesselata*), blunt tansymustard (*Descurainia pinnata* ssp. *glabra*), beavertail cactus (*Opuntia basilaris* var. *basilaris*), bladderpod (*Isomeris arborea*), astragalus (*Astragalus* sp.), phacelia (*Phacelia* sp.), littleleaf rhatany (*Krameria erecta*), Pacific blazingstar (*Mentzelia obscura*), desert mallow (*Sphaeralcea ambigua*), camissonia (*Camissonia* sp.), sapphire eriastrum (*Eriastrum sapphirinum*), California buckwheat (*Eriogonum fasciculatum*), larkspur (*Delphinium* sp.), box-thorn (*Lycium* sp.), and Joshua tree, among others (Chambers Group 2009). The protocol-level survey identified over 100 species of plants while looking for special status plant species.

Plant communities were determined in accordance with the categories set forth by Holland (1986) and Sawyer and Keeler-Wolf (1995). Plants of uncertain identity were collected and subsequently identified from keys, descriptions, and illustrations in Abrams (1923, 1944, and 1951), Abrams and Ferris (1960), Baldwin et al. (2002), Ingram (2008), MacKay (2003), and Munz (1974). Plant nomenclature follows that of *The Jepson Desert Manual: Vascular Plants of Southeastern California* (Wetherwax 2002). Identification and distribution of vegetation across the site was determined from reconnaissance-level field surveys conducted by Chambers Group on March 16, 2009 (Chambers Group 2009).

The site is composed of open space dominated by several vegetation communities (Table 3.6-1). Three major plant communities were mapped within the site including creosote bush-white bursage series, white bursage series, and desert wash. Some of the site was disturbed, and low densities of invasive weed species were located throughout the site. Figure 3.6-1 shows the locations of mapped vegetative communities throughout the Proposed Action area within the Lucerne Valley. A summary of common plant communities is provided below, followed by a discussion of succulent plant species.

Table 3.6-1 Vegetation Communities in the Proposed Action Area

Vegetation Community	Area (acres)	Percentage of Proposed Action Area
Creosote bush (white bursage)	319	62
White bursage	176	34
Desert wash	18	3
Disturbed	5	1
Total	**518**	**100**

Source: Chambers Group 2009

Creosote Bush-White Bursage Series

Creosote bush-white bursage series is an extremely drought-tolerant mixed evergreen-deciduous shrubland that typically consists of well-drained secondary soils with very low available water holding capacity (Sawyer and Keeler-Wolf 1995). This community type is dominated by creosote bush and white bursage, with creosote bush occupying 55 percent and white bursage occupying 45 percent of the total vegetative cover in this portion of the site (Chambers Group 2009). Total vegetative cover by perennials is approximately 45 percent. This community is found on slopes and fans, and in valleys on well-drained soils at elevations up to 3,300 feet above mean sea level (amsl). Ephemeral herbs within this community typically flower in late March and April if winter rains are sufficient.

This community is located throughout the eastern portions of the site and accounts for 62 percent (319 acres) of the total Proposed Action area (Chambers Group 2009). In addition to creosote bush and white bursage, other plant species common to this portion of the site include common fiddleneck (*Amsinckia menziesii*), blackbush (*Coleogyne ramosissima*), Nevada ephedra, winter fat (*Krascheninnikovia lanata*), box-thorn, blazingstar species (*Mentzelia* sp.), golden cholla (*Opuntia echinocarpa*), big galleta grass (*Pleuraphis rigida*), and Joshua tree (Chambers Group 2009).

White Bursage

White bursage series is a mixed evergreen-deciduous shrubland dominated by white bursage, with creosote bush in a lower proportion. The shrub canopy, typically less than 10 feet in height, is two-tiered, with an upper tier consisting of a few creosote bush shrubs and a lower tier of white bursage (Sawyer and Keeler-Wolf 1995). Total vegetative cover in this series was approximately 35 percent within this portion of the site, with white bursage comprising 75 percent and creosote bush comprising 25 percent of the plants. The ground layer is open with annual species seasonally present. This community occurs on alluvial fans or at the base of a mountain where several alluvial fans have merged (bajadas), stabilized sand fields, and upland slopes with well-drained soils at elevations up to 4,000 feet amsl (Sawyer and Keeler-Wolf 1995). This series was present where the ground appeared more compacted and with larger soil particles when compared to the ground occupied by the creosote bush-white bursage series within the site (Chambers Group 2009).

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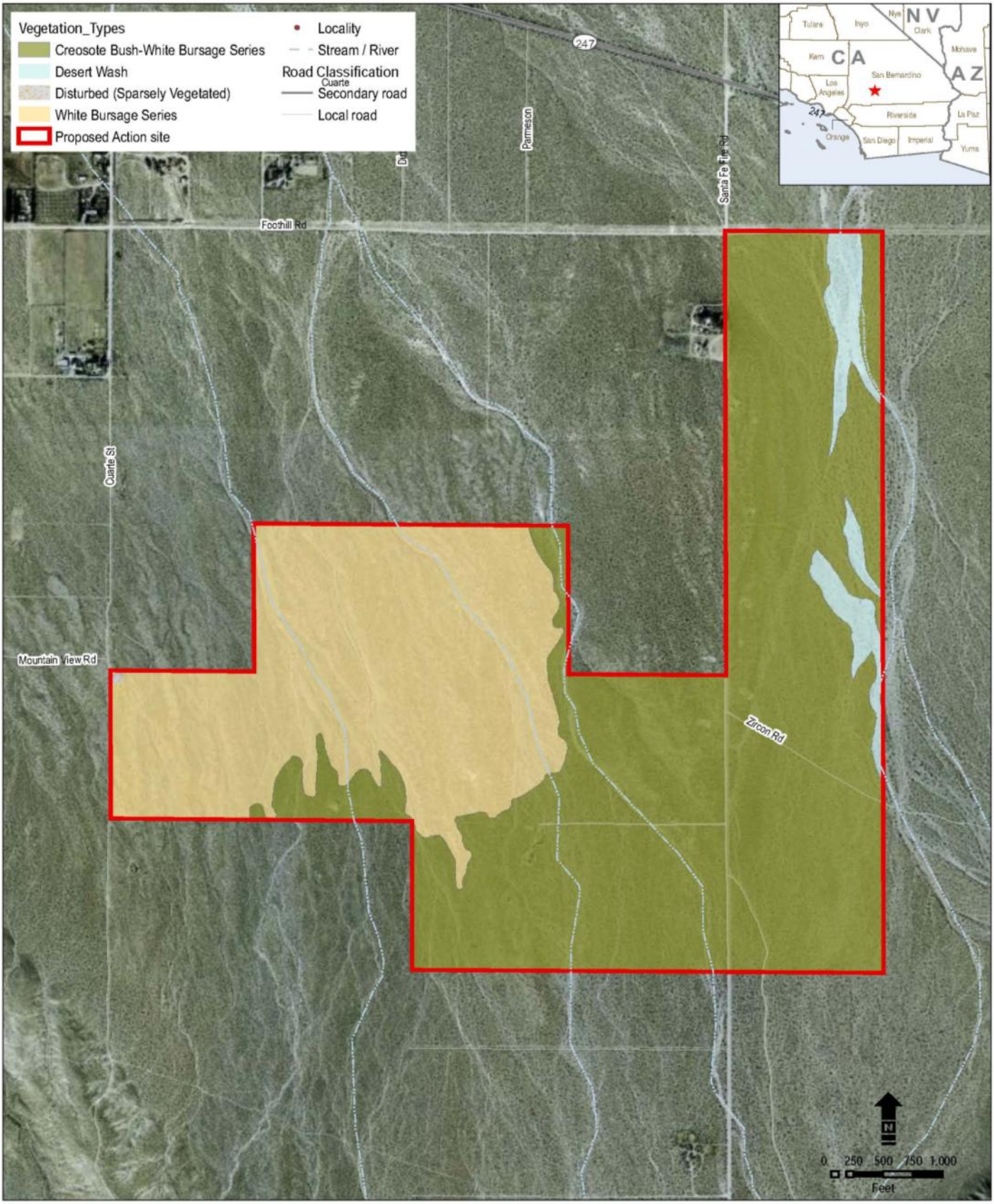

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999; California Resource Agency, Legacy Project, 2003.

Figure 3.6-1
Vegetation Types Map
Chevron Lucerne Solar Project
San Bernandino County, California

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This community is present on the northwestern portion of the site and accounts for 34 percent (176 acres) of the total Proposed Action area (Chambers Group 2009). In addition to white bursage and creosote bush shrubs, other plant species common to this portion of the site include Nevada ephedra, Pima rhatany (*Krameria erecta*), and box-thorn. Less common species found within this community include common fiddleneck, wingnut cryptantha (*Cryptantha pterocarya*), flat-topped buckwheat (*Eriogonum deflexum*), California buckwheat, wishbone bush (*Mirabilis* sp.), phacelia, big galleta grass, and Joshua tree (Chambers Group 2009). Joshua trees were less abundant in this portion of the site than within the creosote bush-white bursage series.

Desert Wash

Desert washes are typically located in sand or gravel drainages with braided channels that migrate with every surface flow event (Holland 1986). The substrate of the desert wash areas at within the site consisted of loose sandy soil with very little ground cover (Chambers Group 2009). This habitat accounts for three percent (18 acres) of the total Proposed Action area and is located in the northeastern corner and eastern edge of the site. This community supports a larger diversity of plant species than is found throughout other portions of the site. The dominant plant species within this portion of the site are cheesebush (*Hymenoclea salsola*) and blunt tansymustard; white bursage, Nevada ephedra, creosote bush, desert alyssum (*Lepidium fremontii* var. *fremontii*), and sandpaper plant (*Petalonyx thurberi*) are also fairly common (Chambers Group 2009). Other less frequently occurring species in the desert wash include common fiddleneck, four-wing saltbush (*Atriplex canescens*), blackbush, wingnut cryptantha, bladderpod, scalebroom (*Lepidospartum squamatum*), golden cholla, big galleta grass, London rocket (*Sisymbrium irio*), and occasional Joshua trees (Chambers Group 2009).

Disturbed

Approximately one percent (five acres) of the site is disturbed habitat, defined as areas that are either devoid of vegetation (cleared or graded) such as dirt roads or heavily compacted areas with sparse vegetation. This area is located immediately south of the junction of Donaldson Road and Mountain View Road in portions of the dry washes where scouring has taken place, in large areas of desert pavement, and on sediment berms (Chambers Group 2009). Only sparse vegetation is found growing in disturbed areas and species include stunted white bursage shrubs, red-stemmed filaree (*Erodium cicutarium*), sapphire eriastrum, and Mediterranean schismus (*Schismus barbatus*).

Succulent Plant Species

Succulent plant species are considered important components of desert communities because they are long-lived and many wildlife species depend on them for survival (Chambers Group 2009). Succulent plant species within the site include:

- Cottontop cactus (*Echinocactus polycephalus* var. *basilaris*) (fewer than 5 individuals) and
- Beavertail cactus (30 to 50 individuals).

3.6.2.2 Invasive Species

Nonnative invasive weeds are opportunistic plants that readily colonize disturbed areas and that can adversely affect the habitats they invade economically, environmentally, or ecologically (Chambers Group 2009). They are considered by the BLM to be plants that have been introduced into an environment where they did not evolve (BLM 2010). They usually have no

natural predators to limit their reproduction and distribution, thereby quickly spreading out of control and excluding or outcompeting native species. This can cause habitat homogenization by decreasing the overall species diversity of an area. As a result, invasive species can have dramatic effects on the natural ecosystem by reducing available habitat for native vegetation, as well as altering forage and wildlife habitat. The cost and complexity of managing invasive weeds and restoring native habitats increases the longer these situations are not adequately addressed as eradication is intensive, time consuming, and costly.

Weeds deemed by the California Invasive Plant Council as nonnative invasive in desert provinces could occur on the site and are of concern to the BLM. These weed species include Sahara mustard (*Brassica tournefortii*), London rocket, Russian thistle (*Salsola tragus*), red-stemmed filaree, foxtail chess (*Bromus madritensis* ssp*. rubens*), cheatgrass (*B. tectorum*), and Mediterranean schimus (*Schismus barbatus*).

All the invasive weed species identified by the California Invasive Plant Council, excluding Mediterranean tamarisk (also called salt cedar), have been observed on the site. The overall density of weed species throughout the site was very low. Populations of weeds were concentrated along dirt roads or adjacent to home sites.

3.6.2.3 Wildlife

Wildlife species detected during site surveys were characteristic of the existing site conditions (Chambers Group 2009) of relatively flat terrain with limited vegetation communities. Wildlife and birds were identified in March 2009 and during avian point-count transect surveys (Table 3.6-2; Chambers Group 2009) conducted in spring 2009 during four consecutive weeks on March 26 and 27 and April 1, 2, 9, and 17.

Table 3.6-2 Wildlife Species Observed in the Proposed Action Area

Scientific Name	Common Name
Reptiles	
Callisaurus draconoides draconoides	Common zebra-tailed lizard
Cnemidophorus tigris tigris	Great Basin whiptail
Crotalus cerastes	Sidewinder rattlesnake
Crotalus scutulatus	Mojave green rattlesnake
Dipsosaurus dorsalis	Desert iguana
Gambelia sila	Blunt-nosed leopard lizard
Gopherus agassizii	Desert tortoise
Phrynosoma platyrhinos	Desert horned lizard
Uta stansburiana	Common side-blotched lizard
Birds	
Amphispiza belli	Sage sparrow
Amphispiza bilineata	Black-throated sparrow
Asio flammeus	Short-eared owl
Athene cunicularia	Burrowing owl
Buteo jamaicensis	Red-tailed hawk
Callipepla californica	California quail
Carduelis psaltria	Lesser goldfinch
Carpodacus mexicanus	House finch
Cathartes aura	Turkey vulture
Chordeiles acutipennis	Lesser hawk
Circus cyaneus	Northern harrier
Columba livia	Rock pigeon
Corvus corax	Common raven

Table 3.6-2 Wildlife Species Observed in the Proposed Action Area

Scientific Name	Common Name
Eremophila alpestris	Horned lark
Falco mexicanus	Prairie falcon
Hirundo rustica	Barn swallow
Petrochelidon pyrrhonota	Cliff swallow
Polioptila melanura	Black-tailed gnatcatcher
Struthio camelus	Ostrich
Sturnus vulgaris	European starling
Toxostoma lecontei	Le Conte's thrasher
Zenaida macroura	Mourning dove
Zonotrichia leucophrys	White-crowned sparrow
Mammals	
Ammospermophilus leucurus	White-tailed antelope ground squirrel
Bos bovis	Domestic cow
Canis familiaris	Domestic dog
Canis latrans	Coyote
Dipodomys species	Kangaroo rat
Equus asinus	Wild burro
Equus caballus	Horse
Lepus californicus	Black-tailed jackrabbit
Ovis aries	Domestic sheep
Procyon lotor	Raccoon
Spermophilus tereticaudus	Round-tailed ground squirrel
Sylvilagus audubonii	Desert cottontail
Urocyon cinereoargenteus	Gray fox
Vulpes velox	Kit fox

Source: Chambers Group (2009)

Birds

The one-day reconnaissance level survey detected 12 bird species, including the black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*A. belli*), California quail (*Callipepla californica*), California horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), black-tailed gnatcatcher (*Polioptila melanura*), ladder-backed woodpecker (*Picoides scalaris*), common raven (*Corvus corax*), European starling (*Sturnus vulgaris*), northern harrier (*Circus cyaneus*), and house finch (*Carpodacus mexicanus*), all of which are commonly found in the region. A series of avian point-count transect surveys did not detect any sensitive avian species, and avian species were fairly evenly distributed within the three main vegetation communities identified at the site (Chambers Group 2009). The most abundant species on-site during avian point-counts were black-throated sparrow, California horned lark, common raven, and sage sparrow. The red-tailed hawk (*Buteo jamaicensis*) is also common to the Mojave Desert, although they were not observed during surveys (Chambers Group 2009). Additionally, eight other bird species were recorded foraging or migrating through the site during the burrowing owl (*Athene cunicularia*) and desert tortoise protocol surveys. Table 3.6-2 provides a complete list of all bird species observed within the site during all surveys.

Mammals

Seven common mammal species were observed on the site during the one-day reconnaissance level survey, including the black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kit fox (*Vulpes velox*), two species of ground squirrels including antelope ground squirrel (*Ammospermophilus leucurus*) and round-tailed ground squirrel (*Spermophilus tereticaudus*), domestic dog (*Canis familiaris*), and domestic sheep (*Ovis aries*) (Chambers

Group 2009). Table 3.6-2 provides a complete list of all mammal species observed within the site during all surveys.

Reptiles

Reptiles known to occur in the Mojave Desert include lizards, snakes, and the desert tortoise. Common species include Mojave rattlesnake (*Crotalus scutulatus*), mountain kingsnake (*Lampropeltis zonata*), and several species of lizard and iguana, including the chuckwalla (*Sauromalus ater*). Some of these species may occur within the site and/or may forage in the area. Gila monsters (*Heloderma suspectum*) are known to occur within the extreme eastern portions of San Bernardino County but are not considered present in the Proposed Action area. Table 3.6-2 provides a complete list of all reptile species observed within the site during all surveys.

Migratory Pathways

The Proposed Action area is located in the Lucerne Valley between the Cougar Buttes to the north, Cushenbury Canyon and Blackhawk Mountain in San Bernardino National Forest to the south, Johnson Valley to the east, and Apple Valley and the Granite Mountains to the west (Figure 3.6-2). The proposed site is south of several critical habitat units for the desert tortoise. Critical habitat for desert tortoise is defined in the federal ESA as the specific areas within the geographic area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. The closest critical habitat is the Ord-Rodman critical habitat unit located approximately 10 miles to the north of the site (Chambers Group 2009) across SR-247. The Fremont-Kramer critical habitat unit is to the northwest and the Superior-Cronese critical habitat unit is to the north of the Ord-Rodman critical habitat unit. Desert wildlife species, including the desert tortoise, that utilize these critical habitat units may use the Proposed Action area, as well as other areas of the Lucerne Valley, to forage for vegetation and search for suitable burrow substrate.

3.6.2.4 Special Status Species

Special status species are species that are listed under ESA, given some form of special designation to denote rarity by the state, or are listed as sensitive by the BLM. Special status species, other than those already listed under ESA, are in potential danger of becoming listed under the ESA. The BLM policy for special status species is also contained in BLM Manual 6840.

Plant and animal species of elevated conservation concern were emphasized in field studies and in the literature research. These species include those listed by the CDFG or the USFWS as either threatened or endangered, those considered “sensitive” by the BLM, and those listed as “Species of Special Concern” by the CDFG. Additionally, some nongovernmental organizations maintain watch lists that the reviewing agencies and the public consult when evaluating a project’s potential effects on natural resources. Accordingly, species included on these lists also were considered and are collectively referred to herein as “special status species.” A brief description of the special status species determined to have potential to occur within the Proposed Action area is provided in Table 3.6-3.

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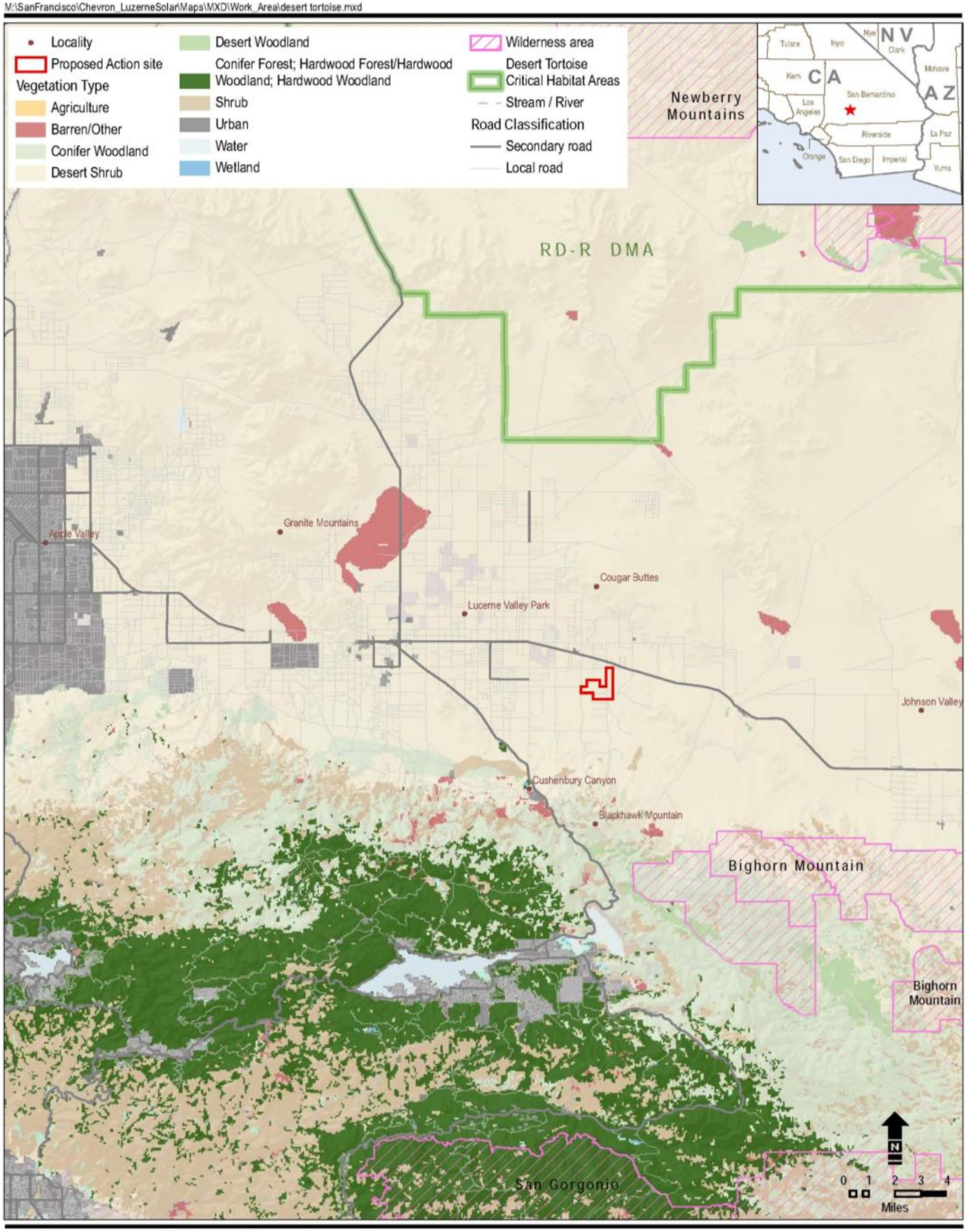

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee, 1999;
California Resource Agency, Legacy Project, 2003.
U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 1994.

Figure 3.6-2
Desert Tortoise Map
Chevron Lucerne Solar Project
San Bernandino County, California

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Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Plants					
Parish's daisy	*Erigeron parishii*	This perennial herb has pale rose to lavender flowers between May and June.	Typically on limestone alluvium in Mojavean desert scrub and pinyon and juniper woodland, usually in carbonate and sometimes in granitic soils at elevations between 2,600 and 6,600 feet amsl.	FT, CNPS 1B.1, limestone endemic	Not present. Suitable habitat present within the creosote bush-white bursage series or the white bursage series; two known occurrences near State Route 18 at Camp Rock Road within 5 miles.
Little San Bernardino Mountains linanthus	*Linanthus malatus*	This is a small annual herb that grows to only 1 1/8-inch high with thick leaves and bell shaped flowers; the flowering period extends from March to May.	Found in sandy soils of Mojavean desert scrub, desert dunes, Sonoran desert scrub, and Joshua tree woodlands at elevations between 635 and 6,810 feet amsl.	BLM S, CNPS List 1B.2, California endemic	Moderate. Suitable habitat present; no historical populations recorded within 10 miles.
Alkali mariposa lily	*Calochortus striatus*	This bulbiferous herb has three petals and flowers from April to June.	Chaparral, chenopod scrub, Mojavean desert scrub, meadows, and seeps typically in alkaline or mesic soils in ephemeral washes, alkaline meadows, and spring areas at elevations between 230 and 5,200 feet amsl.	BLM S, CNPS 1B.2	Not Present. Suitable habitat present; two known occurrences at Cushenbury Springs and Rabbit Springs recorded within 10 miles.
Mojave monkey flower	*Mimulus mohavensis*	This annual herb is between 1.5 and 2.75 inches tall with reddish-purple leaves; flowers between April and June.	Joshua tree woodland and Mojavean desert scrub, typically in dry sandy or gravelly soils, often in washes. Suitable habitat is present throughout the site, but this species is most likely to be found within the creosote bush-white bursage series or the white bursage series at elevations between 2,000 and 4,000 feet amsl.	BLM S, CNPS 1B.2	Not present. Suitable habitat present; historical populations recorded along Old Woman Springs Road, located within approximately 5 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Short-joint beavertail	*Opuntia basilaris* var. *brachyclada*	This stem succulent (cactus) flowers between April and June.	Chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodland, typically on dry slopes and in washes within the creosote bush-white bursage series or the white bursage series at elevations between 1,400 and 7,500 feet amsl.	BLM S, CNPS 1B.2	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
Desert cymopterus	*Cymopterus deserticola*	This perennial herb flowers between March and May.	Fine to coarse, well-drained sandy soils and flats of Joshua tree woodland and Mojavean desert scrub. Typically grows in blow sand within the creosote bush-white bursage series, desert wash, and white bursage series.	BLM S, CNPS 1B.2	Not present. Marginally suitable habitat; no historical populations recorded within 10 miles.
Forked buckwheat	*Eriogonum bifurcatum*	This annual herb flowers between April and June.	Chenopod scrub, typically in sandy saline soils at elevations between 2,290 and 2,660 feet amsl.	BLM S, CNPS 1B.2	Not present. Marginally suitable habitat in the desert wash areas along the eastern edge of the site; no historical populations recorded within 10 miles.
Death Valley beardtongue	*Penstemon fruticiformis* var. *amargosae*	This perennial herb flowers between April and June.	Mojavean desert scrub on gravelly washes and canyon floors at elevations of 2,800 to 4,600 feet amsl.	BLM S, CNPS 1B.3	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
Death Valley sandpaper plant	*Petalonyx thurberi* ssp. *gilmanii*	This evergreen shrub is less than 3.3 feet tall and flowers between May and September.	Desert dunes, Mojavean desert scrub, desert wash, canyons, dunes, and slopes at elevations between 850 and 4,700 feet amsl.	BLM S, CNPS 1B.3	Not present. Suitable habitat present; no historical populations recorded within 10 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Barstow woolly sunflower	*Eriophyllum mohavense*	This annual herb flowers between April and May.	In open sandy or silty areas of chenopod scrub, Mojavean desert scrub, and playas; typically found on caliche and shallow soils at elevations between 1,600 and 3,200 feet amsl.	CNPS 1B.2	Not present. Moderately suitable habitat in the creosote bush-white bursage series, desert wash, and white bursage series; no historical populations recorded within 10 miles.
Latimer's woodland gilia	*Saltugilia latimeri*	This annual herb flowers between March and June.	Chaparral, Mojavean desert scrub, and pinyon and juniper woodland in rocky or sandy, often granitic, soils at elevations between 1,310 and 6,235 feet amsl.	CNPS 1B.2	Not present. Suitable habitat present; no historical populations recorded within 10 miles.
White pygmy-poppy	*Canbya candida*	Grows 1–3 cm with leaves less than 1 cm long. Flowers in March and June.	Found in gravelly, sandy, or granitic soils of Joshua tree woodlands, Mojavean desert scrub, desert dunes, and Sonoran desert scrub and at elevations between 635 and 6,810 feet amsl.	CNPS List 4.2	Moderate. Suitable habitat present; no historical populations recorded within 10 miles.
Birds					
Burrowing owl	*Athene cunicularia*	The burrowing owl is a small, ground-dwelling, often diurnal owl with a round, gray-brown, tuftless head, long and bare yellow legs, bright yellow iris, brown back, and buffy-white underparts with brown barring.	Typically occurs in open, dry, annual or perennial grasslands and in desert and scrublands characterized by low-growing vegetation. It occupies mammal burrows for subterranean shelter and nesting.	CSC, BLM S	High. No burrowing owls or recent sign were observed in 2009; past occurrence of unknown date was observed.
Le Conte's thrasher	*Toxostoma lecontei*	A sandy colored bird with a long curved bill, black eyes, and black tail. The thrasher blends in well with its environment.	Open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub habitats, and in Joshua tree habitat with scattered shrubs.	CSC, BLM S (sensitive in the San Joaquin population)	Present. Two observations during March and April 2009.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Summer tanager	*Piranga rubra*	A medium-sized songbird. The male is entirely red, and the female has dull yellow coloration.	Breeding habitat in California includes riparian habitat dominated by tall willows and mature cottonwoods.	CSC (nesting)	Not present. No nesting habitat present; recorded observation at Cushenbury Springs, 5 miles away.
Northern harrier	*Circus cyaneus*	A medium-sized hawk with long wings and tail. The male has a light grey and black hood. The female has mottled brown coloration.	Forages for small rodents, insects, and occasionally birds and reptiles in open grasslands and marshes. Nesting habitat is similar.	CSC (nesting)	Present. Observed in June 2009.
Prairie falcon	*Falco mexicanus*	A medium-sized falcon with pale brown and black markings and a white chest with brown spots or bars. Wings are long and pointed.	Hunts medium-sized birds and more infrequently mammals in dry grasslands and prairies. Nests along cliff ledges and protected recesses.	CDFG watch list (nesting)	Present. Observed in June 2009.
Mammals					
Mohave ground squirrel	*Spermophilus mohavensis*	Small brown squirrels with white underparts and thin tails.	Open desert scrub, alkali desert scrub, and Joshua tree communities with sandy to gravelly soils.	ST	Not present. Suitable habitat present; no historical record within 5 miles.
Western mastiff bat	*Eumops perotis californicus*	A large free-tailed bat with a 2-foot wing span.	Found in a variety of habitats, including desert scrub, chaparral, woodlands, floodplains, and grassland. Roosting habitat includes rocky cliffs and canyons, large boulders, and buildings.	CSC, BLM S	Not present. Foraging habitat present; no historical records within 5 miles.
Pallid San Diego pocket mouse	*Chaetodopus fallax pallidus*	Similar in appearance to *C. f. fallax* but lighter in overall coloration.	Common resident of sandy or gravelly to rocky herbaceous areas. Habitats include coastal scrub, chamise-redshank chaparral, mixed chaparral, sagebrush, desert wash, desert shrub, pinyon-juniper, and annual grassland.	CSC	Not present. Marginal habitat present; no historical records within 5 miles.

Table 3.6-3 Special Status Plant and Wildlife Species with Potential to Occur on the Site

Common Name	Scientific Name	Description	Habitat	Status	Potential to Occur
Reptiles					
Desert tortoise	*Gopherus agassizii*	A medium-sized tortoise with an adult carapace length of about 8 to 14 inches.	Inhabits river washes, rocky hillsides, slopes, and flat deserts with sandy or gravelly soils suitable for burrowing. Creosote bush, white bursage, saltbush, Joshua tree, Mojave yucca, and cactus are often present in the habitat, along with other shrubs, grasses, and wildflowers.	FT, ST	Present. Two observations within the Proposed Action area in April and June 2009.

Notes:

amsl = above mean sea level

FT = Federally threatened

ST = State threatened

BLM S = Species designated as sensitive by the BLM. BLM sensitive plants are those plant species that are not on federal or state lists as endangered, threatened, candidate, or proposed, but are designated by the BLM State Director for special management consideration.

cm = centimeter

CSC = California species of special concern

CNPS = California Native Plant Society

1A = Plants presumed extinct in California

1B = Plants rare and endangered in California and throughout their range

2 = Plants rare, threatened, or endangered in California but more common elsewhere in their range

3 = Plants about which more information is needed; a review list

4 = Plants of limited distribution; a watch list

CNPS Extensions

0.1 = Seriously endangered in California (greater than 80 percent of occurrences threatened/high degree and immediacy of threat)

0.2 = Fairly endangered in California (20–80 percent occurrences threatened)

0.3 = Not very endangered in California (less than 20 percent of occurrences threatened)

Vegetation

Thirty-one special status plant species are known to occur in the Lucerne Valley and the region within which the Proposed Action would be located. Of these, 12 have some potential to occur within the Proposed Action area due to the presence of suitable habitat. None of the special status plant species were observed during surveys conducted between May 4 and May 14, 2009 (Chambers Group 2009). However, the biologists concluded that two species, the white pygmy-poppy (*Canbya candida*) and Little San Bernardino Mountains linanthus (*Linanthus maculates*), were considered to have moderate potential to occur throughout much of the Proposed Action area, even though they were not detected during protocol-level focused plant surveys (Chambers Group 2009). The biologists thought these species may have been missed, may not have germinated, or may not have persisted into May when the survey was conducted because these species are very small (less than 1 ¼ inches in height), below average rainfall fell in the Lucerne Valley in the spring of 2009, and both species can flower as early as March for short periods of time. These protocol-level plant surveys were in accordance with the Botanical Survey Guidelines of the California Native Plant Society (CNPS 2001). A brief description of the species determined to have potential to occur within the Proposed Action area is provided in Table 3.6-3.

Wildlife

A literature review and a habitat assessment were used to determine the potential of special status wildlife species to occur in the Proposed Action area. Factors used to determine potential for occurrence included quality of habitat, effect of surrounding residential development, and the date and location of prior California Natural Diversity Database records of occurrence. It was determined that six special status wildlife species have the potential to occur on-site. Three species were considered to have a low potential to occur on-site due to a lack of both suitable habitat and recorded historical occurrences within five miles of the site. These species include the pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*), western mastiff bat (*Eumops perotis californicus*), and summer tanager (*Piranga rubra*) (Chambers Group 2009). One species, the Mohave ground squirrel (*Spermophilus mohavensis*), was also considered to have a low potential to occur on-site due to a lack of recorded historical occurrences within five miles of the site. However, suitable habitat was present, and a Mohave ground squirrel survey was conducted in May 2009 (Chambers Group 2009). Based on recorded occurrences within the vicinity of the site and the presence of suitable habitat, the desert tortoise and burrowing owl were considered to have a moderate to high potential to occur on-site and focused protocol-level surveys were conducted in June 2009 (Chambers Group 2009).

Desert Tortoise and Burrowing Owl Surveys

The Proposed Action area is not located within designated critical habitat for the desert tortoise but is within the known range of desert tortoise, and suitable habitat for the species is present (Figure 3.6-3). Suitable habitat includes river washes, rocky hillsides, slopes, and flat deserts with sandy or gravelly soils. Soil conditions must be friable for burrow and nest construction (Chambers Group 2009). Creosote bush, white bursage, saltbush, Joshua tree, Mojave yucca, and cacti are often present in desert tortoise habitat along with other shrubs, grasses, and wildflowers (Chambers Group 2009).

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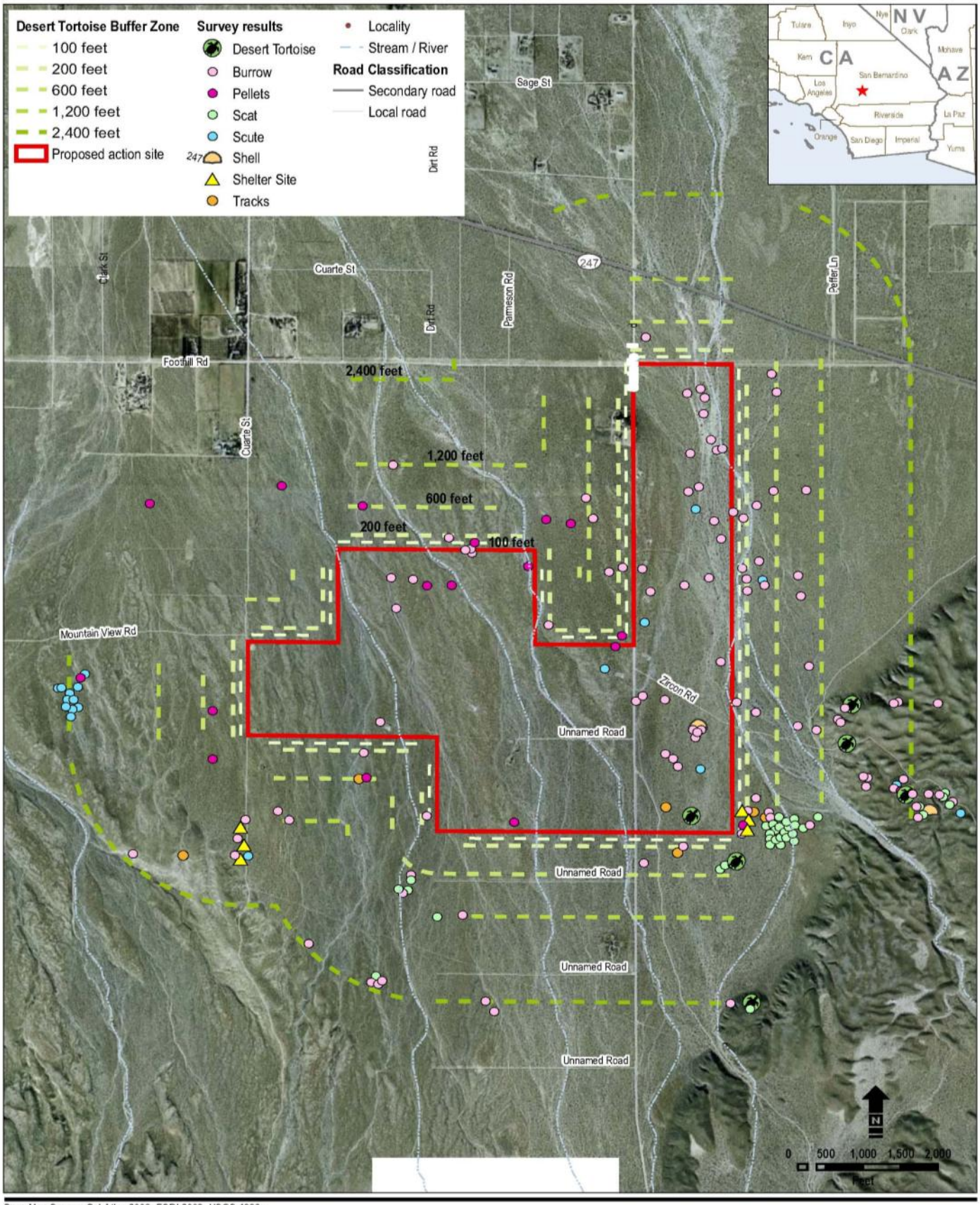

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999; California Resource Agency, Legacy Project, 2003.

Figure 3.6-3

Desert Tortoise Buffer Zone Map

Chevron Lucerne Solar Project

San Bernandino County, California

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Protocol-level surveys for desert tortoise and burrowing owl were conducted for the Proposed Action area in June 2009 (Chambers Group 2009). Desert tortoise surveys were conducted by a qualified biologist, in accordance with the USFWS protocol, March 24 to 27, March 31 to April 3, and April 7 to 10, 2009 (Appendix D; Chambers Group 2009). In addition, a burrowing owl survey was conducted in accordance with the CDFG protocol. A second survey was conducted on June 26, 2009, at six locations that exhibited burrowing owl signs from the previous March/April surveys (Chambers Group 2009). Surveys covered 100 percent of the site and within a 500-foot buffer. Parallel to the edge of the site boundary, a 2,400-foot buffer area was also surveyed at a lower intensity. This area is known as the "buffer zone" and includes areas that might be indirectly affected by the Proposed Action.

One desert tortoise was observed in the southeast corner of the site, five were observed in the southeastern section of the buffer zone, and one was observed in the southwestern section of the buffer zone (Appendix D). Incidental desert tortoise observations were also made during plant surveys in May 2009 in the southeast corner of the site and had been previously identified during the March/April 2009 desert tortoise survey. No signs of upper respiratory tract disease were observed in any of the desert tortoises identified. Three desert tortoise burrows were also identified within the site, nine were identified in the 500-foot buffer, and 26 were identified in the buffer zone. Desert tortoise signs, including shell, bones, excrement, and tracks, were also observed during surveys (Chambers Group 2009).

The site also contains suitable burrowing owl habitat. Suitable habitat for the burrowing owl includes dry, open, native or nonnative grasslands, deserts, and other arid environments with low-growing and low-density vegetation (Chambers Group 2009). Burrowing owls may also utilize golf courses, cemeteries, road ROWs, airstrips, abandoned buildings, irrigation ditches, and vacant lots with holes or cracks suitable for use as burrows and will occupy mammal burrows for shelter and nesting (Chambers Group 2009). Burrowing owl burrows with excrement and regurgitated pellets were observed on and near the site during the burrowing owl survey. None of the burrowing owl signs appeared to be fresh and were estimated to be two to three years old (Appendix D; Chambers Group 2009). No new sign or burrowing owls were identified during the June 26, 2009, survey.

Mohave Ground Squirrel Site Assessment

A Mohave ground squirrel survey was conducted in May 2009 (Chambers Group 2009). Prior to initiating this survey, a records search of the California Natural Diversity Database, managed by CDFG, was completed.

No Mohave ground squirrels were observed on the site, but the site was determined to be consistent with potential habitat for the Mohave ground squirrel (Chambers Group 2009). The Mohave ground squirrel are found in dry, desert environments with suitable habitat, including open desert scrub, alkali desert scrub, and Joshua tree communities with sandy to gravelly soils. They will also feed in annual grasslands (Chambers Group 2009). They live in underground burrows, most often among the roots of the creosote bush (Gustafson 1993 as cited in Leitner 2009). These burrows can be very extensive, sometimes as much as 20 feet long and 3 feet deep.

The site is outside the published range of the Mohave ground squirrel, and nearby trappings for other projects did not reveal their presence; therefore, trapping studies were not conducted. The nearest known occurrence of Mohave ground squirrel is over five miles west of the Proposed

Action site, two miles east of the junction of SR 247 and SR 18. Prior to construction, the Applicant would consult with CDFG on survey results and possible mitigation measures.

Raptors

Raptors (birds of prey) collectively include the hawks, eagles, owls, and falcons. The northern harrier (*Circus cyaneus*) and prairie falcon (*Falco mexicanus*) were observed on the site in spring 2009. The golden eagle is common to the Mojave Desert but was not observed.

3.7 Cultural Resources

This section identifies the cultural resources within and adjacent to the site of the Proposed Action and discusses applicable regulations. During the scoping period, meetings were conducted with the public, government agencies, and tribal governments to identify their concerns. Written comments were also received. The following comments and concerns related to cultural resources were raised: (1) effects on a possible future "historic/scenic" designation for Highway 247 (Old Woman Springs Road); (2) government-to-government consultation between the BLM and the tribal governments within the Proposed Action area; (3) effects on Native American sacred sites in the Proposed Action area; and (4) strategies to minimize and mitigate effects and ongoing engagement in consultation with local Native American tribes. These comments are addressed in the discussion of existing conditions (Section 3.7.2) and the analysis of direct and indirect effects (Section 4.7.2). The information provided in this section was derived from the *Class III Cultural Resources Inventory for the Lucerne Valley Solar Plant, San Bernardino, California* (Chambers Group 2009).

3.7.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable plans, policies, and regulations that influence the management of cultural resources. Although some of the plans, policies, and regulations listed do not directly apply to the Proposed Action, they were applied as a basis for the analysis of potential effects on cultural resources (Section 4.7).

3.7.1.1 Federal

American Indian Religious Freedom Act of 1978 (AIRFA)

AIRFA enforces the right of Native Americans to have access to their sacred places. If a place of religious importance to Native Americans may be affected by an undertaking, AIRFA promotes consultation with Indian religious practitioners, which may be coordinated with National Historic Preservation Act (NHPA) Section 106 consultation.

Antiquities Act of 1906

This was the first law enacted to specifically establish that archaeological sites on public lands are important public resources, and the act obligated federal land management agencies to preserve the scientific, commemorative, and cultural values of such sites on these lands.

Archaeological Resources Protection Act of 1979 (ARPA)

ARPA provides for the protection of archaeological resources and sites that are on public lands and Indian lands. ARPA may impose additional requirements on an agency if federal or Indian lands are involved.

Archaeological and Historic Preservation Act of 1974 (AHPA)

AHPA imposes additional requirements if a project would affect historic properties that have archaeological value and notifies the Department of the Interior when an action under the AHPA does not comply with NHPA Section 106.

Executive Order 11593 (1971), Protection and Enhancement of the Cultural Environment

Executive Order (EO) 11593 provides government leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation and addresses the National Register of Historic Places (NRHP) and provides guidance to those involved with federal properties that should be inventoried and nominated for listing on the NRHP.

Executive Order 13007 (1996), Protection and Preservation of Native American Sacred Sites

EO 13007 established that federal land stewards shall, to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions, accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites. Where appropriate, agencies shall maintain the confidentiality of sacred sites.

Executive Order 13175 (2000), Consultation and Coordination with Indian Tribal Governments

EO 13175 establishes regular and meaningful consultation and collaboration between the United States government and tribal officials in the development of federal policies that have tribal implications.

Executive Order 13287 (2003), Preserve America

EO 13287 requires that the federal government provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of historic properties owned by the federal government.

Executive Order 11593 (1971), Protection and Enhancement of the Cultural Environment

EO 11593 requires federal agencies to administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, to initiate measures necessary to direct their policies, plans, and programs in such a way that federally owned sites, structures, and objects of historical, architectural, or archaeological significance are preserved, restored, and maintained.

Federal Land Policy and Management Act of 1976, as amended

FLPMA establishes policies and goals to be followed in administration of public lands by the BLM to include preservation of historic and archaeological resources.

National Environmental Policy Act of 1969, as amended

NEPA requires the analysis of the effect of federal undertakings on the environment to include effects on cultural resources.

National Historic Preservation Act (Section 106; 36 CFR, Part 800)

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 and other parties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties.

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

NAGPRA provides a requirement for federal agencies and institutions that receive federal funding to repatriate certain Native American cultural items, including human remains, funerary objects, sacred objects, and objects of cultural patrimony, to lineal descendants and cultural affiliated Indian tribes. For activities on federal lands, NAGPRA requires consultation with "appropriate" Indian tribes prior to the intentional excavation, or removal after inadvertent discovery, of several kinds of cultural items, including human remains and objects of cultural patrimony.

3.7.1.2 State of California

Administrative Code, Title 14, Section 4307

This requires that no person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.

Health and Safety Code, Section 7050.5

This code 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 (NAHC) if the remains are Native American.

Health and Safety Code, Section 7051

This code addresses the removal of human remains from internment and requires a place of storage while awaiting internment or cremation, with the intent to sell them or to dissect them with malice or wantonness as a public offense punishable by imprisonment in a state prison.

Health and Safety Code, Sections 7052 and 7050.5

Section 7052 establishes that disturbance of Indian cemeteries is a felony. Section 7050.5 establishes that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American.

Penal Code, Title 14, Sections 622.5 and 623

These sections 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, Section 5097.5

Section 5097.5 provides that no person shall knowingly and willfully excavate upon or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. Violation of Section 5097.5 is a misdemeanor.

Public Resources Code, Sections 5097.9 to 5097.991

Sections 5097.9 to 5097.991 establish regulations for the protection of Native American religious places, establishes the NAHC, establishes repatriation of Native American artifacts,

and requires notification of discovery of Native American human remains to a most likely descendant.

3.7.2 Existing Conditions

3.7.2.1 Natural Setting

The site of the Proposed Action is in San Bernardino County on undeveloped lands administered by the BLM. The location of the Proposed Action in relation to a range of natural resources, including the Mojave River (about 20 miles west of the Proposed Action) and the Antelope Valley (within about 25 miles of the Proposed Action) make it suitable for a variety of life forms and periods of human occupation.

Manmade disturbances to the Proposed Action area include section roads, informal two-track roads, and mechanized prospecting activity in the form of pits, trenches, and grading. Naturally occurring disturbances to the Proposed Action area include ephemeral drainages and burrowing activity by reptiles, mammals, and insects.

Geology

The Proposed Action is located upon Quaternary alluvium deposits. Some deposits on the site date to the Early Pleistocene (about 2.6 million years ago) (Table 3.3-1). Holocene deposits (from about 10,000 years ago to present) also underlie portions of the Proposed Action area; these deposits have the potential to contain cultural resources. Further discussion of Lucerne Valley geology can be found in Section 3.3, “Geology, Topography, and Geologic Hazards.”

Vegetation

The Proposed Action area lies in the Lower Sonoran life zone, which is characterized as warm desert found below 6,000 feet in elevation. Vegetation includes sagebrush, rabbitbrush, cacti, and creosote bush. A discussion of specific vegetation communities known to occur in the Proposed Action area is located in Section 3.6, “Biological Resources.”

Fauna

Mammals found in the Mojave Desert include the desert bighorn sheep, desert kit fox, coyote, spotted skunk, black-tailed jackrabbit, ground squirrels, kangaroo rats, and white-footed mouse. Bird species include the golden eagle, black-billed magpie, raven, turkey vulture, red-tailed hawk, quail, and roadrunner, as well as numerous songbirds, including finches, warblers, sparrows, and wrens. Common reptiles include desert tortoise, three species of rattlesnakes, and chuckwalla lizard. A detailed discussion of animal species known to occur in the Proposed Action area is in Section 3.6, “Biological Resources.”

3.7.2.2 Prehistoric Background

The area has long supported a variety of floral and faunal resources conducive to human occupation. Human habitation of the Lucerne Valley has occurred for about 12,000 years, as evidenced by archaeological remains. Periods of prehistoric occupation and use of the Proposed Action area may extend from the Early to Late Holocene. Archaeological sites associated with the period of early human occupation, which archaeologists typically refer to as the Lake Mojave Period (12,000 to 7,000 Before Present [BP]), predominantly include flaked stone tools and, to a lesser degree, ground stone and shell beads. The presence of shell beads

and imported mineral resources on sites from this period indicate large-scale trade networks between desert and coastal Native American groups.

By about 7,000 BP, beginning what is also referred to as the Pinto Period (7,000 to 4,000 BP), artifacts indicate continuing patterns of interaction with groups outside the area, and artifacts were very similar to those found during the Lake Mojave period. Archaeological sites from this period in the Mojave Desert predominantly include an increase in ground stone, shell beads, and imported mineral resources (e.g., obsidian from the Coso Range, about 120 to the northwest of the Proposed Action). An increase in ground stone tools during this period indicates an increasing use of plants for subsistence, and the greater need to process small hard seeds from grasses and other vegetation.

By about 4,000 BP, beginning what is also referred to as the Gypsum Period (4,000 to 1,500 BP), artifacts indicate an apparent focus on hunting and connections between peoples of the Mojave Desert and the American Southwest. Archaeological sites from this period in the Mojave Desert predominantly include a greater diversity of projectile forms than in earlier periods, as well as the occurrence of split-twig figurines, which have been found on sites ranging from Newberry Cave just to the south of the Mojave River to sites in the Grand Canyon,

By about 1,500 BP, beginning what is also referred to as the Saratoga Period (1,500 to 700 BP), archaeological sites predominantly contain evidence of a change in hunting implements, human occupation, and trade with other areas, especially the Southwest. Projectile points associated with the period are smaller than in earlier periods and are thought to coincide with the introduction of the bow and arrow. Sites from this period also include dense middens that are generally thought to represent villages, especially in the Antelope Valley west of the Proposed Action area. Some of these villages are associated with large cemeteries, containing infant burials with as many as 5,000 shell beads.

By about 700 BP, differences in artifacts found in sites north and south of the Mojave River are similar to those found by groups who were encountered in the Mojave Desert at the time of European-American expansion into the region by about 300 BP (i.e., 1700s). Archaeological sites from this period in the Mojave Desert include more sparse deposits of flaked stone tools, ground stone milling equipment, and midden than in earlier periods, indicating more brief camps or occupations. As in all earlier periods, the majority of the obsidian artifacts found in sites from this period derive from the Coso Range; however, during this period, obsidian from Mount Hicks and Obsidian Butte is also present. Archaeological sites from this period also include multiple pottery types and steatite pendants and beads, which may be an indicator of interactions with the California Coast or the Leona Valley about 100 miles southwest of the Proposed Action.

3.7.2.3 Ethnohistoric Background

Native American ethnographic records indicate that people affiliated with five ethnic groups—the Mohave, Kawaiisu, Southern Paiute (Las Vegas and Chemehuevi groups), Vanyume/Serrano, and Western Shoshone made use of the Proposed Action area.

The nature and range of different settlement and subsistence systems operating in the region was not extensively documented prior to Euroamerican disruption and data for some groups are entirely lacking. Although no direct data are available, indirect data suggest the Lucerne Valley would have been used by small groups. Ethnographic data imply that the area was likely used by many different groups coming from many directions, which may help explain why ethnographers attribute the area to different people. Unfortunately, the lack of direct

ethnographic observations of groups in the area makes reconstruction of subsistence activities difficult.

The distribution and availability of food resources suggests use by small groups of people as well. Plant foods are likely to have been very important in the diets of people living in the area and an important factor in the decision of when and where to move residence. Ethnographic and historic accounts indicate that trade and exchange were, and still are, important and valued aspects of Native American culture. Besides the exchange of items and the social aspects of trade, this activity may have helped spread information about the state of environmental circumstances in the surrounding area, such as the location of food resources.

The ancestral life of the Mohave Indians is not well documented; however, ethnohistoric evidence indicates groups of tribes, and other related Yuman-speaking peoples, lived along the lower Colorado River Valley, farming, fishing, and hunting mostly small game for subsistence until about 200 years ago.

The Southern Paiute, especially the Las Vegas and Chemehuevi subgroups, mostly inhabited villages along the lower Colorado River, with a few groups inhabiting the mountains along the California-Nevada state line, especially in the Ivanpah and Kingston Mountains.

The Kawaiisu ranged from the Scodie Mountains south of Walker Pass to the Tehachapi Mountains about 50 miles to the southwest of the Proposed Action. Although the Kawaiisu core area was in the Sierra Nevada about 100 miles west of the area, ethnohistorical accounts document their use of the Mojave Desert, extending out into at least the Argus Range.

Very little is known of the Vanyume, who may have been linked with the Serrano, a sparse population living along the Mojave River. Ethnohistorical accounts indicate that the area just to the southwest of the Avawatz Mountains was occupied by the Vanyume, which would make them the main residents of the area. If the Vanyume core area was along the Mojave River, they would have been the nearest group, with a distance of only about 15 to 25 miles, separating them from the Proposed Action. However, Modern Mohave Indians suggest that the Vanyume referred to by anthropologists is not a separate social group, but a Mohave word for the geographic area from Newberry Springs to Hinkley, near Barstow.

No ethnohistorical data clearly indicate that Western Shoshone groups like the Panamint or Timbisha Shoshone made use of the area. However, the high mobility of groups living in the region suggests that such use may have been possible.

3.7.2.4 Historic Background

The first significant European settlement of California began during what historians typically refer to as the Spanish Period (1769 to 1821), when 21 missions and four presidios were established between San Diego and Sonoma. Although located primarily along the coast, the missions dominated economic and political life over the majority of the California region during this period. As part of Spanish exploration of California, Lieutenant Pedro Fages and a small party of soldiers found the Cajon Pass (about 35 miles west of the Proposed Action) in 1769 while seeking a route through the Mojave Desert to Mission San Gabriel. Seven years later, Father Francisco Garces passed through the present day Victorville area, located about 28 miles west of the Proposed Action, as part of Juan Bautista de Anza's expedition. The expedition party is believed to have camped approximately 1.5 miles southeast of present-day Hesperia, within about 26 miles of the Proposed Action. Given the documented heavy use of

this region by the Spanish during this period, associated sites have the potential to be located in the proximity of the Proposed Action area.

From 1821 to 1848, in what historians refer to as the Mexican Period, secularization of the missions occurred, and the vast land holdings of the missions in California were divided into large land grants called ranchos. The Mexican government granted ranchos throughout California to Spanish and Hispanic soldiers and settlers. The Mexican-American War marked the beginning of what historians refer to as the American Period (1848 to present).

In 1826, Jedediah Smith pioneered the section of the Mormon Trail leading from Needles to Mission San Gabriel following the Old Spanish Trail through the high desert, bringing an influx of Mormon settlers to the region. It is estimated that the Mormon Trail routed some 300 to 500 travelers annually across the desert and through the Cajon Pass. Segments of these trails ran along the Mojave River, within about 23 miles of the Proposed Action. Given the continuous use of the trails during this period, sites associated with settlement activity have the potential to be located in the proximity of the Proposed Action area.

The discovery of gold initiated the 1849 California Gold Rush, bringing thousands of miners and settlers to California, and most settled in the north. For those settlers who chose southern California, much of their economic prosperity was fueled by cattle ranching rather than by gold. The first recorded European settler in the Lucerne Valley was Peter Davidson, a Scottish immigrant who made his way as a miner to the Valley following mining activities as early as 1880. By 1900, Davidson and others were operating businesses, such as a way station at Rabbit Springs and the Box S. Ranch, and a small school district. By 1900, serious cultivation efforts of the Lucerne Valley region resulted in the federal government authorization of the Victor Valley Water Project, the largest of its era in the nation. The Lucerne Valley Post Office was established in 1912, and by 1928, the valley was home to approximately 250 residents.

The Lucerne Valley has a rich mining history. The Black Hawk/Silver Reef Mines were significant to the development of the area and are located within about four miles southeast of the Proposed Action. Alongside regional mining developments was the expansion of transportation corridors throughout southern California. Old Woman Springs Road, a trail used by Native Americans and later used as a wagon trail and automotive way, was paved in the early 1960s, becoming SR 247. From 1847, the Atchison, Topeka & Santa Fe Railroad was a significant contribution to the settlement of Southern California by westward bound migrants. The railroad, combined with prospecting, led to a great boom in the region; however, it was not until the late 1850s that Americans chose to settle in the high desert. The Lucerne Valley has remained a relatively small, unincorporated community with an estimated current population of fewer than 10,000. It is possible that features associated with mining activities, including claims, prospects, storage areas, trash scatters, and camps, occur within the Proposed Action area.

3.7.2.5 Known Archaeological Resources

Chambers Group conducted a BLM Class III cultural resource inventory of the Proposed Action area (Chambers Group 2009). The report contains a discussion of the records search and tribal consultation conducted for the Proposed Action. These actions, combined with the cultural resources inventory, ensure the Proposed Action is compliant with the guidance and strategies set forth between the BLM and the California State Historic Preservation Office for evaluating solar energy; the Proposed Action (BLM 2008); and the laws, regulations, and policies governing the management of cultural and historic resources on BLM lands.

Records Search

Chambers Group conducted a records search (file # 09-03-03-01) of the California Historical Resources Information System at the San Bernardino County Museum in Redlands, California, to identify any cultural resources recorded within a one-mile radius of the Proposed Action. The results of the records search showed that only two prior cultural resource investigations have been conducted within a one-mile radius outside the Proposed Action area (Table 3.7-1). As a result of these inventories, a single isolated find (P36-060), a single jasper flake, was recorded within a one-mile radius outside the Proposed Action area. No other cultural resources, including those listed for inclusion with the NRHP (National Park Service 2009) were identified within a one-mile radius of the Proposed Action.

Table 3.7-1 Previous Cultural Resources Inventories Conducted Within One Mile of the Proposed Action

Report No.	Report Title	Sites Within One Mile of the Proposed Action
1061377	R&PP Application from Lucerne Valley Unified School District (Sutton 1983)	None
1062515	Class III Cultural Resources Inventory of the Morongo Basin Pipeline Project, Hesperia to Landers, San Bernardino County, California (Lerch 1992)	None

Although the records search resulted in no previously recorded cultural resources in the Proposed Action area, many prehistoric and historic sites have been recorded between the Proposed Action and the Victorville area. The prehistoric and historic sites recorded in similar settings near the Proposed Action include lithic scatters, rock art, rock alignments, or other features (e.g., bedrock milling stations, hearths). Numerous aboriginal trail segments have been recorded, particularly to the north in Sidewinder Canyon and west in the low hills and bajadas overlooking the Mojave River Basin.

Tribal Consultation

At the request of the Chambers Group, the NAHC provided contact information for the nearest tribes that may have knowledge of the cultural resources of the Proposed Action area. Five contacts from the following four Native American groups were given notice of the Proposed Action as the first step in the consultation process:

- Morongo Band of Mission Indians;
- San Fernando Band of Mission Indians;
- San Manuel Band of Mission Indians; and
- Serrano Nation of Indians.

At the request of the Chambers Group, the NAHC also performed a search of its Sacred Lands File (SLF) to indicate the presence of Native American cultural resources in the Proposed Action area. The SLF search failed to indicate the presence of any Native American cultural resources in the Proposed Action area. The San Manuel Band of Mission Indians reviewed primary information from the cultural resources survey conducted for the Proposed Action and concluded that due to the lack prehistoric cultural resources identified (with the exception of one isolated prehistoric artifact), they may not require further information. Further tribal consultation did not result in the identification of cultural resources or historic properties to which the tribes attach religious or cultural significance within the Proposed Action area.

BLM Class III Survey and Inventory

From March 16 to April 17, 2009, Chambers Group conducted a cultural resources inventory of the Proposed Action area. Chambers methodology for the inventory included a visual inspection of cultural material identified on the ground surface along with surface soil deposition to make a judgment about potential depth of the resources. Areas with bedrock outcroppings, ridge tops, or on eroding side slopes were presumed to have limited potential for cultural depth.

The inventory identified and recorded 40 newly identified archaeological sites (Table 3.7-2) and 18 isolated finds, consisting of 18 historic artifacts and one prehistoric artifact. All of the sites date to the early to mid-twentieth century and consist mostly of mining-related refuse.

Table 3.7-2 Summary of Newly Identified Archaeological Sites in the Proposed Action Area

Site Number	Site Description
SBR-13262 H, 36-020583	Historic debris scatter (mid-twentieth century)
SBR-13263 H, 36-020584	Rock cairn
SBR-13264 H, 36-020585	Rock cairn
SBR-13265 H, 36-020586	Historic debris scatter and a mechanically excavated prospect (mid-twentieth century)
SBR-13266 H, 36-020587	Historic debris scatter (mid-twentieth century)
SBR-13267 H,36-020588	Historic debris scatter (mid-twentieth century)
SBR-13268 H, 36-020589	Historic debris scatter with prospecting features (mid-twentieth century)
SBR-13269 H, 36-020590	Historic debris scatter (mid-twentieth century)
SBR-13270 H, 36-020591	Historic debris scatter with prospecting features (early to mid-twentieth century)
SBR-13271 H, 36-020592	Historic debris scatter (mid-twentieth century)
SBR-13272 H, 36-020593	Historic debris scatter (mid-twentieth century)
SBR-13273 H, 36-020594	Large historic debris scatter with 15 features (mechanically excavated prospect pits and trenches)
SBR-13274 H, 36-020595	Historic debris scatter (mid-twentieth century)
SBR-13275 H, 36-020596	Historic debris scatter with one mechanically excavated prospect pit
SBR-13276 H, 36-020597	Historic debris scatter, a two-track road, and a mechanically excavated prospect (mid-twentieth century)
SBR-13277 H, 36-020598	A mechanically excavated prospect pit
SBR-13278 H, 36-020599	Historic debris with one cairn feature (early to mid-twentieth century)
SBR-13279 H, 36-020600	Historic can scatter with one mechanically excavated prospect
SBR-13280 H, 36-020601	Historic debris scatter (mid-twentieth century)
SBR-13281 H, 36-020602	Historic debris scatter (mid-twentieth century)
SBR-13282 H, 36-020603	Historic debris scatter (mid-twentieth century)
SBR-13283 H, 36-020604	Historic debris scatter (mid-twentieth century)
SBR-13284 H, 36-020605	Historic debris scatter (early to mid-twentieth century)
SBR-13285 H, 36-020606	Historic debris scatter (mid-twentieth century)
SBR-13286 H, 36-020607	Historic debris scatter (mid-twentieth century)
SBR-13287 H, 36-020608	Historic debris and prospecting features (mid-twentieth century)
SBR-13288 H, 36-020609	Historic debris and prospecting features (mid-twentieth century)
SBR-13289 H, 36-020610	Historic debris and one mechanical prospecting feature (mid-twentieth century)

Table 3.7-2 Summary of Newly Identified Archaeological Sites in the Proposed Action Area

Site Number	Site Description
SBR-13290 H, 36-020611	One mechanical prospecting feature
SBR-13291 H, 36-020612	One mechanically excavated prospect trench
SBR-13292 H, 36-020613	Sparse historic debris scatter with four prospecting features (mid-twentieth century)
SBR-13293 H, 36-020614	One historic rock cairn feature
SBR-13294 H, 36-020615	One mechanically excavated trench
SBR-13295 H, 36-020616	One mechanically excavated pit
SBR-13296 H, 36-020617	One mechanically excavated trench
SBR-13297 H, 36-020618	One prospecting feature, a claim post, and glass fragments
SBR-13298 H, 36-020619	Collapsed rock cairn
SBR-13299 H, 36-020620	Historic debris scatter (mid-twentieth century)
SBR-13300 H, 36-020621	Two mechanically excavated features and sparse historic debris
SBR-13301 H, 36-020622	Historic debris scatter (mid-twentieth century)

Source: Chambers Group 2009

All newly identified sites listed in Table 3.7-2 were evaluated based on their ability to meet NRHP criteria (refer to section 4.7.1, “Indicators”). None of the newly recorded sites were recommended eligible for listing under any of the NRHP criterion. The potential for intact deposits of subsurface cultural material was also evaluated against NRHP criteria; however, no sites identified during the inventory contained evidence for intact subsurface cultural material.

3.8 Paleontological Resources

This section identifies paleontological resources within and adjacent to the site of the Proposed Action. Additionally, this section discusses applicable regulations governing paleontological resources. During the scoping period, there were no comments about paleontological resources.

3.8.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable laws, regulations, and standards that influence the management of paleontological resources at the federal, state, and local levels. Although some of these laws do not apply to the Proposed Action, they were applied as a basis for determining what effects the Proposed Action would have on paleontological resources.

3.8.1.1 Federal

Paleontological Resources Preservation Act of 2009

The Paleontological Resources Preservation Act provides protection for vertebrate (i.e., animals with backbones) paleontological resources on federal lands by limiting the collection of vertebrate fossils and scientifically important fossils to permitted and qualified researchers.

Federal Antiquities Act of 1906

The Federal Antiquities Act establishes that federal land management agencies are obligated to preserve the scientific, commemorative, and cultural values of such sites (National Park Service [NPS] 2007). The Federal Antiquities Act does not refer to paleontological resources specifically; however, the protection of “objects of antiquity” is understood to include paleontological resources.

Federal Land Policy and Management Act of 1976, as amended

The FLPMA provides that “public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values…” (BLM 2001). The FLPMA does not specifically discuss protection for the scientific quality of paleontological resources; however, protection of such resources is implied (e.g., 43 United States Code 1785, Fossil Forest Research Natural Area; Public Law 98-603, Title I, Section 103, 1984; and Public Law 104-333, Division I, Title X, Section 1022, 1996).

National Natural Landmarks Program

The National Natural Landmarks Program, administered by the NPS, encourages the preservation of the nation’s best examples of geologic features and identifies landmarks at risk of degradation or damage.

3.8.1.2 State of California

Administrative Code Title 14, Section 4307

The Administrative Code addresses removal, injury, defacement, or destruction of any object of paleontological value.

Public Resources Code Section 5097.5

The Public Resources Code provides that no person shall knowingly and willfully excavate upon, remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, or archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological, or historical feature situated on public lands, except with the express permission of the public agency having jurisdiction over the lands. Violation of Section 5097.5 is a misdemeanor.

3.8.1.3 County of San Bernardino

Public Paleontological Resources Overlay of the San Bernardino County Development Code

Chapter 82.20 of the San Bernardino County Development Code provides evaluation criteria for evaluating paleontologic resources and includes qualifications for professional paleontologists working within the County's jurisdiction.

3.8.1.4 Professional Standards and Guidelines

Society for Vertebrate Paleontology

The Society for Vertebrate Paleontology provides standards for conducting paleontological resource monitoring and mitigation activities and curation of resulting fossils and assessment of potential effects on paleontological resources. The San Bernardino County Museum (SBCM) in Redlands issues suggested paleontological treatment and mitigation measures for proposed actions on lands managed by the BLM using guidance published by the Society for Vertebrate Paleontology.

3.8.2 Existing Conditions

Fossils of thousands of plants and animals—including tiny trilobites more than 600 million years old, dinosaurs from between 210 and 65 million years ago, and Ice Age lions and cheetahs—can be found on public lands in the United States managed by the BLM (BLM 2003). Fossil remains of Pleistocene vertebrates have been found in Pleistocene sediments in the region.

Previous geologic mapping indicates that the Proposed Action is located entirely upon Quaternary younger alluvium of Holocene (about 12,000 years old) or recent age (Bortugno and Sptizer 1986 as referenced in SBCM 2009). Such sediments maintain a low potential to contain significant nonrenewable paleontological resources, yet may overlie older Pleistocene (about 1.8 million to 12,000 years ago) alluvium present in the subsurface (SBCM 2009). Older Pleistocene alluvium has a high potential to contain significant nonrenewable paleontological resources. Section 3.2, "Geology, Topography, and Geologic Hazards," provides greater detail regarding these sediments and the geologic setting of the Proposed Action area.

3.9 Land Use and Realty

This section identifies existing land use goals, objectives, and policies within and adjacent to the site and discusses applicable regulations. Information in this section is largely based on analysis of the CDCA Plan, as well as input received from the public during the scoping process.

The following issues related to land use were raised during scoping: (1) potential land use conflicts; (2) use of public lands for renewable energy generation; (3) use of previously disturbed lands, and; (4) siting the Proposed Action to minimize effects on public lands. These comments are addressed in the discussion of existing conditions (Section 3.9.2) and analysis of direct and indirect effects (Section 4.9.2).

3.9.1 Applicable Plans, Policies, and Regulations

The proposed site is located on lands under the jurisdiction of the BLM. No state or county lands would be used for the Proposed Action. The following land use plans, policies, and regulations would be applicable:

Federal Land Policy and Management Act

The FLMPA provides the BLM with an overarching mandate to manage the public lands and resources under its stewardship under the principles of multiple use and sustained yield. “Multiple-use” is a concept that directs management of public lands and their resource values in a way that best meets the present and future needs of Americans and is defined as a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources (FLMPA Section103[c]). Energy production is one of the intended uses of federal land.

California Desert Conservation Area Plan

All BLM lands covered by the CDCA Plan have been designated geographically into four multiple-use classes based on the sensitivity of resources and types of uses for each geographic area (BLM 1980, as amended). Figure 3.9-1 shows multiple-use classes in the vicinity of the Proposed Action. The site is located entirely on land in the Multiple-Use Class (MUC) M category, which is defined as follows:

- MUC M (Moderate Use): These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, energy, and utility development are allowed. Any damage that permitted uses cause must be mitigated.

While the CDCA Plan stipulates that “[a]ll types of electrical generation plants may be allowed in accordance with State, Federal, and local laws” and that solar generating facilities “[m]ay be allowed after NEPA requirements are met,” the majority of the site falls within a three-mile-wide BLM-designated “contingent” utility corridor (Corridor “S”). According to the Energy Production and Utility Corridor Element of the CDCA Plan, allowable uses within the corridor include the following types of linear utility facilities:

- New electrical transmission towers and cables of 161-kilovolt (kV) or above;
- All pipelines with diameters greater than 12 inches;

- Coaxial cables for interstate communications; and
- Major aqueducts or canals for interbasin transfers of water.

The West Mojave Plan

The WEMO Plan is an amendment to the CDCA Plan that addresses the recovery of the desert tortoise and management of other species in the western Mojave Desert by establishing strategies to conserve and protect the desert tortoise, the Mohave ground squirrel, and nearly 100 other sensitive plants and animals and the natural communities of which they are a part. The WEMO planning area consists of 3,263,874 acres of BLM-administered public lands; 3,029,230 acres of private lands; and 102,168 acres of lands administered by California.

3.9.2 Existing Conditions

The site is located on lands under the jurisdiction of the BLM's California Desert District, Barstow Field Office. Historically, the 516-acre property was used for low-level mineral exploration. No facilities are currently located on the site. The site is almost entirely vacant and undeveloped; however, there are several occupied buildings of unknown origin that are likely not permitted, as well as graded dirt access roads, indicating there are residents living on the property illegally.

3.9.2.1 Santa Fe Fire Road and Zircon Road

The site is bisected by Santa Fe Fire Road (Figure 1-1), which is a BLM-designated "open route" primarily used for access to the San Bernardino National Forest to the south. Another "open route," Zircon Road, bisects the Proposed Action area. As part of the Proposed Action, Zircon Road would be rerouted within the site. The Proposed Action would not change the BLM's route designation of either road. However, rerouting Zircon Road would require an amendment to the CDCA Plan. A discussion of other special land uses within and adjacent to the site can be found in Section 3.10, "Special Management Areas."

3.9.2.2 Livestock Grazing/Grazing Allotments

No grazing allotments are located within the site.

3.9.2.3 Existing Utility Corridor

As stated above, the majority of the site extends 1.4 miles into a three-mile-wide "contingent" utility corridor (Corridor "S" under the CDCA Plan). Currently the corridor is traversed by State Highway 247 and contains an SCE 33-kV distribution line that runs along Foothill Road and telephone lines that serve local residences.

According to the Lucerne Solar Corridor Conflict Analysis prepared by the Applicant and reviewed by the BLM, the site is located directly west of rugged terrain, forming "a natural barrier to utility development" (CES 2009). Because the cost of constructing infrastructure over such terrain would be expensive, utility developers would likely opt to circumvent it. Therefore, siting the Proposed Action within the corridor would not prohibit the BLM from siting other energy infrastructure within the corridor in the future. Figure 3.9-2 depicts the location of the Proposed Action within the corridor, as well as the rugged terrain to the east of the site.

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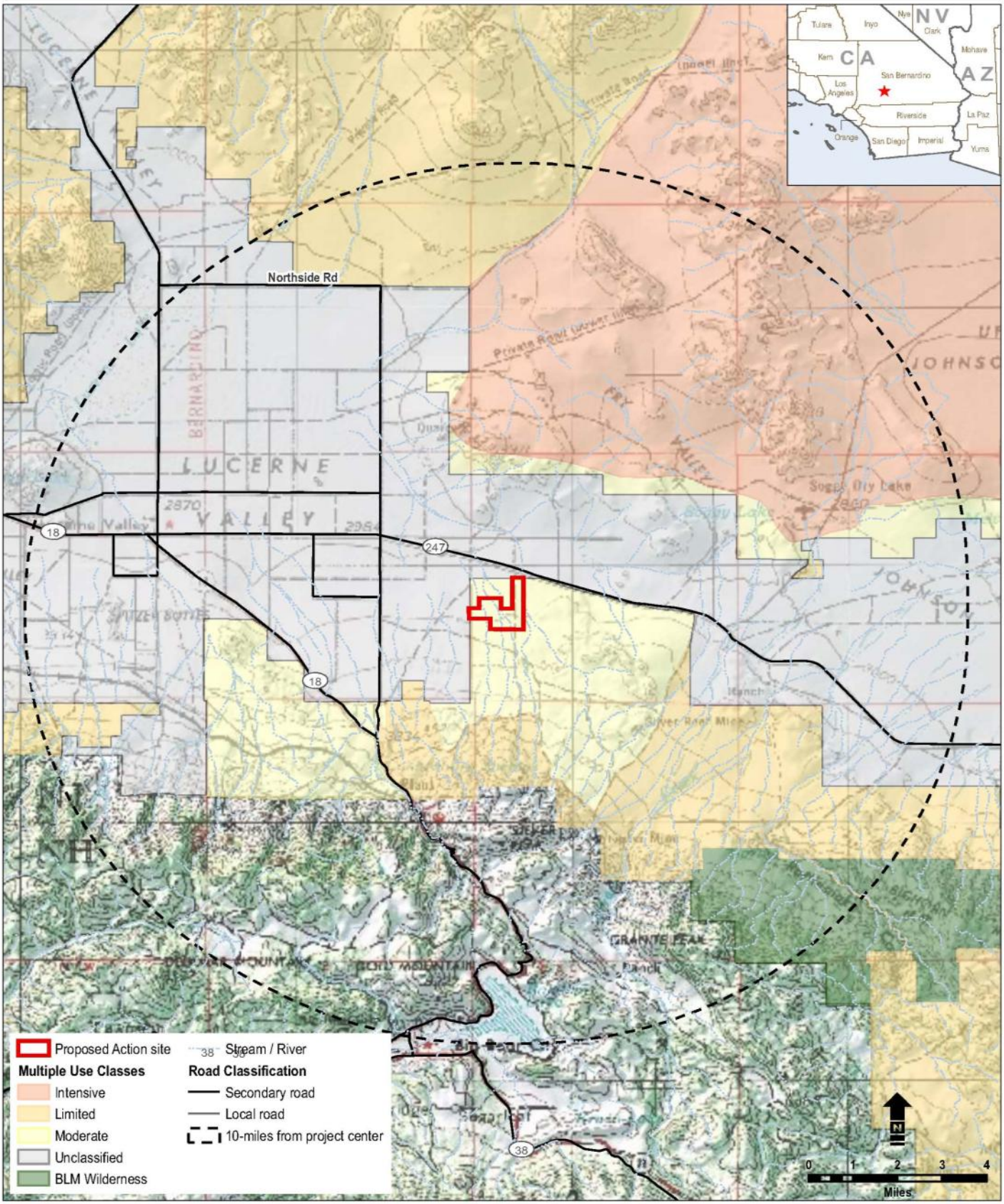
DEIS_Oct2009\3_9\Multiple_Class_Uses.mxd



Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999

Figure 3.9-1

BLM Multiple-Use Classes in the Vicinity of the Proposed Action Site

Lucerne Valley Solar Project

San Bernardino County, California

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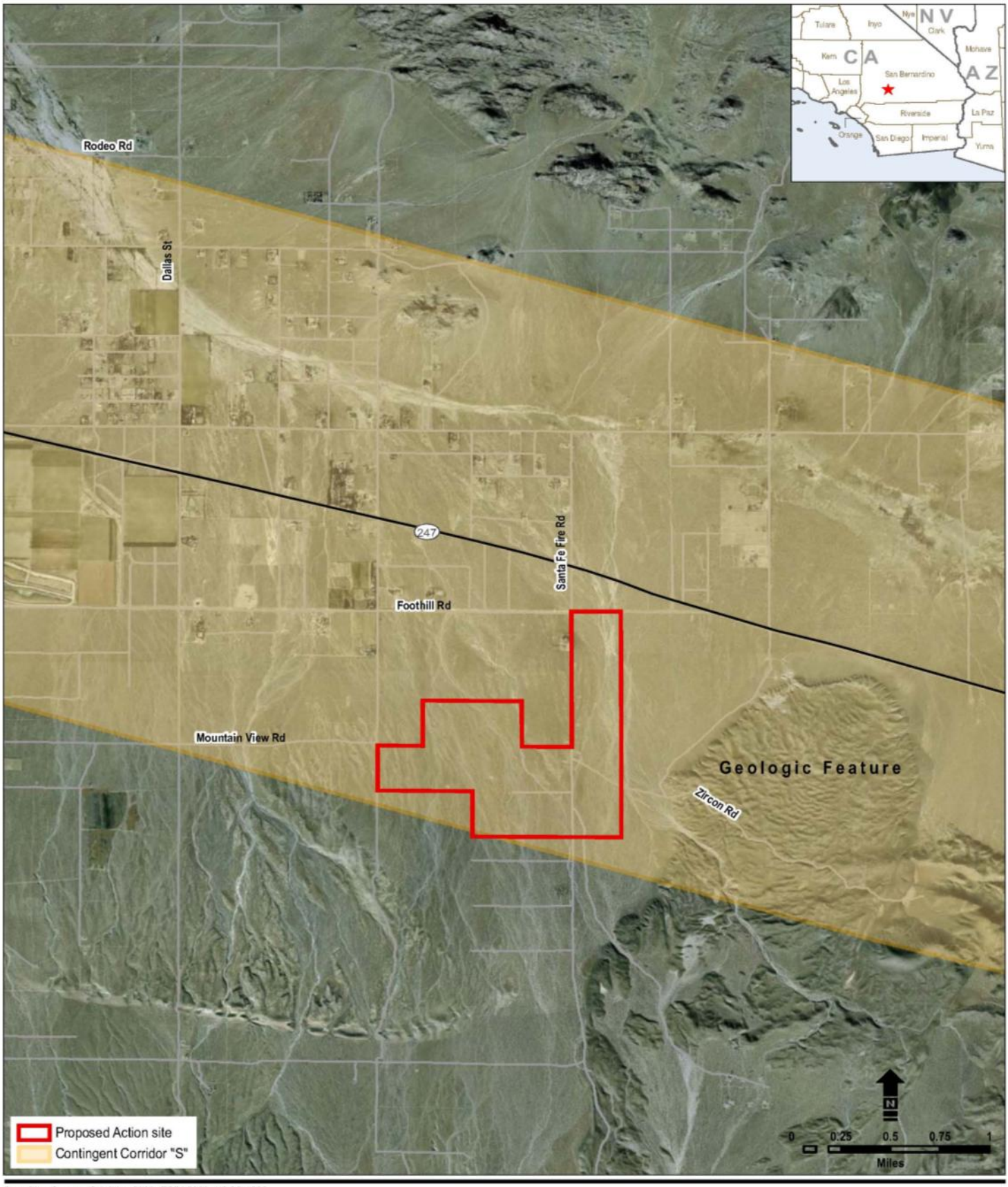

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee 1999

Figure 3.9-2
Contingent Corridor "S" Location
Lucerne Valley Solar Project
San Bernardino County, California

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3.9.2.4 Commercial Filming

Several areas within the Barstow Field Office region are popular commercial filming locations, as follows:

- Johnson Valley OHV area;
- Dumont Dunes OHV area;
- Silurian Dry Lake;
- Soggy Dry Lake;
- Stoddard Valley OHV area; and
- El Mirage Cooperative Management Area.

Commercial production companies must obtain a permit from the BLM for their activities. Permits are reviewed and issued by a BLM staff person based on the type of activity and location that would be used. Commercial filming is allowed upon issuance of a permit. This activity includes production of feature films, television series and commercials, as well as magazine ads and features. Commercial and noncommercial photography projects also require permission to use the BLM lands. Commercial filming permits specify the dates and locations of the planned activity. The permit fees collected are used to help manage the BLM activities, such as improving access to these areas and providing administrative support.

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3.10 Special Management Areas (Special Designations)

This section identifies Special Management Areas (SMAs) within and adjacent to the site of the Proposed Action and identifies applicable regulations pertaining to these areas. The BLM manages federal lands that possess unique and important historical, anthropological, ecological, biological, geological, and paleontological features as SMAs. SMAs include designated Wilderness and Wilderness Study Areas, rare or unique habitats or those occupied by species listed as threatened or endangered, natural environments, open spaces, scenic landscapes, special recreation management areas, historic locations, cultural landmarks, and fossil-bearing regions. SMAs are designated by an Act of Congress or by Presidential Proclamation or are created under the BLM administrative procedures.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. Concerns were raised regarding the potential existence of special management areas in the Proposed Action area.

3.10.1 Applicable Plans, Policies, and Regulations

The National Landscape Conservation System (NLCS) is the primary management framework for SMAs. In June 2000, the BLM created the NLCS to bring some of their premier lands into a single system. NLCS designations include National Conservation Areas and similar designations, including the entire CDCA, except for those lands that have been identified as special recreation management areas for off-highway vehicles.

California Desert Conservation Area Plan

Within the CDCA, specific SMAs also identify designated Wilderness and Wilderness Study Areas; national scenic and historic trails; wild, scenic, and recreational rivers; Areas of Critical Environmental Concern (ACECs); and habitat management planning areas. Chapter 4 of the CDCA Plan addresses ACECs and special areas. Management goals in the CDCA Plan for ACECs are as follows:

- Identify and protect the significant natural and cultural resources requiring special management attention found on BLM-administered lands in the CDCA;
- Provide for other uses in the designated areas, compatible with the protection and enhancement of the significant natural and cultural resources; and
- Systematically monitor the preservation of the significant natural and cultural resources on BLM-administered lands, and the compatibility of other allowed uses with these resources.

Management goals in the CDCA Plan for special areas are as follows:

- Recognize significant natural and cultural resources found on BLM-administered lands in the CDCA;
- Provide for other uses in the designated special areas, compatible with the protection and enhancement of the significant natural and cultural resources; and

- Systematically monitor the qualities of the significant natural and cultural resources on BLM-administered lands and the compatibility of other allowed uses with these resources.

West Mojave Plan

Led by the BLM, federal, state, and local agencies have cooperatively developed a CDCA Plan Amendment to address recovery of the desert tortoise and management of a number of other species in the western Mojave Desert. The WEMO Plan has many SMAs within its jurisdiction, but the closest, the Carbonate Endemic Plants ACEC, is 1.8 miles from the site of the Proposed Action (Figure 3.10-1); others identified are more distant.

3.10.2 Existing Conditions

Areas of Critical Environmental Concern

The FLPMA Section 103(a) defines an ACEC as an area "within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

The BLM uses the ACEC designation to satisfy FLPMA. The BLM identifies, evaluates, and designates ACECs through its resource management planning process. There are three ACECs within 10 miles of the site: the Carbonate Endemic Plants ACEC, located 1.8 miles to the south; the Soggy Dry Lake Creosote Rings ACEC, located 6.1 miles to the east; and the Upper Johnson Valley Yucca Rings ACEC, located 9 miles to the north (Figure 3.10-1).

Desert Wildlife Management Areas

Desert Wildlife Management Areas (DWMAs) were established by the U.S. Fish and Wildlife Service (USFWS) as part of the Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994). DWMAs are areas that are specially designated for protection of desert tortoises and desert tortoise habitats. The nearest DWMA, the Ord-Rodman DWMA, is eight miles from the site.

Wild and Scenic Rivers

The National Wild and Scenic Rivers System (NWSRS) is managed by the Wild and Scenic Rivers Council, which is composed of representatives of the BLM, USFWS, National Park Service, and U.S. Forest Service (USFS). The NWSRS was created in 1968 as an act of Congress "to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations" (Wild and Scenic Rivers Council 2009). There are no wild or scenic rivers within 10 miles of the site.

BLM Wilderness Areas

Federal Wilderness Areas, designated by Congress, are defined by the Wilderness Act of 1964 as places "where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Designation is aimed at ensuring that these lands are preserved and protected in their natural condition. These areas are generally 5,000 acres or larger and offer outstanding opportunities for solitude or a primitive and unconfined type of

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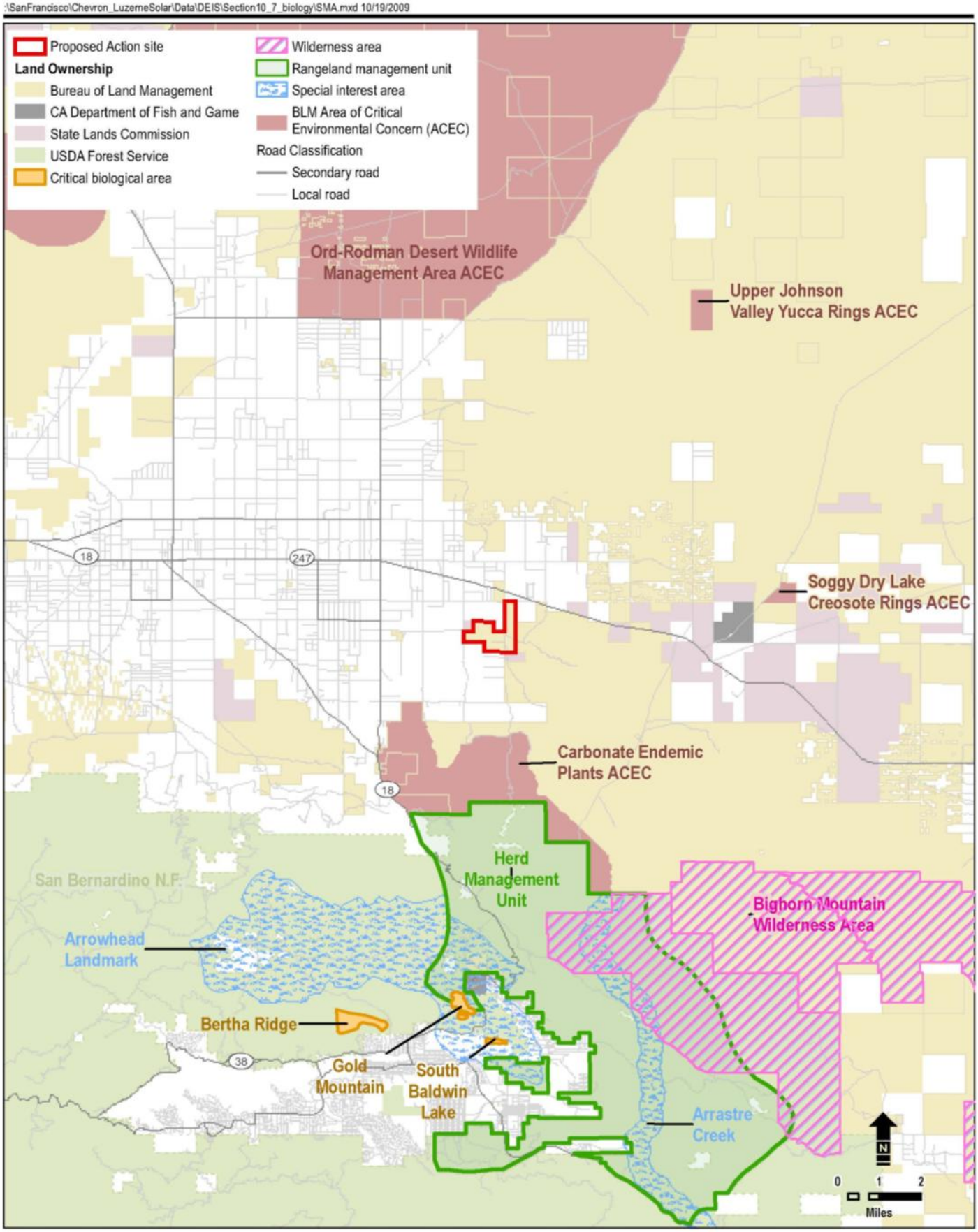

Base Map Source: ESRI 2009; Cal-Atlas 2009;
USDA Forest Service - Pacific Southwest Region - Remote Sensing Lab 2009; SoCal Forest Division 2005; BLM 2008

Figure 3.10-1
Special Management Areas
Lucerne Valley Solar Project
San Bernardino County, California

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recreation; such areas may also contain ecological, geological, or other features that have scientific, scenic, or historical value (BLM 2008a). The nearest wilderness area to the site is the Bighorn Mountain Wilderness located 7.1 miles to the south.

BLM Wilderness Study Areas

Wilderness Study Areas are lands that may meet the criteria of Federal Wilderness Areas as set forth by the Wilderness Act of 1964 but have yet to receive from Congress either the official designation of Federal Wilderness Area or release from consideration as a Wilderness Area (BLM 2008b). There are no Wilderness Study Areas within 10 miles of the site.

National Scenic and Historic Trails

National Scenic Trails are designated in areas that exhibit significant characteristics of the physiographic regions of the nation (U.S. Congress 1968). The nearest National Scenic Trail to the site is the Pacific Crest Trail located 7.6 miles south.

National Historic Trails are extended, but not necessarily continuous, and follow an original trail or route of travel of national significance. National Historic Trails are designated for the protection of the historic route and its historic remnants and artifacts for public use and enjoyment (U.S. Congress 1968). There are no National Historic Trails within 10 miles of the site.

Scenic Highways

SR 247 begins in Yucca Valley and runs north through the Lucerne Valley before connecting with Barstow Road. It is located about 0.25 miles north of the site. The California Department of Transportation (Caltrans) has evaluated the highway in its entirety as eligible for inclusion in its scenic highway system; however, it is currently not designated. If the highway is designated as scenic by the California State Legislature and approved by Caltrans, a “scenic corridor protection program” would be drafted for the route. This document would restrict earthmoving activities within the viewshed of the highway in order to preserve its scenic nature.

SR 247 is a County-designated Scenic Route from the town of Yucca Valley north to Barstow, according to the San Bernardino County General Plan (2007).

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3.11 Recreation

This section identifies recreational resources within and adjacent to the Proposed Action site and discusses applicable regulations. Information in this section is largely based on the goals and objectives of the CDCA Plan, as amended, as well as input received from members of the public during the scoping process.

The following comments and concerns related to recreational resources were raised during scoping: (1) effects on off-highway vehicle (OHV) use and (2) construction dust. These comments are addressed in the discussion of existing conditions (Section 3.11.2) and the analysis of direct and indirect effects (Section 4.11.2).

3.11.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable plans, policies, and regulations that influence the management of recreational resources at the federal, state, and local levels. Although some of these laws do not apply to the Proposed Action, they provide context for determining what effects the Proposed Action would have on recreational resources.

Federal Land Policy and Management Act of 1976

As provided in the FLPMA Section 101, the BLM's legal mandate is to manage public lands in accordance with the principles of multiple-use and sustained yield. The act also directs the BLM to protect "the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use" (Statute 90-2743; 43 United States Code 1601, et seq.).

Specific authorized uses are determined in the land use planning process, as prescribed in Section 202 of FLPMA. The Proposed Action would be in conformance with the BLM's mandate to manage BLM land for multiple-use as outlined in Sections 101 and 202 of FLPMA.

CDCA Plan of 1980

The BLM's CDCA Plan describes land use management goals and policies within the approximately ten million-acre CDCA Planning Area and provides guidelines and requirements for recreational activities. Goals in the CDCA Plan's Recreation Element (BLM 1980:69) are as follows:

- Provide for a wide range of quality recreational opportunities and experiences, emphasizing dispersed undeveloped use;
- Provide a minimum of recreation facilities. Facilities should emphasize resource protection and visitor safety;
- Manage recreational use to minimize user conflicts, provide a safe recreation environment, and protect desert resources;
- Emphasize the use of public information and education techniques to increase public awareness, enjoyment, and sensitivity to desert resources;

- Adjust management approach to accommodate changing visitor use patterns and preferences;
- Encourage the use and enjoyment of desert recreational opportunities by special populations and provide facilities to meet the needs of those groups;
- Locate areas and trails in officially designated wilderness areas or primitive areas; and
- Locate areas and trails in natural areas only if the authorized officer determines that vehicle use in such locations would not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

Goals in the CDCA Plan's Motorized Vehicle Access Element are as follows:

- Provide for contained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies;
- Avoid impacts on desert resources when designating or amending areas or routes for motorized vehicle access, to the degree possible; and
- Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users, making sure all information materials are understandable and easy to follow.

The Proposed Action would conform to the management goals stipulated in both the Recreation Element and the Motorized Vehicle Access Element of the CDCA Plan.

Executive Order No. 11644

Executive Order No. 11644 of 1971 established uniform polices regarding OHV use on public lands, requiring agencies to monitor OHV use to assess and minimize effects on important resources on public lands.

3.11.2 Existing Conditions

The Proposed Action site is on undeveloped lands administered by the BLM in San Bernardino County. The Proposed Action site lies within mostly undisturbed desert habitat, north of the San Bernardino National Forest. Recreational activities in the region include hiking and OHV use. The closest BLM-designated recreation area, the Johnson Valley OHV Area, is located 2.5 miles west of the Proposed Action site.

Lands within or directly adjacent to the Proposed Action site are not designated recreation areas. Other than Zircon Road (Figure 1-1), no BLM open routes exist within the Proposed Action area; however, several recreation areas, including two designated by the BLM, are located within the region (Table 3.11-1). One unimproved dirt road, Santa Fe Fire Road, bisects the Proposed Action site. The portion of Santa Fe Fire Road within the San Bernardino National Forest is maintained by the United States Forest Service (USFS) for access to the San Bernardino National Forest, which is three miles south of the Proposed Action site.

Table 3.11-1 Recreation Areas in the Vicinity of the Proposed Action Site

Name	Distance	Use
San Bernardino National Forest	3 miles south	Hiking, OHV use, and wildlife viewing
Johnson Valley OHV Area	2.5 miles northwest	OHV use, hiking, rock-hounding, wildlife viewing, amateur mining and hunting
Lucerne Dry Lake	9 miles northwest	Model rocket launching
Lucerne Valley Park	6 miles northwest	Community events
Midway Park	6 miles northwest	Community events
Pioneer Park	6.5 miles west	Athletic fields

San Bernardino National Forest

The Proposed Action site would be located three miles north of the San Bernardino National Forest, which contains recreation areas administered by the USFS Front Country Ranger District. This area of the San Bernardino National Forest is designated “Roaded Natural” according to the Recreation Opportunity Spectrum (USFS 2005). Roaded Natural areas are defined as relatively undeveloped but within half a mile of a roadway and typically have low to moderate use on trails and moderate to high use on motorized roadways (USFS 1990).

Johnson Valley OHV Area

The closest BLM-designated recreation area is the Johnson Valley OHV area. OHV users are drawn to the area for its varied landscape, punctuated by steep, red rocky mountains, rolling hills, open valleys, dry lake beds, and sandy washes. Elevations range from 4,600 feet at Hartwell Hills to 2,300 feet at Melville Dry Lake. Vegetation consists of creosote scrub, annual grasses, wildflowers, and Joshua trees. Most visitors tour the area in four-wheel-drive vehicles. The area near Anderson and Soggy Dry Lakes is used extensively for competitive racing events and OHV free play. There are numerous opportunities for hiking, amateur geology, and wildlife watching. The eastern boundary is shared with the Twenty-Nine Palms Marine Corps Air-Ground Combat Center (BLM 2009a).

Local Parks

The three parks in the unincorporated community of Lucerne Valley that are close to the Proposed Action site are the Lucerne Valley Park and Midway Park, which are approximately six miles to the northwest, and Pioneer Park, which is approximately seven miles west of the site on State Route 247. These facilities are used to host community events, including athletics.

Hunting

Hunting is permitted on public lands and is regulated by the California Department of Fish and Game. Hunting of upland game birds in season is allowed in the Stoddard Valley, Johnson Valley, Dumont Dunes, and Rasor OHV Areas with a valid hunting license. Hunter’s vehicles are restricted to designated routes of travel, as posted and as shown on BLM maps (BLM 2009b). Hunting is not an allowable use on the Proposed Action site.

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3.12 Visual Resources

The BLM manual M-8400 Visual Resource Management and handbooks H-8410 Visual Resource Inventory, and H-8431 Visual Resource Contrast Rating set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating proposed actions for conformance to the established objectives for BLM-administered public lands.

All BLM-administered lands are to be inventoried for visual values and management objectives established for managing these values. Visual resource values are determined through a systematic process that documents the landscape's scenic quality, public sensitivity and visibility.

Scenic Quality. Scenic Quality Rating Units (SQRU) are delineated based on common characteristics of the landscape. There are seven criteria used for inventorying the landscape's scenic quality within each SQRU – landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications. Each factor is scored for its respective contribution to the scenic quality and is given a rating of A (highest), B, or C (lowest). SQRU for the Proposed Action are shown in Figure 3.12-1.

Sensitivity Level. Sensitivity Level Rating Units (SLRU) are delineated and evaluated for public sensitivity to landscape change. Criteria used for determining level of sensitivity within each unit includes types of use, amount of use, public interest, adjacent land uses, special areas, other factors. Each criterion is rank high, medium, or low with an overall rating assigned to the unit. SLRU for the Proposed Action are shown in Figure 3.12-2.

Distance Zones (visibility). The third factor is visibility of the landscape evaluated from where people commonly view the landscape. The distance zones are divided into foreground/middleground (3 to 5 miles); background (5 to 15 miles); and seldom seen (beyond 15 miles or topographically concealed areas within the closer range distance zones). Distance Zones for the Proposed Action are shown in Figure 3.12-3.

Visual Resource Inventory Classes. The three factors are mapped individually and then compared through an over-layering analysis. The relationships between the rated values of scenic quality, sensitivity level, and visibility are cross-referenced with the Visual Resource Inventory Matrix to determine the Visual Resource Inventory (VRI) Class. There are four VRI Classes I to IV assigned as a representation of the relative visual value with VRI Class I and II having highest value and VRI Class IV having the lowest. VRI Class I is reserved for special congressional designations or administrative decisions such as Wilderness Areas, visually sensitive ACECs, wild portions of Wild and Scenic Rivers, etc.

VRI information is used for informed land use and land management decision making, as well as to serve as the baseline for NEPA analysis. VRI Classes for the Proposed Action area are shown in Figure 3.12-4.

Visual Resource Management Classes. Visual Resource Management (VRM) Classes are designated during the land use planning process. VRM Classes are similar to VRI Classes in that they range from I to IV. However, they differ in that VRM Classes are management decisions that dictate allowable levels of visual change that may occur on the landscape. VRM objectives are established under each class designation with VRM Class I being the most restrictive and VRM Class IV allowing for the greatest amount of visual change.

- VRM Class I: The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- VRM Class II: The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- VRM Class III: The objective of this class is to partially retain the existing character of the landscape. The level of change to characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- VRM Class IV: The objective of this class is to provide for management activities that allow major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The VRM policy requires that VRM Classes are assigned to all BLM-administered lands during the land use planning process with effects disclosed during analysis of the management alternatives. However, there are older land use plans still in effect that do not designate VRM Classes. When VRM Classes are absent, then Interim VRM Classes are assigned when analyzing individual proposed plans of development. Interim VRM Class designations must match protections of VRI values with existing land use decisions, which balance allowable uses with desired outcomes.

Proposed plans of development are evaluated for conformance to the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Handbook H-8431-1.

3.12.1 Applicable Plans, Policies, and Regulations

Federal Land Policy and Management Act

The following sections of the FLPMA relate to the management of aesthetic and visual resources on the public lands:

> Section 102(a): “The public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values.”
>
> Section 103 (c): Identifies “scenic values” as one of the resources for which public lands should be managed.

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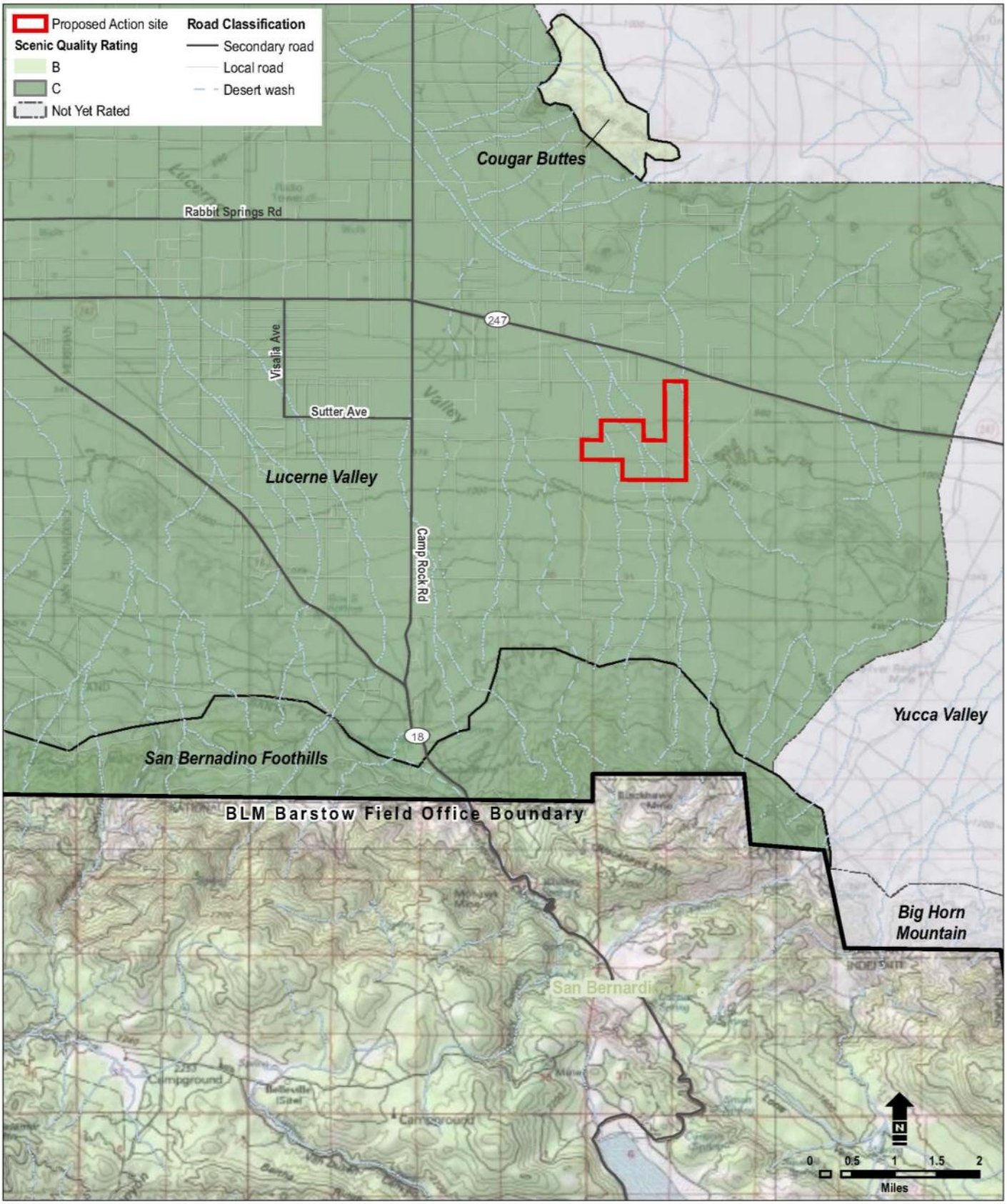

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-1

Scenic Quality Rating Units

Lucerne Valley Solar Project

San Bernardino County, California

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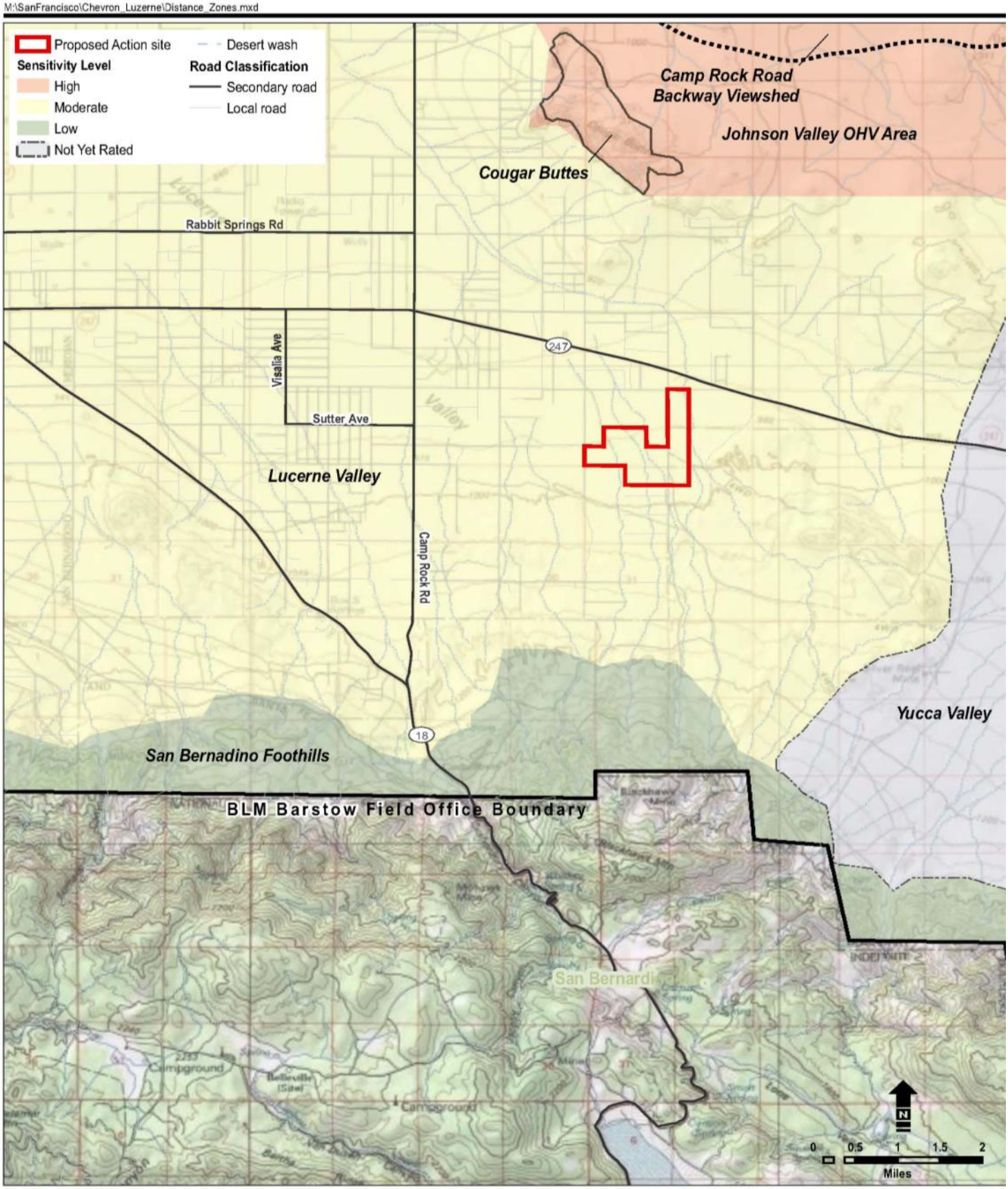

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-2
Sensitivity Level Units
Lucerne Valley Solar Project
San Bernardino County, California

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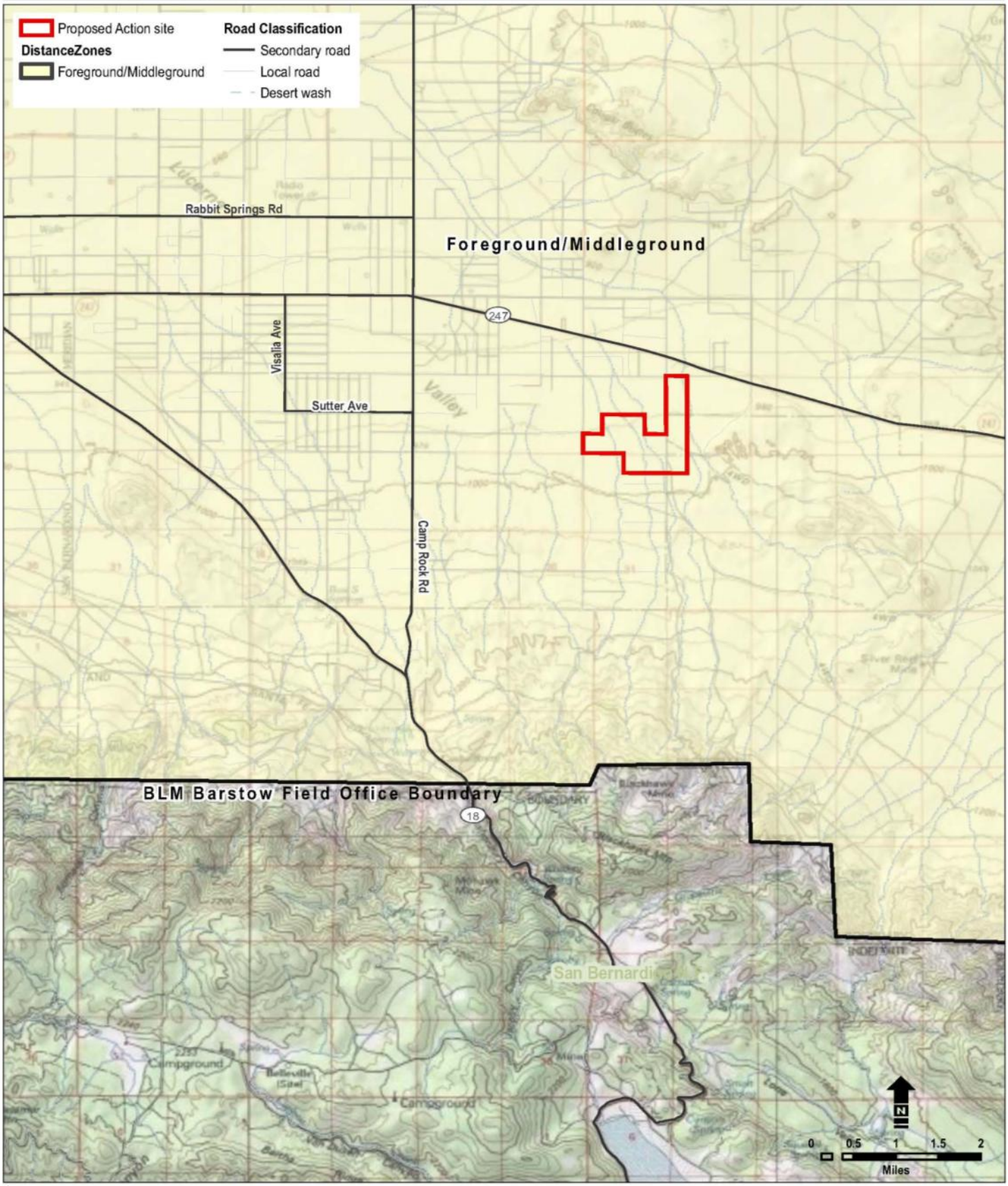

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-3

Distance Zones

Lucerne Valley Solar Project

San Bernardino County, California

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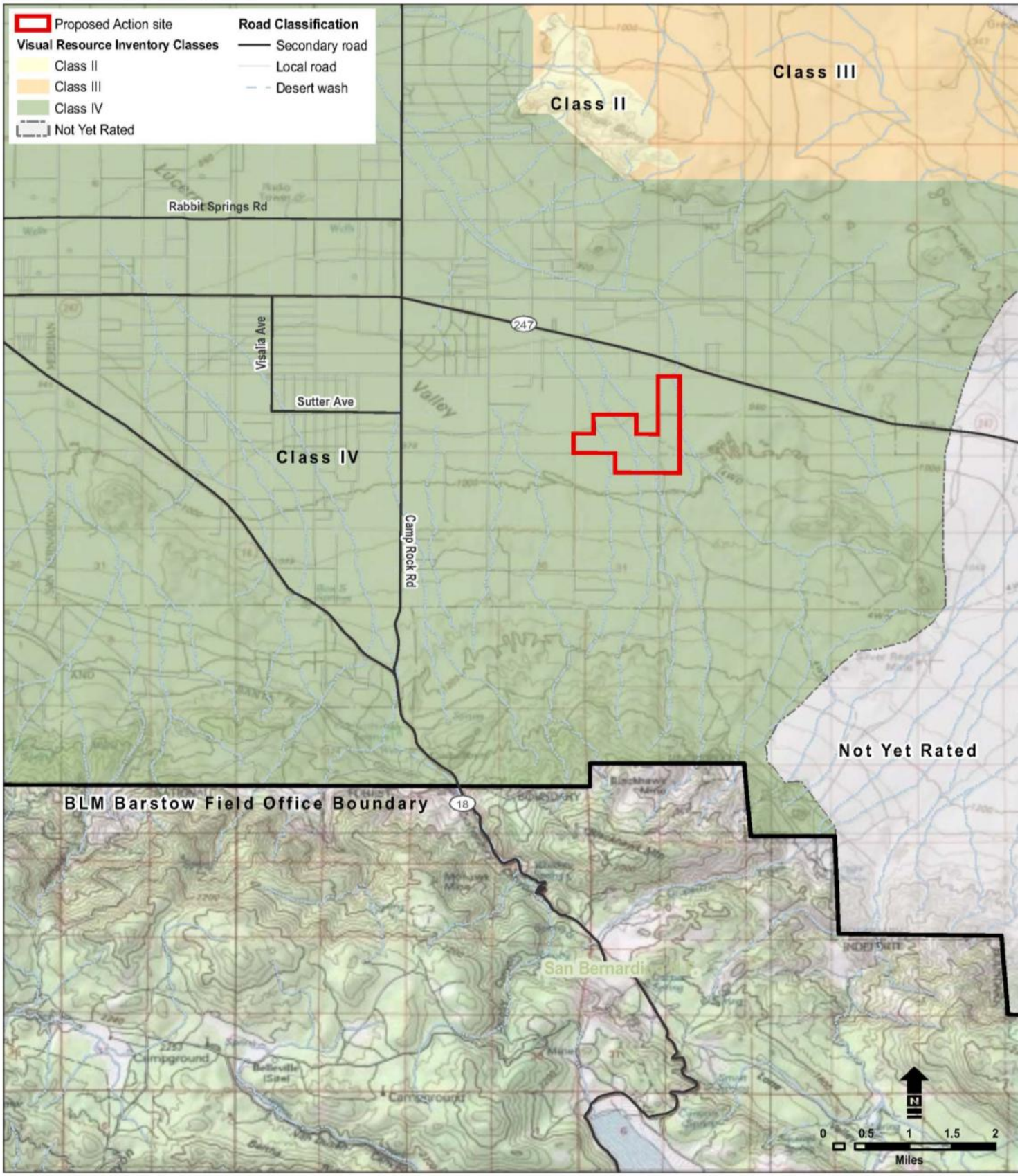

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-4

Visual Resource Inventory Classes

Lucerne Valley Solar Project

San Bernardino County, California

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Section 201(a): "The Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including…scenic values)."

Section 505(a): "Each right-of-way shall contain terms and conditions which will… (ii) minimize damage to the scenic and esthetic values."

Federal regulations regarding aesthetics and visual resources related to the Proposed Action are outlined in the BLM published resource management plans and are enacted through the application of VRM classifications described above.

California Desert Conservation Area Plan

The Proposed Action would be located on land managed according to the CDCA Plan (BLM 1980, as amended). The CDCA Plan does not include VRM classifications but does include Multiple Use Classes (MUCs), which restrict the level of use and development for lands managed under the CDCA Plan. Refer to Section 3.12.2 for VRI values used in making the interim VRM Class assignment.

Since most management activities involve alteration of the natural character of the landscape to some degree, the Bureau will take the following actions in order to effectively manage for these activities:

1) identify the appropriate levels of management, protection, and rehabilitation on all public lands in the CDCA, commensurate with visual resource management objectives in the multiple-use class guidelines; and
2) evaluate proposed activities to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the Bureau's contrast rating process.

The contrast rating process is a tool used to determine the extent of visual impact that proposed resource management activities would create in a landscape. It serves as a guide for reducing visual impacts to acceptable levels as defined by the visual management objectives and multiple use class guidelines.

All BLM lands covered by the CDCA Plan have been designated geographically into four MUCs based on the sensitivity of resources and types of uses for each geographic area (BLM 1980, as amended). Figure 3.9-1 shows MUCs in the vicinity of the Proposed Action. The site is located entirely on land in the MUC Category M, which is defined as follows:

- These lands are managed in a controlled balance between higher-intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, energy, and utility development are allowed. Any damage that permitted uses cause must be mitigated.

While the CDCA Plan stipulates that "[a]ll types of electrical generation plants may be allowed in accordance with State, Federal, and local laws" and that solar generating facilities "[m]ay be allowed after NEPA requirements are met," the majority of the project falls within a three-mile-wide BLM-designated "contingent" utility corridor (Corridor "S"). According to the Energy Production and Utility Corridor Element of the CDCA Plan, allowable uses within the corridor include the following types of linear utility facilities:

- New electrical transmission towers and cables of 161 kV (kilovolt) or above;
- All pipelines with diameters greater than 12 inches;
- Coaxial cables for interstate communications; and
- Major aqueducts or canals for interbasin transfers of water.

California Department of Transportation

The California State Department of Transportation (Caltrans) administers the State Scenic Highway Program to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways (California Streets and Highways Code, Section 260, et seq.). The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. These highways are identified in the Streets and Highways Code, Section 263. The program entails the regulation of land use and density of development, attention to the design of sites and structures, attention to and control of signage, landscaping, and grading, as well as other restrictions. The local jurisdiction is responsible for adopting and implementing such regulations. If a highway is listed as eligible for official designation, it is also part of the Scenic Highway System and care must be taken to preserve its eligibility status. SRs 18 and 247 are not officially designated as a scenic highway but are eligible for the California State Scenic Highway System within the Proposed Action area (Caltrans 2009).

Local Government Land Use Plans

Referring to Figure 2-1 of the Lucerne Valley Community Plan, the designation for the site is Non-County Jurisdiction. Therefore, no local land use plans are applicable (San Bernardino County 2007). However, SR 247 is a San Bernardino County designated scenic route.

3.12.2 Existing Conditions

Developed and Built Landscape

The site is situated outside the community of Lucerne Valley. Land use surrounding the site is dispersed rural residential housing that transitions more into open desert towards Johnson Valley three miles east of the site.

Undeveloped and Natural Landscapes

The site is located in the Mojave Desert in the Great Basin section of the Basin and Range Physiographic Province. The desert scrub and desert dry wash woodland landscapes are composed largely of creosote bush and species typical of the riparian shrub woodland community. Visible mountain ranges to the north and south include the Cougar Buttes, Blackhawk Canyon, and Blackhawk Mountain.

Topography at the site varies between three and eight percent slopes in places. Vegetation consists largely of creosote bush, with sparse transitions to the occasional Joshua tree on the south and eastern sections of the site, where elevation is slightly higher. The desert alluvial fan that characterizes the site transitions south of the Proposed Action area into a rolling hill landscape, which eventually transitions into a mountainous landscape within the San Bernardino National Forest.

Figure 3.12-5 shows the site boundaries in relation to nearby roads, geologic features, and hydraulic features.

Lucerne Valley Visual Resource Inventory

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to visual resources were raised: (1) cumulative visual effects with respect to other solar projects in the region; (2) degradation of views; and (3) views from SR 247, Old Woman Springs Road, a State Eligible Scenic Highway. These comments are addressed in the discussion of existing conditions (Section 3.12.2) and analysis of direct and indirect effects (Section 4.12). These concerns were incorporated into the VRI Sensitivity Level Ratings.

The CDCA was inventoried for visual values in the early 1980s and given the three decades of change within region, the VRI was updated to reflect current conditions. The VRI update was limited to the viewshed associated with the Lucerne Valley Solar Project. The updated inventory was divided into two SQRUs, three SLRUs, and one Distance Zone. The Lucerne Valley Solar Project lies within (See Figures 3.12-1, 3.12-2, 3.12-3, and 3.12-4):

Unit	Rating
Scenic Quality Rating Unit Lucerne Valley	(C)
Sensitivity Level Rating Unit Lucerne Valley	(Moderate)
Distance Zone	(FG-MG)

Comparison of the visual values reveals a VRI Class IV designation. These values are taken into consideration when determining the appropriate VRM Class designation as described in Section 3.12.

The VRM area boundary is defined by the Lucerne Valley floor that has visibility of the site. This single unit represents a contiguous area with uniform landform, vegetation, visual character, and quality. Scenic quality for rating the solar field is determined using the eight key factors, as follows:

1. Landform (rating 1 of possible 1 through 5): Some erosional patterns add subtle variety and shape to the site that is otherwise devoid of distinct landforms;
2. Vegetation (rating 1 of possible 1 through 5): Some variety of vegetation, but only one or two major types;
3. Water (rating 0 of possible 0 through 5): Absent;
4. Color (rating 1 of possible 1 through 5): Little color variations;
5. Adjacent scenery (rating 5 of possible 0 through 5): Adjacent scenery greatly enhances overall visual quality;
6. Scarcity (rating 1 of possible 1 through 5): Indistinctive and very similar to others within the region;
7. Intactness (rating 3 of possible 0 through 5): Majority of site is left intact, with few roads and two track trails bisecting the site; and
8. Cultural modifications (rating 0 of possible 0 through 5): Modifications add little or no visual variety.

For the Proposed Action, the ratings total 15 points, which ranks in the Scenic Quality C (low) category (17 or less points).

Interim VRM Class IV

Based on the criteria discussed above, it is recommended that the defined rating unit receive an Interim VRM Class IV designation. It is the field manager's determination upon approval of this recommendation that the interim VRM Class be designated as Class IV.

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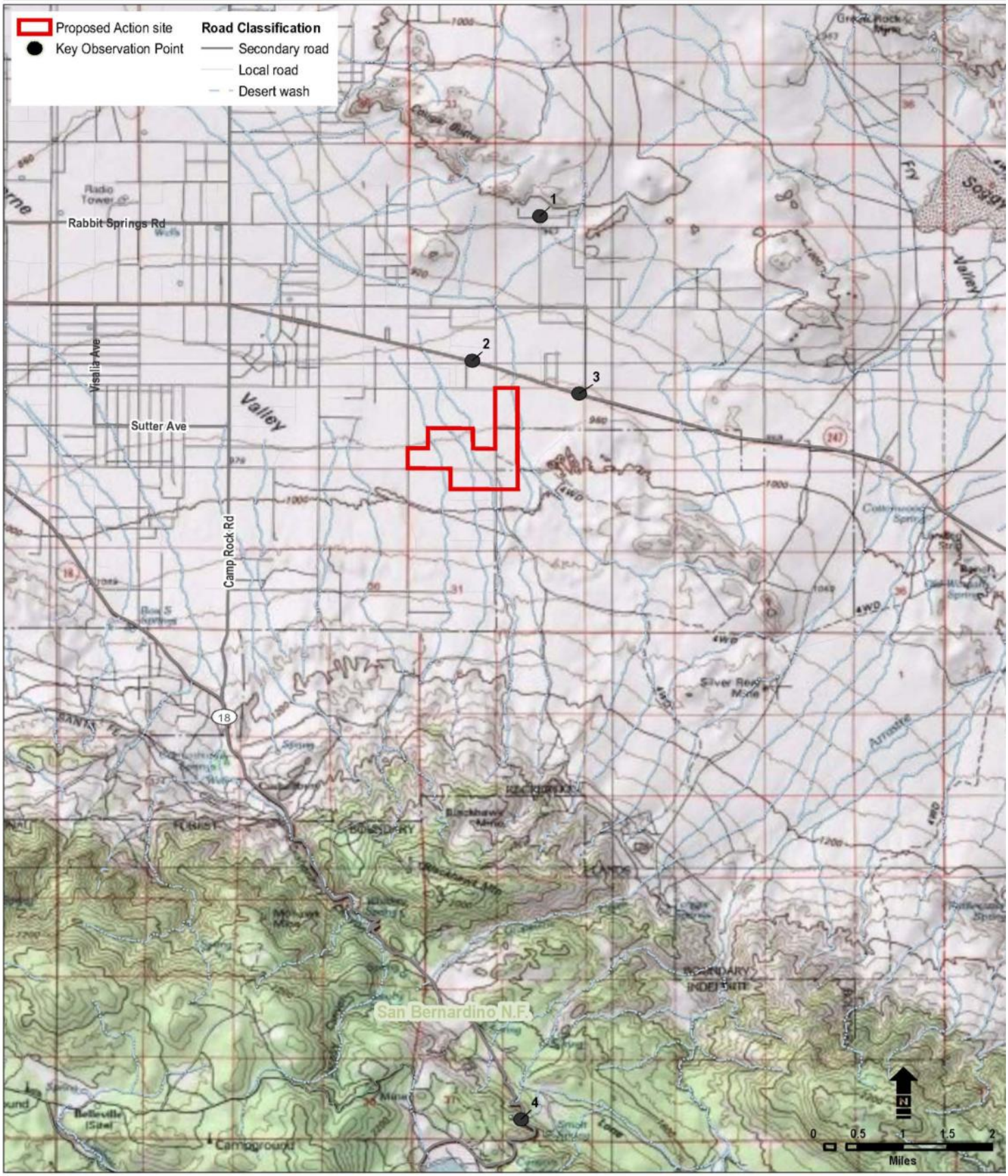

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993;
California Interagency Watershed Mapping Committee 1999;
USDA Forest Service, Region 5, Southern California Forest Plan 2005

Figure 3.12-5

Key Observation Points

Lucerne Valley Solar Project

San Bernardino County, California

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3.13 Transportation/Motorized Vehicle Access

This section identifies existing transportation and motorized vehicle access conditions in the Proposed Action area. Additionally, this section discusses regulations applicable to transportation and vehicle access. Information in this section includes reference to the 2007 *San Bernardino County General Plan Final Program Environmental Impact Report* (County of San Bernardino 2007), as well as input received from members of the public during the scoping process.

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to transportation and motorized vehicle access were raised: (1) whether Santa Fe Fire Road would remain open; (2) whether a right-turn lane on SR 247 would provide safer egress during construction; (3) the Town of Apple Valley requested identification of effects related to traffic to SR 18 and Bear Valley Road within the town's sphere of influence and within town limits; and (4) effects that are identified through a traffic study should be mitigated.

3.13.1 Applicable Plans, Policies, and Regulations

This section provides an overview of the applicable laws, regulations, and standards that apply to transportation and that influence the management of vehicular access of the site of the Proposed Action at the federal, state, and local levels. Although some of these laws do not apply to the Proposed Action, they provide a context for determining why some cultural resources are considered important at the federal, state, or local level, as well as what effects the Proposed Action could have on transportation and motorized vehicle access.

3.13.1.1 Federal

California Desert Conservation Area Plan

On federal lands managed by the BLM, motorized routes, in addition to roads that are within the state or locally maintained roadway system, are designated for public use through the BLM's CDCA Plan (BLM 1980). The majority of these routes are unmaintained. A few major arterial roadways are maintained or paved by the BLM (or both). Most routes receive light use and do not have specific policies or regulations governing their use. A few routes that provide access to major use areas or trailheads receive moderate use and may be hardened or maintained. The CDCA Plan designates roads as open, closed, or limited for vehicle use. The area designations are made on the basis of multiple-use classes with certain exceptions (BLM 1980).

The goal of the Motorized-Vehicle Access Element of the CDCA Plan is to provide a system and set of rules governing access to the CDCA by motor vehicles. The specific objectives in the CDCA Plan (BLM 1980) are as follows:

- Provide for constrained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies;
- When designating or amending areas or routes for motorized vehicle access, to the degree possible, avoid adverse impacts on desert resources; and

- Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users. Be sure all information materials are understandable and easy to follow.

The site of the Proposed Action is within a Class M (Moderate) multiple-use classification area where motorized-vehicle use is allowed only on existing routes of travel unless designated as closed or limited. New routes may be allowed upon approval of the authorized officer (BLM 1980). Routes within the Proposed Action area that are designated open to motorized vehicle access, but where activities have the potential for resource damage or could cause significant conflicts with other uses, may require specific authorization (BLM 1980).

Additional motorized routes through the BLM lands may be designated for commercial or other authorized use or for administrative agency use. These routes are subject to maintenance and other provisions, based on the level of use, public safety considerations, and environmental effects. Paved routes are generally subject to county road standards.

Nonmotorized transportation routes are also designated on public lands. These may include equestrian and hiking trails that serve as a primary access to specific local destinations or that serve as long-distance nonmotorized trekking routes.

The WEMO Plan is an amendment to the CDCA Plan that establishes strategies to conserve and protect sensitive species such as the desert tortoise, the Mohave ground squirrel, and other sensitive plants and animals within the WEMO planning area (BLM 2005). The WEMO modified the BLM routes of travel network designations made in 2003. The WEMO was later challenged in court, and it was ruled that the WEMO was not explicit enough in its designations. Currently the route designations are codified under 43 Code of Federal Regulations Part 8342.1 as follows:

> The authorized officer shall designate all public lands as open, limited, or closed to off-road vehicles. All designations shall be based on the protection of the resources of the public lands, the promotion of the safety of all the users of the public lands, and the minimization of conflicts among various uses of the public lands; and in accordance with the following criteria:
>
> (a) Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands, and to prevent impairment of wilderness suitability.
>
> (b) Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
>
> (c) Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
>
> (d) Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

3.13.1.2 State

California Department of Transportation

The State of California Department of Transportation (Caltrans) is responsible for maintaining approximately 1,240 miles of roadway throughout San Bernardino County. This includes six federal (interstate) freeways, two federal highways, and 18 state highways. Caltrans is the agency responsible for funding and maintaining the state highway and interstate highway system (Caltrans 2009).

3.13.1.3 Local

County of San Bernardino

Currently more than 10,000 miles of roadways are within San Bernardino County. These facilities fall under the jurisdiction of one of the three government agencies responsible for construction and maintenance of roadway infrastructure. The San Bernardino County Department of Public Works is responsible for maintaining approximately 2,830 miles of both paved and unpaved roadways primarily located in unincorporated areas of the county. These facilities range in classification from major arterials to local streets. The remaining 5,930 miles of roadways within San Bernardino County fall under the jurisdiction of the numerous incorporated municipalities across the county. These facilities range in classification from major arterials to local streets.

Transportation/motorized vehicle access management goals, policies, and regulations are outlined in the San Bernardino County General Plan (County of San Bernardino 2007). The goals, policies, and regulations that pertain to transportation/motorized vehicle access within the Proposed Action area are as follows:

- The County will provide a transportation system, including public transit, which is safe, functional, and convenient; meets the public's needs; and enhances the lifestyles of county residents;
- The County's comprehensive transportation system will operate at regional, countywide, community, and neighborhood scales to provide connectors between communities and mobility between jobs, residences, and recreational opportunities;
- The County will have a balance between different types of transportation modes to minimize the adverse effects of automobile use on the environment, reduce dependency on the automobile, and promote public transit and alternate modes of transportation;
- The County will coordinate land use and transportation planning to ensure adequate transportation facilities to support planned land uses and ease congestion;
- The County's road standards for major thoroughfares will complement the surrounding environment appropriate to each geographic region;
- The County will encourage and pursue development of regional transportation facilities, including roads, railroads, and airports to be a multimodal transportation hub and promote economic development.

Town of Apple Valley

The Circulation Element of the Terra Nova/Town of Apple Valley General Plan addresses transportation within Apple Valley and the segments of the local transportation system that interface with, and serve as extensions of, the regional roadway system connecting Apple Valley with the broader Victor Valley region and other communities in southern California. The Circulation Element provides maps to guide the orderly development of all aspects of the transportation system, as well as goals, policies, and programs that correlate to the town's transportation system with the types, intensities, and locations of land uses within the planning area (Town of Apple Valley 2009).

3.13.2 Existing Conditions

Major Traffic Routes Within or Adjacent to the Proposed Action Area

Roads that would be used for site access are SR 247 (also known as Old Woman Springs Road), Camprock Road, Foothill Road, Zircon Road, and Santa Fe Fire Road (Figure 3.13-1, Table 3.13-1). With the exception of SR 247, these are two-lane unpaved roads (single lane in either direction) that mainly provide access to private parcels and agricultural land. There are no railroads, bridges, or other transportation features in the Proposed Action area. Other larger thoroughfares that may be used for regional access to the site include Interstate 15 (I-15), SR18, and Bear Valley Road.

Immediate access to the site would be off SR 247 via Foothill Road, with secondary access points via Santa Fe Fire Road. In addition, there are dirt trails through the site that provide access from SR 247, Foothill Road, and Santa Fe Fire Road. The site is within a Class M (Moderate) multiple-use classification area. According to the CDCA Plan (BLM 1980), the vehicle access designation is classified as Open, Limited to Existing Routes of Travel. Santa Fe Fire Road is undesignated.

Existing Traffic Volumes

The level of service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and roadway segments, these include overall traffic volume, speed, and density.

Several physical and operational characteristics of the roadway, such as lane configuration, free-flow speed (typical speed between intersections), and number of intersections per mile, are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume-to-capacity ratio is calculated. These factors are then converted to a letter grade identifying operating conditions and expressed as LOS A through F. LOS A identifies the best operating conditions along a section of roadway and is characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability. LOS F characterizes forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions. For intersections, LOS can be determined by using either the method described above or by using the average control delay (the amount of time a vehicle is delayed by the operations of the traffic signal) calculated at an individual intersection (County of San Bernardino 2007).

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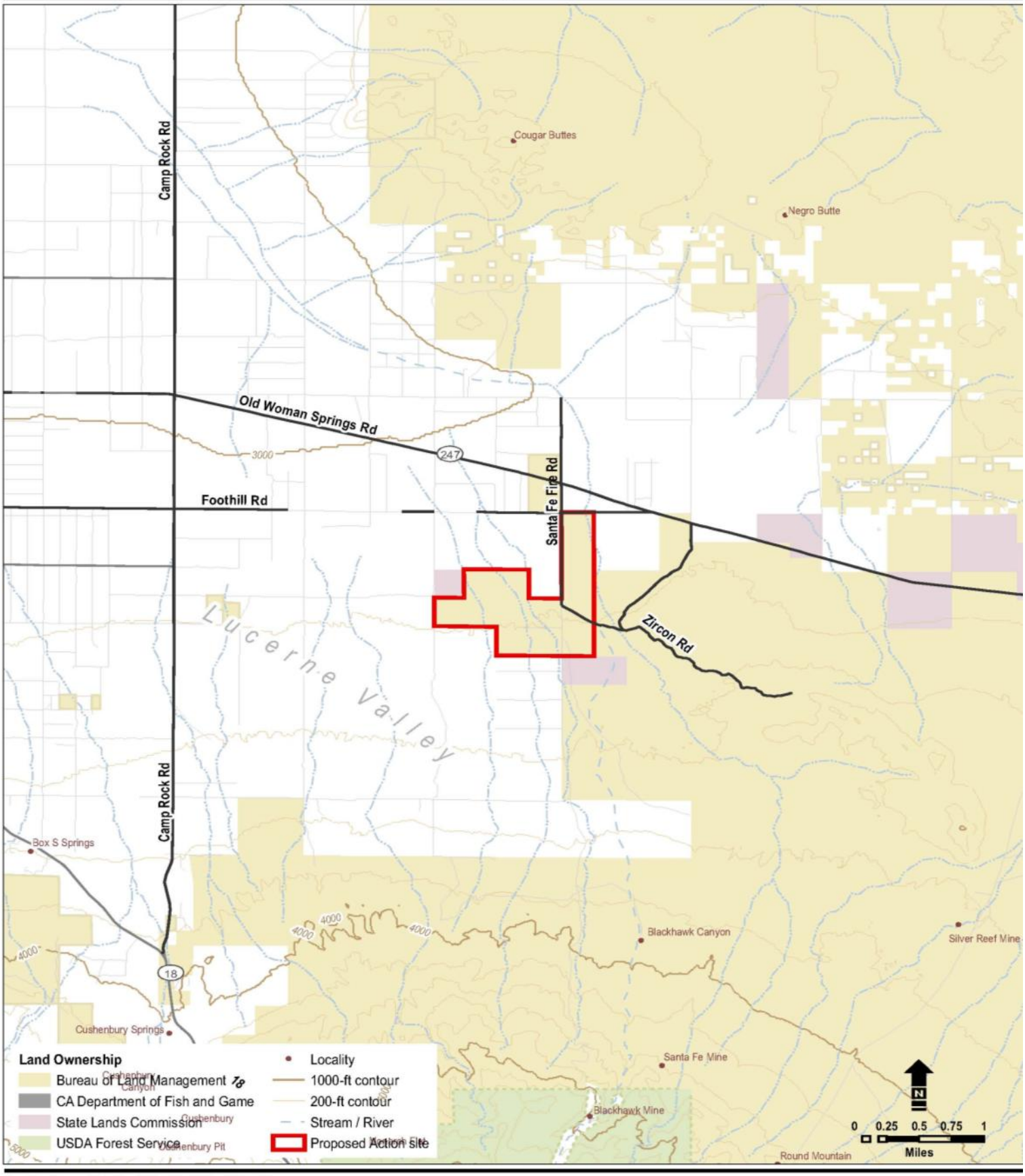

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; California Interagency Watershed Mapping Committee, 1999

Figure 3.13-1

Transportation Study Area Map

Lucerne Valley Solar Project

San Bernardino County, California

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Table 3.13-1 Routes Providing Direct or Indirect Access to the Site of the Proposed Action

Route	Direction	Type	Lanes	Description
I-15	North-south	Paved freeway	3-4 (each direction)	Provides a connection between San Diego, Victorville, and Barstow, California, and Las Vegas, Nevada, and beyond and indirect connection to the greater Los Angeles area. SR 18 and SR 247 connect to larger cities and metropolitan areas via I-15.
SR-18	Northwest-southeast	Paved highway	2-4 (total 2-way)	A major access route into the Lake Arrowhead and Big Bear Lake resorts to the south and leads to Apple Valley, Victorville, and I-15 to the northeast. The portion of SR 18 between Victorville and Palmdale operates as a bypass for trucks making deliveries in the western portion of the Los Angeles Metropolitan Region.
SR-247 (Old Woman Springs Road/ Barstow Road)	East/southeast - west/northwest	Paved highway	2 (total 2-way)	A rural highway that originates at I-15 and provides access between Barstow, Lucerne Valley, and Yucca Valley and terminates at SR 62.
Bear Valley Road	East-west	Paved highway	4-6 (total 2-way)	A major east-west corridor through the cities of Victorville, Hesperia, and Apple Valley and provides a shorter alternate connection between SR 18 and southbound I-15. Traveling west, Bear Valley Road is a secondary arterial until it intersects with US 395. It continues as a primary arterial through its intersections with I-15 and Hesperia Road before terminating at SR 18 east of Apple Valley.
Foothill Road	East-west	Gravel/dirt	2 (total)	Connection from Camp Rock Road or SR 18 to the north end of the site.
Santa Fe Fire Road	North-south	Gravel/dirt	2 (total)	Connection from Foothill Road or SR 247 to the Phase I and II site.
Zircon Road	Northwest-southeast	Gravel/dirt	2 (total)	Crosses the Phase I site. Provides access from the west to Wenger Ranch Road.

Source: County of San Bernardino 2007

Table 3.13-2 provides existing traffic volumes and LOS for highways that may be used for indirect access to the Proposed Action area. The County of San Bernardino has a goal for new development in the desert region of maintaining LOS C on its roadways.

Table 3.13-2 Existing Traffic Volumes and Level of Service

Route	Segment	Peak Hour Volume[a]	Annual Average Daily Traffic[b]	Level of Service
SR 247 (Old Woman Springs Road)	Camp Rock Road to SR 62	235	2,650[1]	B
SR 247 (Barstow Road)	Barstow to Camp Rock Road	NA	2,000–3,000[2]	B
I-15	I 215 to Oak Hill Road	NA	NA	F
I-15	US 395 to SR 18	NA	67,000–84,000[2]	A–C
SR 18	US 395 to Bear Valley Cutoff	690	7,900[1]	D
SR 18 (intersection)	Stoddard Wells Road intersection at I-15 North	3,925	92,000[1]	F
SR 18	Bear Valley Cutoff to SR 38	NA	3,000–9,000[2]	C–E
Bear Valley Road	I-15 to Apple Valley Road	NA	27,000–38,000[2]	C–E

Sources: [1]Caltrans 2009; [2]County of San Bernardino 2007

Notes:

[a]This value is useful for estimating the amount of congestion experienced and shows how near to capacity the highway is operating (average of back and ahead traffic [defined as Back Annual Average Daily Traffic and Peak Hour usually represent traffic south or west of the count location. Ahead Annual Average Daily Traffic and Peak Hour usually represent traffic north or east of the count location]).

[b]The average number of vehicles traveling on a route over a 24-hour period (average of back and ahead traffic).

3.14 Human Health and Safety/Hazardous Materials

This section describes the human health and safety and hazardous materials issues that may be present in the Proposed Action area. Hazards associated with seismic conditions are addressed in Section 3.3, “Geology, Topography, and Geologic Hazards.” Hazards associated with floods are addressed in Section 3.5, “Water Resources/Hydrology.”

During the scoping period, meetings were conducted with the public and government agencies to identify their concerns. Written comments were also received. The following comments and concerns related to human health and safety and hazardous materials were raised: (1) the Draft EIS should address potential direct, indirect, and cumulative effects of hazardous waste from construction and operation; (2) the document should identify projected hazardous waste types and volumes and expected storage, disposal, and management plans; (3) address the applicability of state and federal hazardous waste requirements; (4) appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste; (5) alternate industrial processes using less toxic materials should be evaluated as mitigation. This potentially reduces the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste, and; (6) the EPA recommends that the Applicant strive to address the full product life cycle by sourcing photovoltaic (PV) components from a company that minimizes environmental effects during raw material extraction, manufactures PV panels in a zero waste facility, and provides future PV disassembly for material recovery for reuse and recycling.

3.14.1 Applicable Plans, Policies, and Regulations

Hazardous materials handling and hazardous waste management are subject to numerous laws and regulations at all levels of government; laws and regulations related to health and safety are regulated by federal and state agencies. Additionally, there are also laws and regulations applicable to solar panel construction, design, and operations. The laws that may apply to the Proposed Action are summarized below.

3.14.1.1 Federal

Comprehensive Environmental Response, Compensation, and Liability Act

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or the Superfund Act) of 1980, as amended, and pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, the BLM has the responsibility for responding to the release or threat of release of oil, petroleum products, hazardous substances, or pollutants and contaminants that pose an actual or potential threat to human health or welfare or to the environment. Under this authority, the BLM may take an action to protect public land resources and users from hazardous substances that pose a threat or potential threat to human health and the environment. As the lead Federal agency for actions taken on BLM public land, the BLM is responsible for the identification of all environmental laws that pertain to any CERCLA cleanup actions.

Occupational Safety and Health Administration

The Occupational Safety and Health Administration (OSHA) administers Occupational Safety and Health Standards (29 CFR Sections 1910 and 1926), which (1) provide regulations for

safety in the workplace, (2) regulate construction safety, and (3) require a Hazard Communication Plan to identify and inventory all hazardous materials for which material safety data sheets will be maintained. OSHA's standards also require employee training in safe handling of said materials.

OSHA Electrical Safety Standards

Title 29 CFR, Part 1910.302, Subpart S, Design Safety Standards for Electrical Systems, and 1910.331, Electrical Safety-Related Work Practices Standard (1990), provides a description of concepts and principles associated with electrical hazards and basic electrical safety for individuals. OSHA's electrical standards for construction recommend following general industry electrical standards whenever possible for hazards that are not addressed by industry-specific standards. The standards address concerns that relate to electrical hazards and exposures to such dangers as electrical shock, electrocution, burns, fires, and explosions. OSHA's electrical standards help minimize these potential hazards by specifying safety aspects in the design and use of electrical equipment and systems.

National Fire Protection Association 780, National Electrical Code

The National Electrical Code (NEC) addresses electrical hazards through guidance related to installation of any electrical power system, including PV systems (NEC 2009). The NEC covers the installation of electrical conductors, equipment, and raceways; signaling and communications conductors; and equipment and optical fiber cables for public and private premises. The activities of the Proposed Action may require special permission from the San Bernardino County Fire Department, which has jurisdiction for the enforcement of this code. Article 690 of the NEC specifically covers installation and operational requirements for solar PV systems.

Federal Resource Conservation and Recovery Act

The federal Resource Conservation and Recovery Act (RCRA) regulates solar PV product end-of-life disposal and is based on the California Hazardous Waste Control Law (HWCL). If solar panels are determined to be hazardous waste by the regulatory authority, the requirements of RCRA (and HWCL) would regulate their handling, recycling, reuse, storage, treatment, and disposal (County of San Bernardino 2007). Decommissioned or defective solar panels are currently considered hazardous waste if they do not meet the U.S. Environmental Protection Agency Toxicity Characteristic Leaching Procedure standards (this determination varies depending on the technology used). Silicon-based panels typically last 20 to 25 years, and a proactive recycling option can eliminate health and environmental risks of water stream and water contamination for municipalities.

3.14.1.2 State

California Occupational Safety and Health Administration

Title 8 of the CCR, Chapters 3, 4, and 7 (Occupational and Industrial Safety), establish requirements for safe working conditions and safety-related reporting in the state. A hazard communication plan would need to include identification and inventorying of all hazardous materials, for which material safety data sheets are required, and employee training in safe handling of said materials.

California Environmental Protection Agency

The California Environmental Protection Agency enforces the Hazardous Waste Control Act (Title 26 CCR), which defines requirements for proper management of hazardous materials.

California Office of Emergency Services

California Office of Emergency Services (OES) coordinates overall state agency response to major disasters in support of local government (Division 1, Title 2, CCR Chapter 7, The California Emergency Services Act; Hazardous Materials Release Response Plans and Inventory Law of 1985). The OES is responsible for ensuring the state's readiness to respond to and recover from natural, man-made, and war-caused emergencies and for assisting local governments in their emergency preparedness, response, and recovery efforts. During major emergencies, OES may call upon all state agencies to help provide support. Due to their expertise, the California National Guard, California Highway Patrol, Department of Forestry and Fire Protection, Conservation Corps, Department of Social Services, and the California Department of Transportation are the agencies most often asked to respond and assist in emergency response activities. In addition, pursuant to the Hazardous Materials Release Response Plans and Inventory Law of 1985, local agencies are required to develop "area plans" for response to releases of hazardous materials and wastes. These emergency response plans depend to a large extent on the business plans submitted by persons who handle hazardous materials. An area plan must include pre-emergency planning of procedures for emergency response, notification, coordination of affected government agencies and responsible parties, training, and follow up. The California Hazardous Materials Incident Reporting System is a post-incident reporting system to collect data on the accidental release of hazardous materials. Information on accidental releases of hazardous materials is reported to and maintained by OES.

California Environmental Protection Agency

The California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control (DTSC) regulates the generation, transportation, treatment, storage, and disposal of hazardous waste under RCRA and the California Hazardous Waste Control Law. Both laws impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment.

California Department of Forestry and Fire Protection Office of the State Fire Marshall

In 2008, the Office of the State Fire Marshall published a draft copy of the Solar Photovoltaic Installation Guide (in partnership with interested local fire officials, building officials, and industry representatives). This guide was developed to increase public safety for all structures equipped with solar photovoltaic systems. This guidance was developed for PV systems associated with residential and commercial buildings, but some of the information about marking, access, pathways, smoke ventilation, location of direct current conductors, and ground mounting could be applicable (CALFIRE 2008).

3.14.1.3 Local

County of San Bernardino General Plan, Safety Element

The County Safety Element (County of San Bernardino 2007) describes hazards and hazard abatement strategies to provide guidance on decisions related to zoning, subdivisions, and entitlement permits. The element contains "general hazard and risk reduction goals and policies

to minimize potential dangers to residents, workers, and visitors; reduce the level of property loss resulting from events; and, identifies ways to respond to a crisis." The following safety element fire protection goal and policy are relevant to the Proposed Action: "GOAL S 3. The County will protect its residents and visitors from injury and loss of life and protect property from fires. Require applicants for new land developments to prepare a site specific fire protection plan, with special emphasis in areas of high and very high fire risk."

The San Bernardino County Fire Department

The San Bernardino County Fire Department, Hazardous Materials Division, is the local agency responsible for the enforcement of a variety of hazardous materials management requirements. It is the state-designated Certified Unified Program Agency (CUPA) for San Bernardino County (excluding Victorville). The CUPA provides consolidation and consistency in reporting requirements, permit formats, inspection criteria, enforcement standards, and fees for various hazardous materials programs. The CUPA is required by state law to maintain a list of facilities within the county that are known to use, store, or generate hazardous materials and wastes. Facilities that handle hazardous materials or generate hazardous waste must obtain a permit from the CUPA. The San Bernardino County Fire Department manages six hazardous material and hazardous waste programs: (1) Hazardous Materials Release Response Plans and Inventory (Business Plan); (2) California Accidental Release Program; (3) Underground Storage Tanks; (4) Aboveground Petroleum Storage Spill Prevention Control and Countermeasure; (5) Hazardous Waste Generation and On-Site Treatment; and (6) Hazardous Materials Management Plans and Inventory Statements under Uniform Fire Code Article 80.

3.14.2 Existing Conditions

The site is located on undeveloped lands administered by the BLM in the Lucerne Valley of San Bernardino County. This section defines existing conditions within the site to establish a baseline against which potential effects may be measured. Potential natural hazards, hazards related to existing infrastructure, and hazards associated with uses of the site and surrounding sites are considered. Hazards that could affect human health include natural hazards, wildfires, and endemic harmful species of snakes and spiders.

There are no permitted facilities or infrastructure at the site that could adversely affect human health. The site is almost entirely vacant and undeveloped. However, there are several occupied buildings of unknown origin that are likely not permitted and graded dirt access roads, indicating there are residents living on the property illegally. There are also old mining test pits and evidence of potential illegal dumping at the site. There is no evidence of previous commercial or industrial development at the site, nor evidence of previous usage of the site for agricultural, commercial, or industrial purposes.

Natural Hazards

The site is located in desert scrub/wash. There are hazards associated with the natural environment and species endemic to the site. The site is hot and dry and subject to significant temperature gradients throughout the day.

Existing Fire Hazards

The California Department of Forestry and Fire Protection (CALFIRE) characterizes fire risk for areas within California. CALFIRE produces Fire Hazard Severity Zone maps that assign hazard scores based on factors that influence fire likelihood and behavior, such as fire history, existing

and potential fuel (natural vegetation), flame length, blowing embers, terrain (steep terrain has a greater fire hazard severity), topography, and typical weather for the area. The 2008 Fire Hazard Severity Zone maps include areas where local governments have financial responsibility for wildland fire protection, known as local responsibility areas. Only lands zoned "very high" for fire hazard severity are identified within local responsibility areas. CALFIRE divided state responsibility areas into three hazard zones: moderate, high, and very high (CALFIRE 2008).

The Proposed Action would be developed in desert scrub, which has an associated fire risk. The fire hazard associated with this type of environment has been mapped by CALFIRE as a moderate fire hazard severity zone (CALFIRE 2008).

Hazardous Wastes/Contaminated Soil and Groundwater

A preliminary search of the California DTSC databases identified no potentially contaminated sites on the site or within one mile of the Proposed Action area. This database search included listings of federal superfund, state response, volunteer cleanup, school cleanup, evaluation, school investigation, military evaluation, corrective action, hazardous waste permitted, leaking underground storage tanks, and registered industrial sites (DTSC 2009).

Intentional Destructive Acts

Pursuant to the US Department of Energy's policy set out in December 1, 2006, memorandum, "Need to Consider Intentional Destructive Acts in NEPA Documents," the potential environmental consequences of intentional destructive acts at the Lucerne Valley facility have been considered. The proposed facility presents an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack (BLM 2010).

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3.15 Social and Economic Conditions

3.15.1 Social

This section describes the social and demographic background and existing conditions in the Proposed Action area, which includes the Lucerne Valley and broader Victor Valley area. Additionally, this section discusses applicable plans, policies, and regulations that embody the social aspirations; community characteristics; and desired lifestyle, values, and goals of the stakeholders. These plans, policies, and regulations are necessary to appreciate social group concerns in the context of renewable energy development. Information compiled is based on regional and national sources as well as input received from members of the public during the scoping process. The following comments and concerns related to socioeconomic conditions were raised during scoping: (1) effects on the region from the number of temporary and permanent workers who would be hired to build and operate the Proposed Action; (2) effects on the region from tax revenues generated by the Proposed Action or from payments in lieu of taxes (if applicable) to be paid by the sponsor/developer; (3) integration of restoration and any remedial costs during decommissioning into the total cost of the Proposed Action, and; (4) effects on property values. The background data and social and demographic trends necessary to place these concerns in their proper context and to provide a platform for effect evaluation are included within this section.

3.15.1.1 Applicable Plans, Policies, and Regulations

Locally, for the Lucerne Valley, the main plans, policies, and goals for preserving the community's rural lifestyle character are articulated within the Lucerne Valley Community Plan (LVCP), which was prepared in conjunction with the County of San Bernardino General Plan (County of San Bernardino 2007). The following LVCP goals are relevant to evaluating how socioeconomic resources may be affected by the Proposed Action:

- Goal LU 1: Retain the existing rural desert character of the community;
- Goal LU 2: Ensure that commercial and industrial development within the plan area is compatible with the rural desert character and meets the needs of local residents;
- Goal LU 3: Establish locational criteria for future development within the plan area to ensure compatibility between uses and with the character and vision that is desired for the community;
- Goal circulation and infrastructure (CI) 4: Ensure adequate water sources and associated infrastructure to serve the needs of existing and future water users in the LVCP area;
- Goal CI 5: Encourage and promote water conservation; and
- Goal CI 6: Ensure that public services are delivered and maintain capacities at acceptable levels.

3.15.1.2 Existing Conditions

The site of the Proposed Action is on undeveloped lands administered by the BLM in the Lucerne Valley of San Bernardino County. The region of influence for the Proposed Action is the Lucerne Valley, an unincorporated community located in the Mojave Desert in the southwestern part of San Bernardino County. The Lucerne Valley is in the eastern portion of the greater Victor

Valley, whose main population centers are Victorville, Apple Valley, and Hesperia, communities located close to Interstate 15. Collectively, the Victor Valley communities are part of an economic region encompassing San Bernardino and Riverside Counties that includes the Inland Empire. Figure 3.15-1 shows the site and vicinity (roads, public facilities, major local features, and resources). The site would be within Zip Code tabulation area (ZCTA) 92356 and Census Tract 104.05. These geographic groupings have been used for the compilation of demographic and socioeconomic data.

Demographics and Social Trends

The Lucerne Valley is characterized by its high-desert landscape, natural resources, scenic vistas, and rural open environment. The area is defined by large lots/parcels, limited commercial development, and an agriculture-based rural lifestyle. Residents are concerned with issues such as depleted agricultural lands, water scarcity, and the maintenance of pristine environmental habitats for threatened and stressed species. Some groups are also concerned with future economic opportunities given the changing nature of the rural landscape and the background recession. Social groups or constituencies that take an interest in the Proposed Action's potential effects on, and integration with, their community are comprised of local large lot residents, recreational users (such as hikers and OHV enthusiasts), local groups (e.g., Mountain Home Village, LVEDA etc.) and national environmental groups (e.g., The Wildlands Conservancy). These groups have various views and concerns about the tradeoffs associated with solar energy (and other renewables such as wind) development within the host high desert area landscape. These concerns affect how these stakeholders assess and process proposed developments that would potentially alter their rural, desert lifestyles. The desert landscape and natural resources define the rural character of the community, which prizes open spaces and scenic vistas. Large lot subdivisions allow for raising animals and engaging in agricultural and equestrian activities.

Population: Table 3.15-1 shows recent population estimates, growth rates, and densities (persons per square mile) for Lucerne Valley and the urban centers closest to the site. The Lucerne Valley is an unincorporated area that is represented by ZCTA 92356. The communities within the region have enjoyed relatively strong population growth that has outpaced average growth in California. It is estimated that the Lucerne Valley is home to approximately 7,500 individuals and is a sparsely populated rural area compared to the adjacent Victor Valley urban centers of Hesperia and Victorville and the town of Apple Valley. The area has a relatively older population compared to the state average. For example, ZCTA 92356's population 65 or older is 16.5%, compared to 10.6% for the state.

Housing: Table 3.15-2 shows the quantity and quality of housing stock in San Bernardino County, particularly the availability of temporary housing near the site that might be available to temporary construction workers. Residential development in the Lucerne Valley is low-density, which is consistent with the zoning goals articulated in the LVCP to preserve the community character of rural agrarian lifestyles (County of San Bernardino 2007). Housing conditions within San Bernardino County are closely linked to the construction sector, a major employer in the area. The recession has had a significant effect on the pace of building activity (both residential and commercial) within the Inland Empire, and the construction downturn has contributed to rising unemployment.

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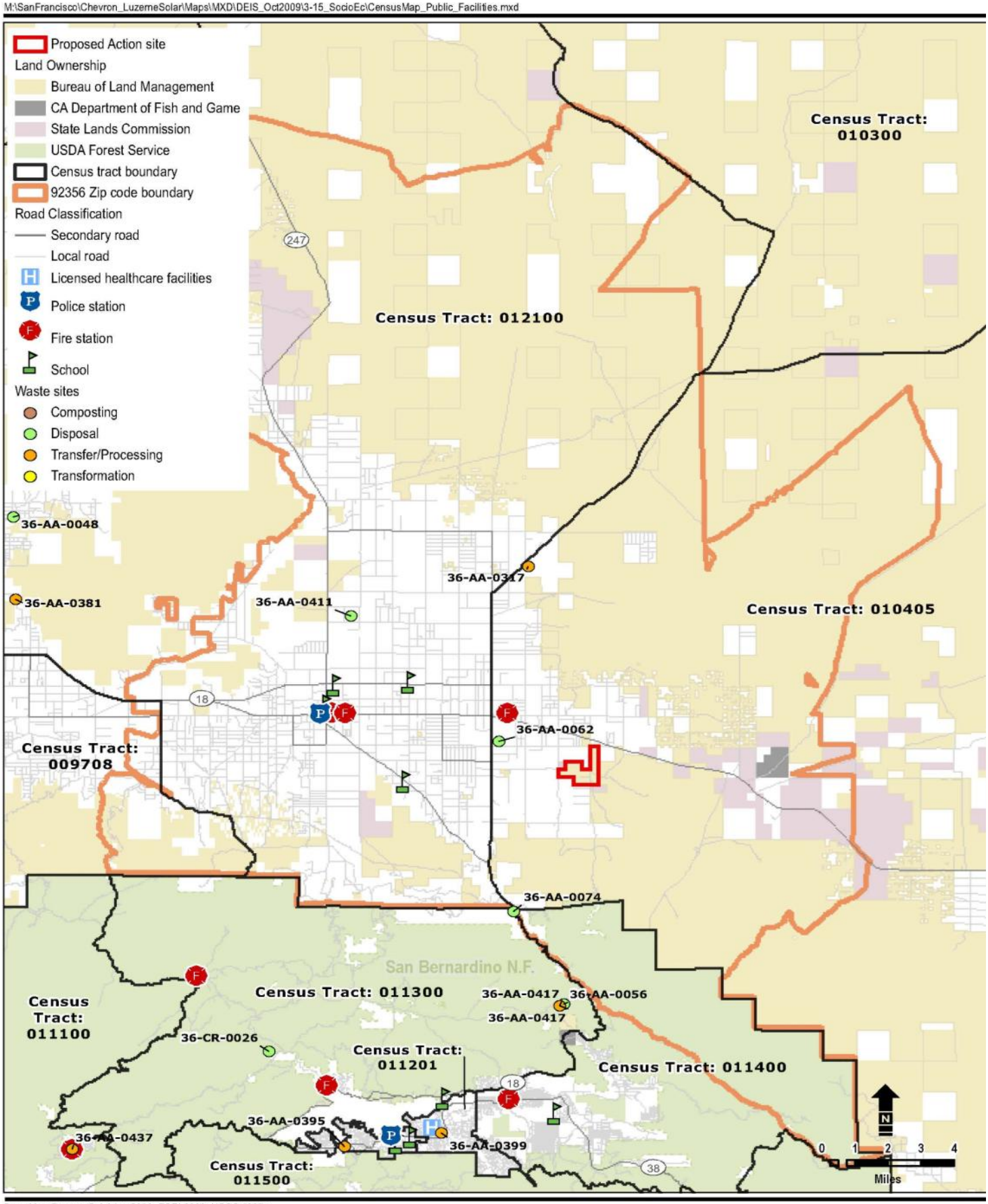

Base Map Source: Cal-Atlas 2009; ESRI 2009; USGS 1993; U.S. Department of Commerce, Bureau of the Census 2001; Heberger, Matthew, and Herrera, Pablo 2009; CA DHS 2006.

Figure 3.15-1

Public Facilities and Census Tracts

Lucerne Valley Solar Project

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Table 3.15-1 Population Levels, Growth Rates, and Density

Area	Population Levels		Population Growth Rates		Population/ square mile		
	2000	2008 est.	2000-2008	Average Annual Growth[a]	2000	2008 est.	Land Area (square miles)
California	33,871,648	36,756,666	8.5%	1.0%	217	236	155,959
San Bernardino County	1,709,434	2,015,355	17.9%	2.1%	85	101	20,053
San Bernardino (city)	185,401	198,580	7.1%	0.9%	3,197	3,424	58
Lucerne Valley (ZCTA 92356)	5,251	7,500	42.8%	4.6%	12	17	433
Apple Valley	54,239	70,200	29.4%	3.3%	2,583	3,343	21
Hesperia (city)	62,582	85,883	37.2%	4.0%	934	1,282	67
Victorville (city)	64,029	110,318	72.3%	7.0%	889	1,532	72

Source: U.S. Census Bureau 2008
Note:
[a]Compound average annual growth rate.

Table 3.15-2 Housing Stock Characteristics (2005 to 2007)

Area	Total Housing Units	Homeowner Vacancy Rate	Rental Vacancy Rate	Median Value (dollars)
California	13,159,358	1.8	4.7	$513,200
San Bernardino County	667,836	2.5	5.5	$363,700
San Bernardino (city)	66,210	2.7	5.0	$300,800
Lucerne Valley (ZCTA 92356)	2,655	n.a.	n.a.	$70,800
Apple Valley	24,353	3.2	3.1	$312,200
Hesperia (city)	26,220	2.3	7.8	$320,200
Victorville (city)	30,973	2.8	6.1	$296,700

Source: U.S. Census Bureau 2009
Notes:
Reflects averages over the 2005–2007 period.
n.a. = not available.

Since the time of the housing indicators shown in the official census records (average from 2005 to 2007), the housing sector has deteriorated rapidly in the recession. For example, median home values within the San Bernardino County-Riverside Metropolitan Statistical Area fell from $370,000 in April 2007 to $138,750 in April 2009 (County of San Bernardino 2009).

Within the immediate vicinity there are two motels on SR 18 (Giant Oaks Lodge Motel and Cabins and Lake Motel). South of this area there are more hotels and room capacity located in the town of Big Bear Lake, California.

Affected Groups and Attitudes

This section discusses some of the groups who potentially may be affected by the Proposed Action. Social effects to these groups and other stakeholders are discussed under Section 4.15.

Classifying stakeholders into groups by no means implies that other stakeholders who do not fit into a group are being ignored or are outside of the social and environmental review process. Discussion of the affected groups is simply a means to highlight and facilitate issue framing related to the social concerns of some stakeholders who may have a particular local or regional relationship to the host landscape that may potentially be developed to exploit solar energy.

Lucerne Valley Economic Development Association (LVEDA): LVEDA provides a forum for discussion and action on important community issues. These issues relate to promoting infrastructure improvements and working with the County and developers to promote development that is both "economic" and compatible with the region's rural lifestyle, environment, and resource availability. The group's purpose is to encourage and facilitate activities that improve the economic viability of this community, provide a forum for guidance and support, provide opportunities to inform, and seek funds necessary for implementing compatible activities that would improve the community. Social attitudes advanced by the group are for sustainable development but are also highly protective of the sanctity of the Mojave Desert (LVEDA 2009).

Environmental Groups / Non-Governmental Organizations: Several national groups have concerns about the siting criteria used for renewable energy projects slated for development in sensitive areas.

Recreational Users: Recreational Users are a distinct group with a particular relationship to the land area that would host the solar farm. These individuals include OHV users, hikers, horseback riders, and wildlife viewing enthusiasts. The recreational user group has a deep appreciation for the natural high desert landscape, and their social attitudes are participatory and protective of this resource. This group is concerned with any future abridgement and restrictions that would be placed on the land that would affect the historic use of the area.

Local Private Land Owners / Residents / Large Lot Owners: Local private land owners with properties that are in the vicinity of the Proposed Action have various attitudes towards renewable energy development. The attitudes run the gamut from being pro renewable energy development, to being against a change to the desert environment, to being indifferent to the Proposed Action. Local land owners are also concerned about permanent changes to the natural high desert environment, wildlife, and potential effects to property values.

Project Workers and Suppliers to the Renewable Energy Industry: The Proposed Action has the potential to affect both the local and non-local labor force from surrounding areas and the nation. Building and operating the Proposed Action would require both temporary and permanent workers. Since the area is in the midst of a recession, social attitudes towards future employment opportunities are favorable and hopeful. Suppliers to the renewable energy industry are firms and establishments that can provide goods or services necessary to build, operate, and decommission the proposed solar farm or other renewable projects in the area. These firms can potentially be local, regional, or national in origin and have a vested interest in participating in renewable energy development. The livelihood of this group depends on economic opportunities for exploiting renewable energy in the region.

Utility Off-taker and End-use Energy Consumers: The processors, distributors, and ultimate consumers of potential electricity to be generated by the Proposed Action are a social group that will be considered in the socioeconomic effect evaluation. The solar farm energy output would be delivered to the California grid system for use by consumers located outside of the

Lucerne Valley. These consumers have various social attitudes towards renewable energy that relate to the reliability, cost, and environmental sustainability of this resource. These attitudes also include concerns for the resources consumed and the tradeoffs necessary to achieve emission free solar power generation.

3.15.2 Economic

This section profiles historic and recent trends in the regional economy that would host the Proposed Action. Recent economic indicators reflect the effect of the Great Recession while historic indicators contrast the high desert region's growth trajectory to State averages. The host region has been severely affected by the recession, and communities within Lucerne Valley and the Victor Valley region have endured a greater contraction in economic activity compared to other communities in California. Concerns related to the current state of the regional economy are directly relevant to comments voiced from stakeholders about the integration of the Proposed Action within the Lucerne Valley. Renewable energy development and green or clean energy is an economic sector that has been targeted for future growth. The economic profile in this section focuses on the economic base or structure of the local economy and provides key indicators on the distribution of employment by industry, incomes, and recent business cycle trends for the area.

The Lucerne Valley is well known for its mining activities, including one of the largest limestone producing districts in the United States. The mining industry dominates the local economy, with limestone mining a significant visible presence on the northern slopes of the San Bernardino Mountains (County of San Bernardino 2007). The Lucerne Valley provides limestone, cement, and aggregates supporting coastal economic development in California (LVEDA 2009).

3.15.2.1 Economic Conditions

Income, Compensation and Employment. Since the most comprehensive set of economic data is available at the county level, the following exhibits highlight key economic profile information for San Bernardino. San Bernardino's personal income was $56 billion in 2007. San Bernardino County contributed 49 percent of the total personal income ($117 billion) to the Riverside-San Bernardino-Ontario metropolitan statistical area (MSA). Within San Bernardino County, approximately 62 percent of personal income was sourced from employee compensation totaling $35 billion in 2007. Personal income is composed of income from all sources.[1]

The county's total employment level was 892,000 in 2007, with government and government enterprises accounting for 15 percent of the employment base (Table 3.15-3).

[1] Personal income includes income received from participation in production as well as from government and business transfer payments. It is the sum of compensation of employees (received), supplements to wages and salaries, proprietors' income with inventory valuation adjustment and capital consumption adjustment, rental income, personal income receipts on assets, and personal current transfer receipts, less contributions for government social insurance (Bureau of Economic Analysis [BEA] 2007).

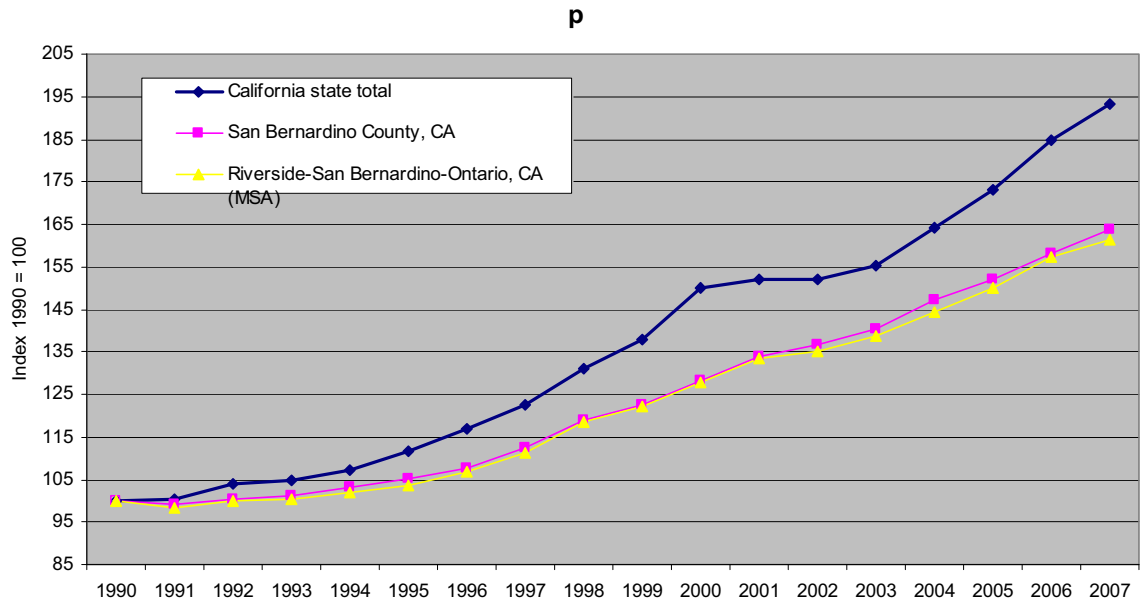
Table 3.15-3 San Bernardino County, California Personal Income, Employee Compensation and Employment by Industry (2007)

	Personal Income (1000s)	%	Employee Compensation (1000s)	%	Employment	%
Total	$56,110,017	100.0%	$34,924,896	100.0%	892,443	100.0%
Farm	-$59,903	-0.1%	$67,771	0.2%	3,558	0.4%
Nonfarm	$38,751,242	69.1%	$34,857,125	99.8%	888,885	99.6%
Total private	$29,699,964	52.9%	$25,805,847	73.9%	753,055	84.4%
Forestry, fishing, related activities	$41,703	0.1%	$32,230	0.1%	1,251	0.1%
Mining	$52,879	0.1%	$47,949	0.1%	959	0.1%
Utilities	$403,817	0.7%	$400,525	1.1%	4,035	0.5%
Construction	$3,362,631	6.0%	$2,546,401	7.3%	62,213	7.0%
Manufacturing	$3,816,306	6.8%	$3,531,907	10.1%	68,478	7.7%
Wholesale trade	$2,266,372	4.0%	$2,147,632	6.1%	41,294	4.6%
Retail trade	$3,345,210	6.0%	$3,056,885	8.8%	110,909	12.4%
Transportation and warehousing	$2,871,673	5.1%	$2,438,673	7.0%	54,580	6.1%
Information	$499,518	0.9%	$476,209	1.4%	9,437	1.1%
Finance and insurance	$1,288,721	2.3%	$1,141,381	3.3%	28,001	3.1%
Real estate and rental and leasing	$924,572	1.6%	$466,762	1.3%	40,335	4.5%
Professional, scientific, and technical services	$1,643,972	2.9%	$1,242,739	3.6%	35,593	4.0%
Management of companies and enterprises	$458,932	0.8%	$458,856	1.3%	6,588	0.7%
Administrative and waste services	$2,016,532	3.6%	$1,809,187	5.2%	75,770	8.5%
Educational services	$371,324	0.7%	$358,126	1.0%	12,559	1.4%
Health care and social assistance	$3,796,197	6.8%	$3,414,331	9.8%	80,705	9.0%
Arts, entertainment, and recreation	$195,648	0.3%	$158,708	0.5%	12,245	1.4%
Accommodation and food services	$1,040,024	1.9%	$997,542	2.9%	57,576	6.5%
Other services, except public administration	$1,303,933	2.3%	$1,079,804	3.1%	50,527	5.7%
Government and government enterprises	$9,051,278	16.1%	$9,051,278	25.9%	135,830	15.2%
Federal, civilian	$1,123,700	2.0%	$1,123,700	3.2%	13,435	1.5%
Military	$1,393,878	2.5%	$1,393,878	4.0%	18,705	2.1%
State and local	$6,533,700	11.6%	$6,533,700	18.7%	103,690	11.6%
State government	$814,425	1.5%	$814,425	2.3%	12,210	1.4%
Local government	$5,719,275	10.2%	$5,719,275	16.4%	91,480	10.3%

Source: BEA 2007

Other important employing sectors include retail trade, healthcare and social assistance, and administrative and waste services and construction.

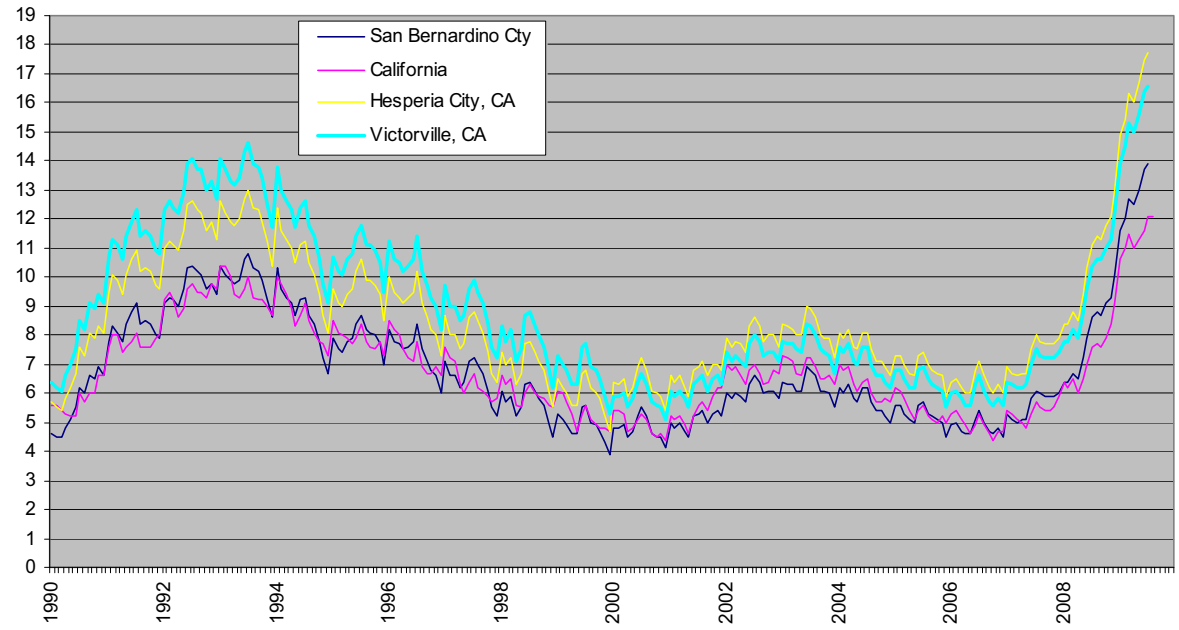
Income Trends: San Bernardino County has not enjoyed the equivalent growth in per capita personal income experienced in California as a whole between 1990 and 2007. Growth in per capita personal income has lagged behind California's average and has grown in line with the broader Riverside-San Bernardino-Ontario MSA. Between the inland high-desert region and the state average, the gap in per capita income also appears to be widening, as shown in Figure 3.15-2. San Bernardino's per capita personal income of $28,024 was 67 percent of California's per capita personal income ($41,805) in 2007.



Source: BEA 2007

Figure 3.15-2 Growth in Per Capita Income

Unemployment Trends: The region surrounding the Proposed Action area has been hit hard by the recession. Recent local unemployment rates for the cities of Hesperia and Victorville exceed County of San Bernardino and State of California averages by several percentage points. There is not yet an indication that unemployment rates have stabilized as the trends displayed in Figure 3.15-3. The recent recession has had a more severe effect compared to the recession of 1990-1992, where area unemployment rates peaked at lower levels.



Source: BLS 2009

Figure 3.15-3 Unemployment Rates (January 1990 to July 2009)

Within San Bernardino County, the Lucerne Valley is an agriculture and mining-based dependent economy. Mitsubishi Cement, Specialty Minerals (formerly Pfizer), and Omya (formerly Pluess-Staufer) are companies that mine the North Face of the San Bernardino Mountain range. The area also is involved in water reclamation and reuse. Lucerne Valley has a state-sponsored water reclamation project, where treated wastewater from Big Bear and Holcomb Valley is transported via pipeline and used to irrigate alfalfa farms on the eastern edge of the valley (City of Big Bear Lake 2006; County of San Bernardino 2007).

Public Revenues: San Bernardino County relied on $3.135 billion in revenue in 2008 (County of San Bernardino 2008). Most of the revenue was sourced from operating grants and contributions ($1.35 billion), charges for services ($0.8 billion), and ad valorem taxes ($0.55 billion). Because a great deal of county land is administered by the BLM, the BLM also pays a Payment in Lieu of Taxes to the county based on a formula that takes into account the population and acres under public management.

Public Services and Utilities: The Lucerne Valley has no centrally provided utilities other than electric power. Neighboring communities in the Victor Valley have these services, and the extension of infrastructure and growth issues are of concern to stakeholders who are seeking to preserve the community's rural character (County of San Bernardino 2007).

Water and Wastewater: Within Lucerne Valley, water supplies are provided by 11 purveyors or service providers who were estimated to be producing water supplies for 2,722 residents annually. All of the service providers extracted water from groundwater wells. The estimated annual production for the 11 service providers totaled approximately 662.21 acre-feet, equivalent to an average daily production of 0.591 million gallons per day. In addition to water from these service providers, groundwater is pumped from other private (self-supply) wells. Wastewater is disposed of through the use of septic tanks and leach field systems. There is no central sewage service provided to Lucerne Valley residents (County of San Bernardino 2007).

Fire and Emergency Medical Services: Fire protection services are provided by Lucerne Valley Fire Protection District in the Lucerne Valley Plan area. The San Bernardino County Fire Department provides administration and support for the fire district and other services, such as hazardous materials regulation, dispatch, communication, and disaster preparedness. The North Desert Division has two stations located within the Lucerne Valley Community Plan Area: Lucerne Valley Stations 111 and 112. The California Department of Forestry and Fire Protection (CALFIRE) also has a fire station, providing seasonal fire protection services and fire-related information for the Lucerne Valley community (County of San Bernardino 2007). Table 3.15-4 lists fire stations and facilities and shows their resources and manpower.

Police: The San Bernardino County Sheriff's Department (SBCSD) provides police services to unincorporated areas within the county. The SBCSD has patrol stations in Big Bear and also in Lucerne Valley. In addition, the incorporated cities of Big Bear Lake, Hesperia, Apple Valley, and Victorville are provided services on a contract basis, as follows: full service law enforcement, traffic services, investigations, and a wide variety of safety services (SBCSD 2009). The City of Big Bear Lake has a police station approximately 25 miles southwest of the site of the Proposed Action. Big Bear Lake contracts with the SBCSD for criminal law and traffic enforcement (City of Big Bear Lake 2009).

Table 3.15-4 Lucerne Valley Fire Stations and Facilities

Fire Stations	Fire District / Agency	Area Served	Equipment	Personnel (number and title)	Emergency Medical Technician (EMT) Response Capabilities	Availability / Ambulance Services
Lucerne Valley Station 111	Lucerne Valley Fire Protection District	County Service Area (CSA) 29	1 Incident Command System (ICS) Type I structure engine, 1 ICS Type III brush engine, 1 ambulance with advanced life support equipment, water tender for additional water needs	1 captain, 1 paramedic firefighter, and 1 limited term firefighter	EMT-automatic external defibrillator (minimum)	1st ambulance medic ambulance 111, 2nd ambulance service under contract
Lucerne Valley Station 112	Lucerne Valley Fire Protection District	CSA 29	MCI trailer-rescue 111 and medic ambulance 111a	Paid call	EMT-automatic external defibrillator (minimum)	1st ambulance medic ambulance 111, 2nd ambulance service under contract
Lucerne Valley CALFIRE Station	State responsibility area wildland responsibility	USFS lands	1 Type III engine, 1 tanker unit, other equipment as provided by USFS	1 captain, 2 firefighters, summer only	EMT	1st ambulance medic ambulance 111, 2nd ambulance service under contract
USFS Station 19, located with Lucerne Valley CALFIRE Station	USFWS	USFS lands	Type III engine, Type IV patrol and utility vehicles	Fire engine (5 person, 7 days, summer only), prevention unit (1 person, year-round)		

Source: County of San Bernardino 2007

Hospitals: The Bear Valley Community Hospital (located in Big Bear Lake) is the facility serving the Lucerne Valley area. Services include 24-hour emergency care, acute respiratory care, inpatient medical care, both in-patient and out-patient surgery, laboratory, physical therapy, as well as a skilled nursing facility and two rural health clinics. The hospital also offers comprehensive diagnostic imaging, including quad detector CT scanning, ultrasound, digital x-ray, and mammography services (Bear Valley Community Hospital 2009).

Schools: The Lucerne Valley Unified School District (LVUSD) is a K-12 district servicing a student population of approximately 1,000. The LVUSD operates an elementary school, a junior and senior high school, and several alternative educational centers that provide community schools and services for traditional home-based education and independent study (LVUSD

2009). Figure 3.15-1 shows the location of public facilities including schools, police stations, fire stations, and hospitals. Table 3.15-5 lists public facilities in the Proposed Action area.

Table 3.15-5 Public Facilities in the Proposed Action Area

Facility Type	Facility Name	Address	Town
Police stations	San Bernardino Sheriff's Station	32770 Old Woman Springs Rd.	Lucerne Valley
	Big Bear Lake Police Department	477 Summit Blvd.	Big Bear Lake
Fire stations	Big Bear City Fire Department	301 W. Big Bear Blvd.	Big Bear City
	Green Valley Lake Fire Station	33596 Green Valley Lake Rd.	Green Valley
	Fawnskin Fire Department	39188 Rim of the World Dr.	Fawnskin
	Big Bear Lake Fire Department	467 Knickerbocker Rd.	Big Bear Lake
Hospitals	Bear Valley Community Hospital	41870 Garstin Dr.	Big Bear Lake
Schools	Lucerne Valley Elementary School	10788 Barstow Road	Lucerne Valley
	Lucerne Valley High School	33233 Rabbit Springs Road	Lucerne Valley
	Lucerne Valley Middle School	33233 Rabbit Springs Road	Lucerne Valley

Solid Waste: Within the immediate vicinity of the site, there are only a few active, permitted, open, and operating solid waste facilities. These facilities include a county-owned transfer station and a solid waste landfill located at a privately owned cement plant. The Camp Rock Transfer Station is located at 29805 Squaw Bush Road in the Lucerne Valley. This facility is permitted and active and is owned by San Bernardino County and provides medium volume transfer and processing of solid wastes. The Mitsubishi Cement Plant Cushenbury L. F., owned by Mitsubishi Cement, is also an active disposal site in the area. This solid waste landfill is located at 5808 State Highway 18. There is also a sanitary solid waste landfill called the Victorville Sanitary Landfill located at 18600 Stoddard Wells Road in Victorville.

3.16 Environmental Justice

This section presents descriptive information about communities in the Proposed Action area and their racial compositions. Additionally, this section discusses applicable laws and regulations that pertain to environmental justice as it relates to the Proposed Action.

3.16.1 Applicable Plans, Policies, and Regulations

Executive Order 12898

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, Section 1-101, states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

Guidance from the Council on Environmental Quality (CEQ) says that "minority populations should be identified where either: (1) the minority population of the affected area exceeds 50% or; (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997).

3.16.2 Existing Conditions

The site of the Proposed Action is located in the Lucerne Valley area, which is part of the broader Victor Valley area. Table 3.16-1 provides a description of the racial composition in the Proposed Action area and the percentage of individuals (as a percent of the total population) who subsist on incomes classified as being below the poverty level threshold. The table shows the racial composition and poverty level status of communities within zip code tabulation area (ZCTA) 92356 and Census Tract 104.05 and compares these populations to urban areas farther from the site but within the Victor Valley area.

Table 3.16-1 indicates that the communities closest to the site are less racially diverse than other populations in the Victor Valley area, with the exception of Big Bear Lake City. The Lucerne Valley area does not contain minority community aggregations in excess of 50 percent of the population, and there are fewer Hispanics and Blacks than in the surrounding urban areas. The geographic area (ZCTA 92356) used to describe unincorporated areas in Lucerne Valley shows higher poverty levels compared to county and state averages.

Table 3.16-1 Racial Composition and Poverty Level Status for the Lucerne Valley and Adjacent Communities

County/City/Area	Total	White	Black	American Indian and Alaska Native	Asian	Native Hawaiian and other Pacific Islander	Some other race	Two or more races	Hispanic or Latino (any race)	Minority aggregation*	Individuals below poverty level
California	100%	60.4%	6.3%	0.7%	12.2%	0.4%	16.8%	3.3%	35.7%	36.3%	13.0%
San Bernardino County	100%	61.2%	9.0%	0.9%	5.9%	0.3%	19.2%	3.5%	45.7%	35.3%	13.7%
San Bernardino (city)	100%	56.6%	15.7%	0.9%	4.3%	0.3%	19.9%	2.2%	57.2%	41.2%	25.0%
Lucerne Valley (ZCTA 92356)	100%	84.2%	2.2%	2.1%	1.1%	0.2%	6.0%	4.2%	14.5%	11.6%	19.3%
Census Tract 104.05	100%	91.2%	1.1%	1.4%	0.5%	0.1%	2.9%	2.7%	9.5%	6.1%	21.6%
Apple Valley (town)	100%	69.7%	9.7%	1.9%	2.3%	0.05%	13.4%	3.0%	27.4%	27.4%	17.2%
Hesperia (city)	100%	68.1%	4.8%	0.9%	1.5%	0.20%	21.5%	2.9%	45.6%	29.0%	16.5%
Victorville (city)	100%	57.3%	16.3%	1.5%	4.2%	0.31%	16.4%	4.0%	42.9%	38.7%	18.5%
Big Bear Lake (city)	100%	91.2%	0.7%	1.0%	0.8%	0.04%	3.6%	2.8%	13.7%	6.0%	13.4%

Source: U.S. Census Bureau 2009

Notes:

*Minority aggregation includes the sum of Black, Asian, American Indian and Alaskan Native, Hawaiian and other Pacific Islander, and some other race.

American Community Survey estimates (U.S. Census Bureau 2009) are based on data collected over three years. The estimates represent average population and housing characteristics between January 2005 and December 2007. The estimates do not represent a single point in time.

3.17 Energy and Minerals

This section identifies energy and mineral resources that would be used by and affected by construction, operation and maintenance, and decommissioning of the Proposed Action. Additionally, this section discusses applicable regulations.

3.17.1 Applicable Plans, Policies, and Regulations

The Proposed Action would comply with all applicable laws, ordinances, regulations, and standards related to energy and mineral resources during and following construction of the Proposed Action. The State Surface Mining and Reclamation Act of 1975 guides surface mining reclamation and the identification of mineral resources of regional and statewide significance. The act is administered by the California Department of Conservation, Office of Mine Reclamation. The Federal Surface Mining Control and Reclamation Act of 1977 also applies to the Proposed Action.

3.17.2 Existing Conditions

Oil and gas resources in the Proposed Action area were identified using a map produced by the California Department of Conservation (1999). There are no oil or gas producers or seeps within five miles of the Proposed Action. The nearest oil and gas site is a plugged and abandoned dry hole located 7.3 miles from the site.

Nonpetroleum mineral resources available near the site were identified by compiling data from the U.S. Geological Survey (2005). Multiple mining operations are located within five miles of the Proposed Action. A list of mining sites, both active and inactive, and the location of the mines in proximity to the site of the Proposed Action are provided in Table 3.17-1. Distance from the Proposed Action site perimeter, site name, commodity and operation type, and operation status are outlined in Table 3.17-1.

The majority of mineral resources identified within five miles of the site of the Proposed Action (Table 3.17-1) have been labeled as past producers (52.1%). This means that they were once mined but that mining operations have ceased. Many of the mineral resources (26.1%) are in the occurrence stage of development. This means that a mineral resource has been reported but not evaluated for possible commercial use. Some of the mineral resources near the site are in the prospecting stage of development (8.7%). This indicates where mineral deposits were evaluated for possible commercial use.

One processing plant, the Blackhawk Property, is located 3.9 miles south of the site (Table 3.17-1). The plant processes uranium, gold, and silver.

The majority of mineral resources along the right-of-way can be accessed with surface mines (34.8%). About 13% must be accessed underground and 4% accessed by some combination of surface and underground mining. No data were available regarding operation type or access means for 34% of the mineral resources identified.

Table 3.17-1 Energy and Mineral Resources Within 5 miles of the Proposed Action

Distance (miles)	Deposit ID #	Mineral Resources Data System ID #	Site Name	Commodity	Operation Type	Development Status
2.1	10034091	M020789	Vida	Copper	Unknown	Occurrence
2.2	10213638		Lucerne Valley Pit	Sand and gravel, construction	Surface	Past producer
2.3	10262562	M020789	Vida	Copper	Unknown	Unknown
3.4	10140563		Arlington and Black Hawk	Limestone, general	Unknown	Occurrence
3.4	10034006	M020678	Aviation	Gold, silver, copper, lead	Unknown	Past producer
3.5	10262499		Arlington Mill	Gold	Processing plant	Past producer
3.5	10140522	M020678	Aviation	Lead, copper, gold, silver	Unknown	Occurrence
3.5	10102985	M020725	Garfield	Lead, silver, galena, wulfenite	Unknown	Past producer
3.5	10165272	M020725	Garfield Mine	Lead, silver	Underground	Past producer
3.5	10035655	M023511	Santa Fe	Gold, lead, copper, iron, quartz	Unknown	Past producer
3.5	10188943	M023511	Santa Fe Mines	Gold, copper, lead	Surface-underground	Past producer
3.7	10236993		Akron-Silver Reef Deposit	Silver	Surface	Prospect
3.8	10116828		Unnamed plant	Gold	Processing plant	Occurrence
3.9	10189514		Little Joe	Gold	Surface	Occurrence
3.9	10189416		Blackhawk Mill Site	Gold	Processing plant	Past producer
3.9	10164312		Blackhawk Property	Uranium, gold, silver	Unknown	Plant
4.0	10212948		Swanson Granite Quarries	Granite	Surface	Past producer
4.0	10262153		Texas Rock Quarry	Stone	Surface	Past producer
4.3	10213235		Unnamed Mine	Gold	Underground	Prospect
4.6	10140771		Cushenbury Quarry	Limestone, general	Surface	Past producer
4.7	10286386		Bruner Pacific Quarry	Stone, crushed/broken	Surface	Producer
4.9	10164730		Texas Granite Quarries	Granite	Surface	Past producer
5.0	10116412		Silver Peak	Silver	Underground	Occurrence

Source: USGS 2005

Gold, copper, silver, and lead have each been prospected, produced, or processed at 16 locations within five miles of the site. Sand, gravel, and stone have been produced at seven locations. Currently, crushed/broken stone is produced at one quarry. Uranium, gold, and silver are processed at one plant within five miles of the site.

Energy and Mineral Resources Used for the Proposed Action

Table 3.17-2 identifies metallic mineral, nonmetallic mineral, gravel, and concrete resources that would be used during construction. Metallic minerals would predominantly be used to produce steel and aluminum for the PV panel structures and perimeter fence. Copper and other metallic minerals would be contained in the transformer, switchyard, and transmission line. Silica would be contained in the PV panels.

Table 3.17-2 Mineral Resources Contained in Construction Materials

	Metallic Minerals	Gravel/Concrete	Nonmetallic minerals
Photovoltaic panels	X		X
Photovoltaic panel structures	X	X	
Access roads		X	
Transformer	X	X	
Transmission line	X	X	
Operations and maintenance building	X	X	
Switchyard	X	X	
Fence	X	X	

Refer to Section 3.1, “Air Quality and Climate,” for a discussion about vehicles that would be used during construction of the Proposed Action.

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3.18 Cumulative Projects

3.18.1 Introduction and Methodology

Preparation of a cumulative effects analysis is required under NEPA and the Council on Environmental Quality (CEQ) regulations. NEPA identifies three types of potential effects: direct, indirect, and cumulative. As part of Chapter 4, effects to each resource are described in detail. For the cumulative effects analysis, each resource is included in a Cumulative Effects Study Area (CESA) designed to specifically address the cumulative effects for that individual resource. Cumulative effects can result from individually minor but collectively significant actions taken over a period of time. Major past and present land uses and disturbances in the area, which are also projected to continue into the future, include energy generation, military uses, and roadway improvements. Dispersed recreation (including special motorized vehicle events), as well as residential and commercial development, also occur in parts of the CESAs.

According to the CEQ Regulations:

> Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR, Part 1508.7.)

Under NEPA, both context and intensity are considered. Among other considerations when considering intensity is:

> [w]hether the action is related to other actions with individually minor but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts" (40 CFR, Part 1508.27[b][7].)

The specific actions expected under the Proposed Action and alternatives, as well as information collected during scoping, provides the foundation for identifying CESAs for this analysis. Cumulative effects are evaluated in terms of the specific resource at the appropriate scale, so the boundaries of the CESAs will vary by resource. For each resource, it was determined the extent to which the environmental effect could be reasonably measured and then the appropriate geographic scale was used to include the effect on each resource. However, some project-related effects affect a number of environmental resources across the same area, so in these instances, CESA boundaries were left identical for multiple resources where it seemed reasonable and prudent to do so. The boundaries of these CESAs have been set to ensure that all reasonably expected effects are identified and analyzed. This approach conforms with guidance from the CEQ, "Considering Cumulative Effects – January 1997" (CEQ 1997). The CESA for each environmental resource, and the rationale for its boundaries, is described below in each specific resource subsection.

Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. Therefore, agencies must look for present effects of past actions that are, in the judgment of the agency, relevant and useful because they have a significant cause-and-effect relationship with the direct and indirect effects of the proposal for agency action and its alternatives.

The cumulative effects analysis identifies past actions that are closely related either in time or location to the Proposed Action site, catalogues past projects, and discusses how they have affected the environment. The analysis is sufficiently detailed to assist in identifying mitigation measures that would reduce the cumulative effect. Most of the projects listed in Table 3.18-1 have been, are now, or will be required to undergo their own independent environmental review under the California Environmental Quality Act or NEPA, or both. Significant adverse effects from these projects will be required to be reduced, avoided, or minimized through the application and implementation of mitigation measures. The net effect of these mitigation measures is assumed to be a general lessening of the potential for a contribution to cumulative effects.

The key consideration is whether the remaining effect on the human environment will represent an adverse environmental effect. There are two commonly used approaches for establishing the cumulative effect setting or scenario. One is to use a list of past, present, and probable future projects producing related or cumulative effects. The other is to use a summary of projects contained in an adopted general plan or related planning document, or in a prior environmental document that has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative effect.

This EIS uses the list approach to provide a tangible understanding and context for analyzing the potential cumulative effects of the Proposed Action. General plans and other planning documents were used as additional reference points in establishing the cumulative scenario for the analysis. The project list includes those projects found within a geographic area sufficiently large to provide a reasonable basis for evaluating cumulative effects. The area over which the cumulative scenario is evaluated may vary by resource because the nature and range of potential effects vary by resource (e.g., air quality effects tend to disperse over a large area or region, while biological effects are typically more location-specific). This spatial area is identified as the geographic scope for the analysis of cumulative effects related to a particular resource.

The analysis of cumulative effects considers a number of variables, including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of the analysis is based on the nature of the geography surrounding the Proposed Action and the characteristics and properties of each resource and the region to which they apply. In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the Proposed Action's schedule. This is a consideration for short-term effects from the Proposed Action and other action alternatives. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the lifetime of the Proposed Action.

3.18.2 Potential Cumulative Projects

Past, present, and reasonably foreseeable projects that could contribute to the cumulative effects analysis are listed in Table 3.18-1 by project name and type, location, and status. Each project is identified by a map number, keyed to Figure 3.18-1. This figure shows the Proposed Action and indicates projects contributing to the cumulative effects scenario. Collectively, these projects represent known and anticipated activities that may occur in the project vicinity that have the potential to contribute to a cumulative effect on the environment.

Table 3.18-1 Potential Cumulative Projects

Map ID Number	Description	Location (All San Bernardino Baseline and Meridian)	Project Type and Size	Status	Resources Potentially Affected
Bureau of Land Management Barstow Field Office *Renewable Energy rojects*					
1	LSR Pisgah LLC; CACA 50704	Lucerne T5N, R10E; 4.75 miles northwest	Solar energy; 10,880 acres; 300 MW	Pending	See 3.18.2
2	Solel Inc.; CACA 50150	Johnson Valley T4N, R3E & R4E; 5.75 miles east	Solar energy; 2,436 acres; 500 MW	Pending	See 3.18.2
3	LSR Pisgah, LLC; CACA 50706	Johnson Valley T4N, R3E, R4E & R5E; 4.75 miles east-northeast	Solar energy; 17,920 acres	Pending	See 3.18.2
ther B M rojects Authori ations					
4	Johnson Valley Feature Film Shoot; National Geographic documentary on venomous snakes	Cougar Buttes area of Johnson Valley OHV Open Area; T5N, R2E, Sec 36; T5N, R3E, Sec 31; 5.75 miles northeast	Filming; less than 5 acres	Film shot from 6/7/08 – 6/9/08; one-time event	Temporary effects such as increase in traffic and potential disposal of solid waste.
5	Chevron PV Geotesting Land Use Permit—CACA-50562	T4N, R2E, Sections 19 & 20, within project boundary	Geologic testing; size unknown	Permit Issued	Construction effects including temporary increase in air and fugitive dust emissions, noise and vibration; traffic; and disturbance of local wildlife.
6	JPL Balloon Testing Land Use Permit for Soggy Dry Lake area—CACA-50568	Johnson Valley OHV Open Area T4N, R3E, Secs. 5 & 8	Testing; size unknown	Awaiting BLM review.	No anticipated long-term effects.

Table 3.18-1 Potential Cumulative Projects

Map ID Number	Description	Location (All San Bernardino Baseline and Meridian)	Project Type and Size	Status	Resources Potentially Affected
7	Caltrans Camprock Rd/SR 247 Bridge & Road Realignment Right-of-Way	Big Bear City Quad: T3N, R1E, Sec 3; 3.4 miles southwest	Transportation; size unknown	Right-of-way grant for road realignment issued, work scheduled for early April 2009	Construction effects including temporary increase in air and fugitive dust emissions, noise and vibration; traffic; disturbance of local wildlife; potential changes to local surface water quality.
8	Replacement of 2 fire-damaged poles	Fawnskin Quad, T3N, R1E, Secs. 5 & 6; 5.5 miles west-southwest	Transmission line; size unknown	Awaiting BLM Review	Temporary construction effects including temporary increase in air and fugitive dust emissions, noise and vibration. No anticipated permanent effects because the poles would be replacing existing poles.
9	PGE Cushenbury Natural Gas Line	T3N, R1E, Sec 3—Carb. Endemic ACEC; 3.5 miles southwest	Pipeline; size unknown	Approved	See 3.18.2.
San Bernardino County Projects					
SB-25	Parcel Map 18629 to create two parcels - 550 acres	Lucerne Valley; 5.4 miles southwest	Residential; 550 acres	Accepted	See 3.18.2.
SB-26	SPP to add a wood grinding storage and distribution system to an existing cement plant - a portion of 74 acres	Lucerne Valley; 4.1 miles south-southwest	Wood grinding storage and distribution system; 74 acres	Conditionally Approved	Temporary construction effects including temporary increase in air and fugitive dust emissions, noise and vibration; traffic; and disturbance of local wildlife. Permanent or long-term visual effect.

Table 3.18-1 Potential Cumulative Projects

Map ID Number	Description	Location (All San Bernardino Baseline and Meridian)	Project Type and Size	Status	Resources Potentially Affected
SB-28	CUP to establish a 90' monopalm tower with one 4' diameter microwave antenna, twelve panel antennas and a 185.6 SF equipment shelter on a portion of 1.25 acres	Lucerne Valley; 4.5 miles southwest	Monopalm tower; 1.25 acres	Conditionally Approved	Temporary construction effects including temporary increase in air and fugitive dust emissions, noise and vibration. Permanent visual effect.
SB-29	CUP to establish an asphalt plant with a major variance to allow a silo 74 feet high on a 4 acre portion of a 146.52 acre parcel.	Lucerne Valley; 4.5 miles southwest	Asphalt plant; 146.25 acres	Accepted	Temporary construction effects including temporary increase in air and fugitive dust emissions, noise and vibration; traffic; and disturbance of local wildlife. Permanent visual effect and likely long-term increase in air and particulate emissions.
SB-30	TPM 18506 to create 4 parcels and a remainder on 27 acres	Lucerne Valley; 4.2 miles east	Residential; 27 acres	Incomplete	See 3.18.2.
SB-31	TPM 18452 to create three parcels - 5 acres	Lucerne Valley; 3.3 miles west	Residential; 5 acres	Conditionally Approved	See 3.18.2.
SB-32	TPM 18018 to create 2 parcels - 15 acres.	Lucerne Valley; 1.75 miles north	Residential; 15 acres	Conditionally Approved	See 3.18.2.
SB-33	Department review to recognize a pot belly pig rescue - 10 acres	Lucerne Valley; 1.9 miles northeast	Residential; 10 acres	Conditionally Approved/ Existing	See 3.18.2.
SB-34	TPM 18531 to create 4-parcels - 5 acres	Lucerne Valley; 2.8 miles west	Residential; 5 acres	Conditionally Approved	See 3.18.2.

Table 3.18-1 Potential Cumulative Projects

Map ID Number	Description	Location (All San Bernardino Baseline and Meridian)	Project Type and Size	Status	Resources Potentially Affected
SB-35	TPM 17919 to create 4-parcels - 5 acres	Lucerne Valley; 2.75 miles west	Residential; 5 acres	Conditionally Approved	See 3.18.2.
SB-36	TPM 19099 to create 4-parcels and a remainder parcel - 10 acres	Lucerne Valley; 2.8 miles west	Residential; 10 acres	Accepted	See 3.18.2.
SB-44	TPM 18691 to create 4-parcels - 20 acres	Lucerne Valley; 5.4 miles west-northwest	Residential; 20 acres	Accepted	See 3.18.2.
SB-61	TPM 17569 to create 2 parcels - 10 acres	Lucerne Valley; 4.6 miles north	Residential; 10 acres	Conditionally Approved	See 3.18.2.
SB-62	TPM 18699 to create 2 parcels - 10 acres	Baldy; 4.3 miles north	Residential; 10 acres	Conditionally Approved	See 3.18.2.

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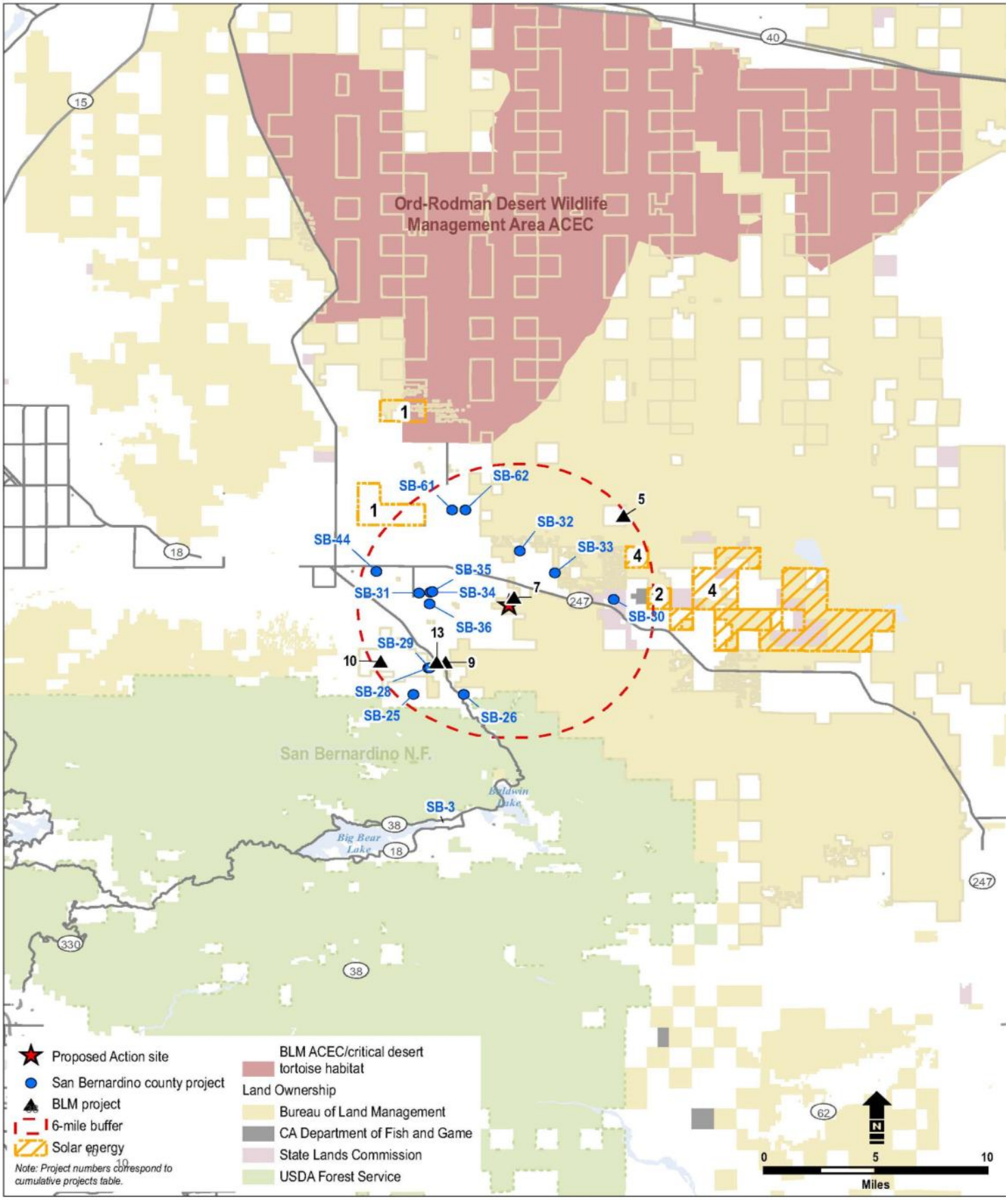

Base Map Source: Cal-Atlas 2009; ESRI 2009; Bureau of Land Management 2009; San Bernardino county 2009.

Figure 3.18-1

Cumulative Projects Map

Lucerne Valley Solar Project

San Bernardino County, California

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Cumulative Project Types

The following project types are listed in Table 3.18-1 and are the basis for the cumulative effects discussion.

Solar Projects

There are two primary types of solar technologies: concentrating solar power (CSP), which converts the sun's heat to create steam to drive a turbine, and PV, which uses semiconductor cells to convert sunlight directly to electricity.

Three solar thermal projects are proposed with six miles of the Proposed Action. Some of these projects are in the early planning stages, or do not have detailed project descriptions, or have not undergone formal impact assessment. Both CSP and PV solar technologies have similar effects on land-based resources, although CSP usually has a substantial requirement for water for cleaning and cooling. Typically, both types of construction projects cause a:

- Temporary increase in air pollutants and dust emissions;
- Temporary increase in noise;
- Temporary or permanent disruption in wildlife patterns from construction activities;
- Possible loss of biological, cultural, or historic resources;
- Temporary disruption of local traffic patterns and road use.

Most construction effects can be mitigated through site-specific BMPs and other mitigation measures. However, because solar projects may preclude other land uses, several permanent effects could occur as a result of operations, including:

- Permanent loss of wildlife habitat;
- Effect to existing recreational activities;
- Increase in impermeable surfaces that could lead to increased magnitude or frequency of flooding events;
- Permanent alteration of visual or aesthetic characteristics.

Residential and Commercial Development

Multiple temporary use permits and conditional use permits have been issued within six miles of the site of the Proposed Action. Issuance of these permits implies that the land will be developed for the permitted use. Residential and commercial developments have similar effects. In general, construction would result in localized and temporary increases in dust and air emissions, traffic, and noise. Since these permits have been approved, it can be assumed that the issuing body would ensure that no threatened and endangered species or cultural resource would be adversely affected by the development or the effects would have to be mitigated. The land may or may not have been previously developed; therefore, it is not possible to determine for many of these sites if habitat would be lost. However, commercial and residential developments represent permanent changes in land use, an increased area of impervious surfaces, and increased use of pesticides and fertilizers for landscaping. These factors can alter the local drainage patterns.

The potential cumulative effects of these types of developments depend upon their proximity to the site of the Proposed Action and the timing of their potential construction. At this time, the timing of any of these residential or commercial developments is unknown.

Pipelines

Most pipelines are linear underground facilities that require trenching to bury the pipe. Typically, the disturbed area is larger during construction to allow for equipment, pipe laydown, and staging areas. Much of this land is reclaimed after construction ends. Above-ground infrastructure includes compressor stations and metering, power lines, and other operations facilities. Effects include loss of native vegetation (habitat), disruption of wildlife, loss of cultural or historic resources, changes in visual quality, increased predation, avian mortality from power lines, and threats to public health and safety.

Transmission Lines

Environmental effects from construction and operation of transmission lines are similar to pipelines, except that the footprint from electric transmission facilities is smaller, usually only affecting land where the towers or other associated infrastructure is placed. Vegetation is affected along the entire ROW for access roads for maintenance and emergency repairs and to reduce the threat from wildfire or trees falling onto the lines. High voltage transmission lines create a threat to birds, especially raptor species, which often build nests that sometimes cause electrical shorts that kill or seriously injure birds.

4.0 Environmental Consequences

Introduction

The proposed action and alternatives outlined in Chapter 2 may cause, directly or indirectly, changes in the human and physical/natural environment. This Environmental Impact Statement (EIS) assesses and analyzes these potential changes and discloses the effects to decision makers and the public. This process of disclosure is one of the fundamental aims of the National Environmental Policy Act (NEPA).

The following sections define and clarify the concepts and terms used in this EIS when discussing the impacts assessment.

Effects

Effects may refer to ecological, aesthetic, historical, cultural, economic, social, or health-related phenomena that may be caused by the proposed action or alternatives. Effects may be direct, indirect, or cumulative.

Direct Effects

A direct effect occurs at the same time and place as the action. Direct and indirect effects are discussed in combination under each affected resource.

Indirect Effects

Indirect effects are reasonably foreseeable effects that occur later in time or are separated by some distance from the action. Direct and indirect effects are discussed in combination under each affected resource.

Cumulative Effects

Effects on a resource are cumulative when added to the effects (or anticipated effects) from other past, present, or future projects in the cumulative effects area for the project. The cumulative effects area may be larger than the direct effects area.

Residual Impacts

Effects are considered residual when the effect from the proposed project cannot be completely avoided or minimized and remain after or despite mitigation.

Duration

When describing the duration of effects, “temporary” refers to those effects that would occur primarily during construction. “Short-term” refers to effects lasting three years or less. Long-term” refers to effects lasting more than three years.

Significance

"Significant" has a very particular meaning when used in a NEPA document. Significance is defined by CEQ (Sec. 1508.27) as a measure of the *intensity* and *context* of the effects of a major federal action on, or the importance of that action to, the human environment. Significance is a function of the beneficial and adverse effects of an action on the environment. Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining intensity of effect..

Context means that the effect(s) of an action must be analyzed within a framework or within physical or conceptual limits. Both long- and short-term effects are relevant.

Impact Indicators

Impact indicators are the consistent currency used to determine quality, intensity, and duration of change in a resource. Working from an established existing condition (i.e., the baseline conditions described in Chapter 3), this indicator would be used to predict or detect change in a resource related to causal effects of proposed actions.

Mitigation

Where applicable, mitigation measures are proposed in this document. Mitigation measures are solutions to environmental impacts that are applied in the impact analysis to reduce intensity or eliminate the impacts. To be adequate and effective, CEQ rules (40 CFR, Part 1508.20) require that mitigation measures fit into one of five categories:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; or
- Compensating for the impact by replacing or providing substitute resources or environments.

4.1 Air Quality and Climate

This section discusses effects on existing air quality and climate conditions that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency (BLM, EPA, MDAQMD) recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.1.1 Indicators

The Proposed Action would affect air quality or climate conditions if it would:

- Conflict with or obstruct implementation of applicable air quality plans;
- Violate applicable air quality standards or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region of the Proposed Action is non-attainment under an applicable federal or state ambient air quality standard. This includes the release of emissions that exceed quantitative thresholds for ozone precursors; or
- Expose sensitive receptors to substantial pollutant concentrations.

Air District Significance Thresholds

The Mojave Desert Air Quality Management District (MDAQMD) has established emissions thresholds to evaluate air quality effects (Table 4.1-1). These values are the California Clean Air Act (CCAA) thresholds and California Environmental Quality Act significance values. For this agency, project air effects are considered major if they:

- Generate total emissions (direct and indirect) in excess of the thresholds;
- Result in a violation of any ambient air quality standard when added to the local background;
- Do not conform with the applicable attainment or maintenance plans; or
- Expose sensitive receptors to substantial pollutant concentrations.

General Federal Actions Conformity

The MDAQMD Rule 2002 implements federal requirements under 40 CFR, Part 51, Subpart W, and applies in all non-attainment and maintenance areas within the jurisdiction of the MDAQMD. According to this rule, since the site would be located in a designated federal non-attainment area for ozone and PM_{10}, the BLM as lead federal agency must make a conformity determination stating that the Proposed Action conforms to the applicable State Implementation Plan (SIP) before the action is taken.

Table 4.1-1 MDAQMD Emission Thresholds

Air Pollutant	Annual Threshold (tons per year)	Daily Threshold (pounds per day)
Carbon monoxide (CO)	100	548
Oxides of nitrogen (NO_x)	25	137
Volatile organic compounds (VOCs)	25	137
Oxides of sulfur (SO_x)	25	137
Particulate matter (PM_{10})	15	82
Particulate matter ($PM_{2.5}$)	15	82
Hydrogen sulfide (H_2S)	10	54
Lead (Pb)	0.6	3

Source: MDAQMD 2009

Notes:
Emission thresholds are given as daily and annual values so that multi-phased projects with phases shorter than one year can be compared to the daily value.

Federal conformity requirements apply to the Proposed Action because the total of direct and indirect emissions are in a non-attainment area and would exceed the PM_{10} yearly emission rate listed in Table 4.1-2. This rule also identifies exemptions, de minimis activities, and activities presumed to conform. The requirements of this rule do not apply for those actions where the federal agency clearly demonstrates that the total of direct and indirect emissions is below the emissions levels specified in Table 4.1-2.

Table 4.1-2 General Federal Actions Conformity: Applicable Emission Rates for Non-attainment Areas (NAAs)

Air Pollutant	Emission Rate (tons per year)
Ozone	(VOC or NOx)
Serious NAAs	50
Severe NAAs	25
Extreme NAAs	10
Other ozone NAAs[a]	100
Marginal and moderate NAAs	VOC: 50; NOx: 100
Carbon Monoxide	
All NAAs	100
PM_{10}	
Moderate NAAs	100
Serious NAAs	70
Pb (Lead)	
All NAAs	25

Source: MDAQMD 1994

Note:
[a]Defined as those located outside an ozone transport region

Climate Change (Greenhouse Gas)

At this time, there is no formal BLM guidance on greenhouse gas (GHG) and climate change that would apply to the Proposed Action. As impact indicators, potential effects on climate

change due to the increase or reduction in GHG emissions would occur if the Proposed Action would:

- Increase the consumption of energy resources, especially fossil fuels;
- Result in increased energy efficiency of and a reduction in overall GHG emissions from an existing facility;
- Generate GHG emissions, either directly or indirectly, that may have a major effect on the environment;
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHG;
- Affect forest resources or the capacity of desert soils for carbon storage;
- Help or hinder attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020; or
- Emit annual rates that equal or exceed 25,000 metric tones of CO_2 equivalence as a result of operations (EPA Mandatory Reporting of GHG Rule).

4.1.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. Effects on existing air quality and climate conditions may arise from construction, operation and maintenance, or decommissioning (including equipment and vehicles), as well as from the introduction of traffic associated with the Proposed Action on local roads.

4.1.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on air quality and climate.

4.1.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site as either suitable or unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on air quality and climate.

4.1.2.3 Alternative 3: Proposed Action

The BLM ROW grant would consist of the authorization to construct, operate, maintain, and decommission a 45-MW PV solar power plant on the site (516 acres). The Proposed Action would be built in two phases. Phase I would have an electrical generation capacity of 20 MW; would occupy approximately 180 acres (approximately 35 percent of the ROW), and would be operational in mid-2011. Phase II would have an electrical generation capacity of 25 MW; would

occupy approximately 240 acres (approximately 50 percent of the ROW), and would require "reconductoring" of the existing SCE transmission line back to the Cottonwood substation. Phase II could begin construction as early 2011. The site disturbance associated with Alternative 3 is presented on Table 2-1. Impacts that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with Phase I and/or II are analyzed in this section.

Construction (Phases I and II)

Effect AQ-1: Short-term, adverse cumulative effect on air quality conditions resulting from construction

Construction of Phases I and II components would comprise the following sequence of activities over a period of 240 days: site clearing and preparation (including access roads), assembly and installation of facilities, and cleanup and reclamation of temporary areas. Each of these phases would generate air pollutant emissions, such as equipment and vehicle exhaust and fugitive dust. These emissions would include criteria pollutants (VOCs, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$) and hazardous air pollutants, such as diesel particulate matter (PM). Diesel engines emit a complex mix of pollutants, the most visible of which are very small carbon particles or "soot," known as diesel PM, which are a subset of $PM_{2.5}$ emissions. In addition, the Proposed Action would directly generate GHG emissions. CO_2 and CH_4 would be emitted from on-road vehicles and non-road equipment during construction. A list of equipment proposed for construction of both phases is presented in Table 4.1-3.

Table 4.1-3 Alternative 3 (Proposed Action) Construction Equipment List for Both Phases

Equipment List	Equipment Engine Size (horsepower)	Total Hourly Usage
Vibratory post driver	100-175	4,050
Crawler tractors/dozer	100-175	500
Dump, concrete, and tender trucks	on-road vehicle	120
Excavators	175-300	200
Forklifts/aerial lifts/booms	50-100	6,000
Generator/compressor	5-15	4,000
Graders	175-300	80
Rollers/compactors	100-175	500
Scrapers	175-300	40
Tractors/loaders/backhoes	100-175	160
Vibratory plate (handheld)	10-15	40
Highway tractor	On-road vehicle	80
Flatbed truck	On-road vehicle	1,000
Water truck	On-road vehicle	1,000

Source: Chevron Energy Solutions data. Complete equipment information is listed in Appendix B.

Only 433 acres of the proposed site would be developed. During construction of Phase I, 192 acres would be disturbed as part of the site preparation. However, additional grading would be required in Phase II. During Phase II, 240 acres would be developed with installation of the solar PV arrays and ancillary facilities.

During construction, emissions would be generated within the boundaries of the site. Combustion products would be emitted from diesel- and gasoline-powered construction equipment. Fugitive dust would be generated from equipment movement, drilling and trenching, clearing, grading, and backfilling activities. Beyond the boundaries of the ROW, air pollutant emissions would also be generated by delivery trucks and worker vehicles on local roads. Combustion products would be emitted from on-road vehicles, and fugitive dust would be released from paved and unpaved roads. GHG emissions from construction are discussed separately at the end of this section.

Maximum daily and total air pollutant emissions were calculated for each construction phase and are presented in Table 4.1-4. This table also includes a comparison of daily emissions to applicable MDAQMD daily impact thresholds. These projected emissions are based on Table 4.1-3 and additional project design information provided by the Applicant in its ROW application.

Table 4.1-4 Alternative 3 (Proposed Action) Construction Emissions

Emission Type	Source	Emissions (pounds per day)					
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
hase M							
Exhaust	Non-road equipment	7.8	30.2	63.0	0.1	3.5	3.5
	On-road vehicles	0.8	3.0	9.7	0.0	0.5	0.4
Fugitive dust emissions	Construction activities	-	-	-	-	124	17
	Roads (on-site and off-site)	-	-	-	-	48	5
Subtotal Phase I		**9**	**33**	**73**	**0**	**176**	**27**
MDAQMD daily impact threshold		137	137	548	82	82	137
Exceed impact threshold?		No	No	No	No	Yes	No
hase E pansion to M							
Exhaust emissions	Non-road equipment	7.8	30.2	63.0	0.1	3.5	3.5
	On-road vehicles	0.8	3.0	9.7	0.0	0.5	0.4
Fugitive dust emissions	Construction activities	-	-	-	-	34	5
	Roads (on-site and off-site)	-	-	-	-	48	5
Subtotal Phase II		**9**	**33**	**73**	**0**	**86**	**14**
MDAQMD daily impact threshold		137	137	548	82	82	137
Exceed impact threshold?		No	No	No	No	Yes	No

Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors. These are unmitigated emissions, and mitigation measures discussed in Section 4.1.2.3 would likely reduce PM_{10} emissions below the daily threshold.

The estimated maximum daily emissions of PM_{10} during the construction of both phases are predicted to exceed corresponding MDAQMD daily impact thresholds. The vast majority of particulate matter would be emitted as fugitive dust during site preparation as well as from

vehicle traffic on local and access roads. This disturbance in the existing air quality would be short-term (240 days). The estimated emissions in Table 4.1-4 represent peak values without mitigation and would likely occur only during a small fraction of the entire construction timeframe for each phase.

However, since the site is located in federal and state non-attainment areas for PM_{10}, the projected total construction emissions for both phases would result in a short-term effect on the existing air quality conditions (Effect AQ-1). Implementation of MM AQ-1 would reduce construction related particulate matter emissions.

In addition, emissions of non-attainment/maintenance pollutants from construction activities are potentially subject to General Conformity Rule requirements. Under this rule, applicable emissions that are not addressed in current SIPs may need to be offset Total annual emissions for each phase (Table 4.1-5) were estimated based on the total duration of the construction period (240 days) and compared with the federal action applicability criteria presented in Table 4.1-2. Emissions in each phase are below the applicable criteria. However, total annual emissions of PM_{10}, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 16.82 tons per year.

Table 4.1-5 Alternative 3 (Proposed Action) General Federal Action Conformity Analysis (First year of operations)

Emission Type	Source	Emissions (tons per year)					
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
hase M							
Construction exhaust emissions	Non-road equipment	0.57	2.29	4.90	0.01	0.25	0.25
	On-road vehicles	0.09	0.36	1.17	0.00	0.06	0.05
Construction fugitive dust emissions	Construction activities	-	-	-	-	1.55	0.22
	Roads (on-site and off-site)	-	-	-	-	5.80	0.64
Subtotal construction emissions		0.66	2.65	6.06	0.01	7.65	1.16
Operational exhaust emissions	Heavy-duty diesel truck	0.01	0.04	0.14	0.00	0.01	0.01
	ATVs	0.05	1.14	0.01	0.00	0.00	0.00
Operational fugitive dust emissions	Roads	-	-	-	-	1.31	0.13
Subtotal operational emissions		0.06	1.19	0.15	0.00	1.31	0.14
Subtotal emissions Phase I first year		**0.72**	**3.84**	**6.22**	**0.01**	**8.97**	**1.30**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No
hase E pansion to M							
Exhaust emissions	Non-road equipment	0.57	2.29	4.90	0.01	0.25	0.25
	On-road vehicles	0.09	0.36	1.17	0.00	0.06	0.05
Fugitive dust emissions	Construction activities	-	-	-	-	0.44	0.22
	Roads (on-site and off-site)	-	-	-	-	5.80	0.06
Subtotal Construction Emissions		**0.66**	**2.65**	**6.06**	**0.01**	**6.54**	**0.58**

Table 4.1-5 Alternative 3 (Proposed Action) General Federal Action Conformity Analysis (First year of operations)

Emission Type	Source	Emissions (tons per year)					
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Operational exhaust emissions	Heavy-duty diesel truck	0.01	0.04	0.14	0.00	0.01	0.01
	ATVs	0.05	1.14	0.01	0.00	0.00	0.00
Operational fugitive dust emissions	Roads	-	-	-	-	1.31	0.13
Subtotal Phase II first year		**0.72**	**3.84**	**6.22**	**0.01**	**7.85**	**0.72**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No

Notes:
n/a: Not available
1. Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.
2. Estimations based on a 240-day construction period and a 125-day operational period over the first year of operations of each phase.

Implementation of MM AQ-1 would reduce effects on air quality resulting from the release of fugitive dust. Implementation of MM AQ-2 would reduce air quality effects resulting from the combustion of fossil fuels.

MM AQ-1: Fugitive Dust Control Plan. The Applicant has prepared and submitted for BLM approval, a Draft Dust Control Plan (DCP) that describes the fugitive dust control measures to be implemented and monitored at the construction site. This plan would also be submitted to the MDAQMD prior to the start of construction. The DCP would comply with the mitigation measures described in the Fugitive Dust Control Rules enforced by MDAQMD (Rule 403.2), as well as the existing SIP available for PM_{10} and $PM_{2.5}$ and the BLM Fugitive Dust/PM_{10} Emissions Control Strategy for the Mojave Desert Planning Area. During construction, the Applicant would:

- Use periodic watering for short-term stabilization of disturbed surface area to minimize visible fugitive dust emissions. For purposes of this Rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
- Take actions sufficient to prevent project-related trackout onto paved surfaces;
- Cover loaded haul vehicles while operating on publicly maintained paved surfaces;
- Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate visible fugitive dust emissions;
- Cleanup project-related trackout or spills on publicly maintained paved surfaces within twenty-four hours;
- Reduce non-essential earth-moving activity under high wind conditions. For purposes of Rule 403.2, a reduction in earth-moving activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance;

- Provide stabilized access route(s) to the site of the Proposed Action as soon as is feasible. For purposes of Rule 403.2, as soon as is feasible shall mean prior to the completion of construction/demolition activity;
- Maintain natural topography to the extent possible;
- Construct parking lots and paved roads first, where feasible; and
- Construct upwind portions of project first, where feasible.

During operation when undergoing weed abatement activity, the Proposed Action would not:

- Disrupt the soil crust to the extent that Visible Fugitive Dust is created due to wind erosion.

MM AQ-2: Equipment Emissions. The Applicant would implement equipment emissions control measures prior to construction of the Proposed Action, as requested by the Environmental Protection Agency during scoping. These actions would reduce diesel particulates, CO, hydrocarbons, and NOx associated with construction activities. In addition there would be specific mitigation measures related to construction equipment emission standards/controls as contractual requirements. At a minimum, the following equipment emissions control measures would be implemented to ensure that all construction-related engines:

- Are tuned to the engine manufacturer's specification, in accordance with an appropriate timeframe;
- Do not idle for more than five minutes unless it is necessary for the operating scope;
- Are not tampered with in order to increase engine horsepower;
- Include particulate traps, oxidation catalysts, and other suitable control devices on all construction equipment used at the site;
- Use diesel fuel with a sulfur content of 15 parts per million (ppm) or less, or other suitable alternative procured in the market area; and
- Include control devices to reduce air emissions. The determination of which equipment is suitable for control devices should be made by an independent Licensed Mechanical Engineer. Equipment suitable for control devices may include generators, compressors, graders, bulldozers, and dump trucks.

The Applicant would also consult with BLM and MDAQMD to identify other potential control measures not identified above. The Applicant or designated representative should submit these measures and related construction contract specifications to the agencies involved in the environmental review and permitting process for the Proposed Action, to the extent applicable under rules and regulations (BLM, EPA, MDAQMD) prior to construction activities.

Operation and Maintenance (Phases I and II)

Operations of both phases would be totally automated. The various power components would be turned on and off automatically in the morning and night, respectively. Electrical power components that would be operated include solar field direct current (DC) electrical collector systems, DC to alternating current (AC) inverters and step-up transformers, 33-kV collector system, project switchyard, and 33-kV generation tie line. Maintenance needs for both phases

would include panel washing (quarterly), array visual and infrared inspection, vegetation control (as needed), and inverter and switchyard maintenance on a monthly and yearly basis. The equipment would also include all-terrain vehicles (ATVs) to go inside the array for physical inspection and parts replacement.

It is expected that potential emission sources resulting from operations and maintenance activities would be mainly related to vehicle traffic on roads, including ATVs and water trucks for panel washing. Permanent staff would consist of up to three persons, including the security officer, and additional staff would be involved only during routine maintenance activities. The projected increase in annual emissions for inspection and maintenance is presented in Table 4.1-6, and a detailed summary of operational emission estimates is presented in Appendix B.

Table 4.1-6 Alternative 3 (Proposed Action) Operation and Maintenance Emissions

Emission Type	Source	Emissions(tons per year)					
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Exhaust emissions	Heavy-duty diesel truck	0.000	0.001	0.001	0.005	0.000	0.000
	ATVs	0	0	0.002	0.000	0.000	0.000
Fugitive dust emissions	Vehicles on roads	-	-	-	-	0.008	0.001
Subtotal operational emissions		**0.009**	**0.187**	**0.003**	**0.005**	**0.009**	**0.001**
MDAQMD daily significance threshold		25	25	100	15	15	25
Exceed significance threshold?		**No**	**No**	**No**	**No**	**No**	**No**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No

Notes: Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Estimations of operational emissions show that the expected exhaust and fugitive dust emissions would not exceed the thresholds established by the MDAQMD or the federal action applicability criteria for general conformity. This would result in an effect on air quality conditions, which would be further reduced by implementation of MM AQ-2. Projected emissions were calculated based on existing information from current project design; potential additional sources of air pollutant emissions from on-site equipment are not included. Additionally, this estimation does not include irregular increases in emissions due to unscheduled maintenance, which would result in short-term effects. The effects would be reduced through implementation of MM AQ-2.

Effect AQ-2: Long-term cumulative effect on air quality conditions resulting from operations

Since estimated operational and maintenance emissions of air criteria pollutants would not exceed the MDAQMD impact thresholds, project-related contributions to the existing air quality in the area would result in a long-term change to current conditions in the area. These effects would be reduced through implementation of MM AQ-1 and MM AQ-2.

Decommissioning

The expected lifespan of the Proposed Action is 30 years. According to the Applicant, if the site should be removed from power generation service, it would be made suitable for reclamation. All equipment, buildings, concrete foundations, and driven piles would be removed from the site,

resulting in a potential short-term increase in air pollutant emissions (Effect AQ-3). This analysis assumes that emissions would be in a magnitude similar to those estimated for construction for Phase I (worst-case scenario from construction). This would result in short-term effects on the projected background conditions of the area, especially in levels of particulate matter.

Effect AQ-3: Short-term effect on air quality conditions resulting from decommissioning

As a construction activity, demolition is regulated by MDAQMD Rule 403.2, requiring mandatory actions on fugitive dust control. In addition, as part of the design of the Proposed Action, the Applicant would develop a decommissioning plan consistent with BLM requirements in a manner that protects public health and safety and is environmentally acceptable.

Implementation of dust control plans and emission control measures, as described in MM-AQ 1 and MM AQ-2, including planting vegetative ground cover in disturbed areas as soon as possible following decommissioning, would ensure that emissions control measures and best practices are incorporated to comply with applicable air quality standards.

Climate Change and Greenhouse Gas

Alternative 3 would directly generate GHG emissions during construction, routine operational activities, maintenance, and decommissioning. CO_2 and CH_4 would be emitted from on-road vehicles and non-road equipment during construction and from vehicles used during routine operational activities. Estimated emissions from construction and operational activities based on the information provided by the Applicant are shown in Tables 4.1-7, 4.1-8, 4.1-9. A comparison of the GHG emissions (88.3 $MTCO_2e$) to the existing power plant inventory for California (107,243,302 $MTCO_2e$) shows that the emissions resulting from the Proposed Action would be 0.00008 percent of total emissions. Detailed summaries of the calculations used to estimate GHG emissions from construction and operational activities are included in Appendices B and C.

In addition, fugitive emissions of SF_6 and refrigerant could be emitted from the switchyard and solar PV power block equipment. The use of electricity to drive operational equipment on-site would also generate an indirect increase of GHG emissions at power generating stations linked to local electrical grids.

Currently, there is no formal BLM guidance, applicable plan, policy or regulation of an agency adopted for the purpose of reducing emissions of GHG or evaluating GHG and climate change effects. However, a comparison with existing significance criteria on GHGs in California, such as the interim GHG significance thresholds of the South Coast Air Quality Management District (SCAQMD),[1] and the existing regional emission inventories in California indicates that potential contributions from direct GHG emissions would be considered a long-term effect. In addition, in order to reduce potential GHG emission contributions, the Applicant has proposed to incorporate the following practices as part of the design of the Proposed Action:

- All construction equipment would be properly tuned, according to the manufacturer's specifications;
- Fuel for all off-road and portable diesel-powered equipment would be California Air Resources Board-certified motor vehicle fuel (non-taxed version suitable for use off-road);

[1] SCAQMD Interim GHG Threshold: 10,000 metric tons per year of CO_2e

- All on- and off-road diesel equipment would not be allowed to idle for more than five minutes; and
- Alternatively fueled construction equipment, i.e., compressed natural gas or biodiesel, would be used.

Table 4.1-7 Alternative 3 (Proposed Action) GHG Emissions during the Construction (per Phase)

Emission Type[a]	Source	GHG Emissions CO_2e (metric tons)
Exhaust emissions	Non-road equipment	537
	On-road vehicles	117
Fugitive dust emissions	Construction activities	-
	Roads (on-site and off-site)	-
Subtotal construction emissions per Phase		**653**
Total proposed action construction emissions (Phase I and II)		**1,306**

Notes:
[a]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Table 4.1-8 Alternative 3 (Proposed Action) GHG Emissions during the Operation and Maintenance

Emission Type[a]	Source	GHG Emissions CO_2e (metric tons)[b]
Exhaust emissions	Heavy-duty diesel truck	0.5
	ATVs	0.9
Fugitive dust emissions	Roads	-
Operational and maintenance direct emissions		**1.3**

Notes:
[a]GHG emissions from electrical consumption and additional project equipment other than vehicles are not included in this estimation.
[b]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Table 4.1-9 Annualized Emissions from Proposed Action

Source	GHG Emissions CO_2e (metric tons)[d]
Direct operational emissions[a]	1.3
Direct construction emissions[b]	43.5
Direct decommissioning emissions[c]	43.5
Total annualized GHG emissions	**88.3**

Notes:
[a]GHG emissions from electrical consumption and additional project equipment other than vehicles are not included in this estimation.
[b]GHG emissions from construction were amortized over a 30-year-period.
[c]GHG emissions from decommissioning were amortized over a 30-year-period.
[d]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Since the Proposed Action is intended to generate electricity from a renewable source of energy, no increase of consumption of fossil fuels and related combustion emissions are expected. A typical 45-MW fossil fuel fired power plant in California would produce 1,448,330 metric tons of carbon dioxide equivalents ($MTCO_2e$) over its 30 year lifespan. Subtracting the Proposed Action GHG emissions (88.3 $MTCO_2e$) from these avoided emissions also indicates that the Proposed Action would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. Therefore, a beneficial effect would result from the Proposed Action under this criterion.

The Proposed Action would not be developed within a forested area, resulting in no effects on forest resources. However, it has been documented that desert soils also have a carbon storage capacity (25.4 tons per acre, UNEC 2010), which, although it is considerably minor compared to the carbon storage capacity of forested areas (102.4 tons per acre, UNEC 2010), is considered a carbon sequestration option due to the global extension of drylands (World Resources Institute 2003). Only 433 acres of the project site (516 acres) would be developed. Of this only 12.5 acres would be graded. The remaining 420.5 acres would have the vegetation cut, but the soil would not be permanently disturbed. This would result in a loss of 317.5 tons of carbon storage capacity. Considering the relative proportion between the proposed graded area and the total regional extension of the CDCA Area (approximately 300,000 acres), potential effects of the Proposed Action over the existing carbon storage capacity would be long-term.

4.1.2.4 Alternative 4: Modified Site Layout

Construction, Operation and Maintenance Impacts

Short-term construction effects during Phases I and II under this alternative would be slightly less than those identified under Alternative 3 because Alternative 4 would develop nine fewer acres than Alternative 3, and would grade five fewer acres. During construction, emissions would be generated within the boundaries of the site. Combustion products would be emitted from diesel- and gasoline-powered construction equipment. Due to the reduction in the total area of disturbance compared to Alternative 3, slightly less fugitive dust would be generated from equipment movement, drilling and trenching, clearing, grading, and backfilling activities. Beyond the boundaries of the ROW, air pollutant emissions would also be generated by delivery trucks and worker vehicles on local roads. Combustion products would be emitted from on-road vehicles, and fugitive dust would be released from paved and unpaved roads. GHG emissions from construction are discussed separately at the end of this section.

The long-term effects of Alternative 4 are anticipated to be the same as Alternative 3 because operational and maintenance activities would be essentially the same. Potential emission sources resulting from operations and maintenance activities would be mainly related to vehicle traffic on roads, including ATVs and water trucks for panel washing. Permanent staff would consist of up to three persons, including the security officer, and additional staff would be involved only during routine maintenance activities

As under Alternative 3, operational exhaust and fugitive dust emissions would not exceed the thresholds established by the MDAQMD or the federal action applicability criteria for general conformity.

Climate Change and Greenhouse Gas

Under Alternative 4, climate change and greenhouse gas impacts would be the same as those identified for Alternative 3.

General Conformity Action Analysis

Similar to Alternative 3, the estimated maximum daily emissions of PM_{10} during the construction of both phases of Alternative 4 are predicted to exceed corresponding MDAQMD daily impact thresholds. The vast majority of particulate matter would be emitted as fugitive dust during site preparation as well as from vehicle traffic on local and access roads. This disturbance in the existing air quality would be short-term (240 days). The estimated emissions in Table 4.1-5 represent peak values without mitigation and would likely occur only during a small fraction of the entire construction timeframe for each phase.

However, since the site is located in federal and state non-attainment areas for PM_{10}, the projected total construction emissions for both phases of Alternative 4 would result in a short-term effect on the existing air quality conditions (Effect AQ-1). Implementation of MM AQ-1 would reduce construction related particulate matter emissions.

4.1.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects that could result from the implementation of Alternative 5 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Construction (Phases I and II)

Effect AQ-1: Short-term, adverse cumulative effect on air quality conditions resulting from construction

Construction of Phases I and II components would comprise the following sequence of activities over a period of 180 days: site clearing and preparation (including access roads), assembly and installation of facilities, and cleanup and reclamation of temporary areas. Each of these phases would generate air pollutant emissions, such as equipment and vehicle exhaust and fugitive dust. These emissions would include criteria pollutants (VOCs, NO_x, CO, SO_2, PM_{10}, and $PM_{2.5}$) and hazardous air pollutants, such as diesel particulate matter. Diesel engines emit a complex mix of pollutants, the most visible of which are very small carbon particles or “soot,” known as diesel PM, which are a subset of $PM_{2.5}$ emissions. In addition, the Proposed Action would directly generate GHG emissions. CO_2 and CH_4 would be emitted from on-road vehicles and non-road equipment during construction. A list of equipment proposed for construction of both phases is presented in Table 4.1-10.

Table 4.1-10 Alternative 5 (Smaller Project) Construction Equipment List for Both Phases

Equipment List	Equipment Engine Size (horsepower)	Estimated hours of use Phase I	Estimated hours of use Phase II
Vibratory post driver	100-175	2,430	1,215
Crawler tractors/dozer	100-175	300	150
Dump, concrete, and tender trucks	on-road vehicle	80	40
Excavators	175-300	120	60
Forklifts/aerial lifts/booms	50-100	4,000	2,000
Generator/compressor	5-15	2,400	1,200
Graders	175-300	48	24
Rollers/compactors	100-175	300	150
Scrapers	175-300	24	12
Tractors/loaders/backhoes	100-175	96	48
Vibratory plate (handheld)	10-15	24	12
Highway tractor	On-road vehicle	48	24
Flatbed truck	On-road vehicle	600	300
Water truck	On-road vehicle	600	300

Source: Chevron Energy Solutions data. Complete equipment information is listed in Appendix B.

Only 233 acres of the proposed site would be developed. During construction of Phase I, 108 acres would be disturbed as part of the site preparation. However, additional grading would be required in Phase II. During Phase II, 120 acres would be used for the installation of the solar PV arrays and ancillary facilities.

During construction, emissions would be generated within the boundaries of the site. Combustion products would be emitted from diesel- and gasoline-powered construction equipment. Fugitive dust would be generated from equipment movement, drilling and trenching, clearing, grading, and backfilling activities. Beyond the boundaries of the ROW, air pollutant emissions would also be generated by delivery trucks and worker vehicles on local roads. Combustion products would be emitted from on-road vehicles, and fugitive dust would be released from paved and unpaved roads. GHG emissions from construction are discussed separately at the end of this section.

Maximum daily and total air pollutant emissions were calculated for each construction phase and are presented in Table 4.1-11. This table also includes a comparison of daily emissions to applicable MDAQMD daily impact thresholds. These projected emissions are based on Table 4.1-3 and additional project design information provided by the Applicant in its ROW application.

Table 4.1-11 Alternative 5 (Smaller Project) Construction Emissions

Emission Type	Source	Emissions (pounds per day)					
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
hase M							
Exhaust	Non-road equipment	4.8	18.5	38.7	0.05	2.1	2.1
	On-road vehicles	0.3	1.2	3.8	0.0	0.2	0.2
Fugitive dust emissions	Construction activities	-	-	-	-	43	6
	Roads (on-site and off-site)	-	-	-	-	48	5
Subtotal Phase I		**5**	**20**	**42**	**0.1**	**94**	**14**
MDAQMD daily impact threshold		137	137	548	82	82	137
Exceed impact threshold?		No	No	No	No	Yes	No
hase E pansion to M							
Exhaust emissions	Non-road equipment	2.4	9.3	19.3	0.0	1.1	1.1
	On-road vehicles	0.3	1.2	3.8	0.0	0.2	0.2
Fugitive dust emissions	Construction activities	-	-	-	-	48	7
	Roads (on-site and off-site)	-	-	-	-	48	5
Subtotal Phase II		**3**	**10**	**23**	**0**	**98**	**13**
MDAQMD daily impact threshold		137	137	548	82	82	137
Exceed impact threshold?		No	No	No	No	Yes	No

Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

The estimated maximum daily emissions of PM_{10} during the construction of both phases are predicted to exceed corresponding MDAQMD daily impact thresholds. The vast majority of particulate matter would be emitted as fugitive dust during site preparation as well as from vehicle traffic on local and access roads. This disturbance in the existing air quality would be short-term (240 days). The estimated emissions in Table 4.1-11 represent peak values without mitigation and would likely occur only during a small fraction of the entire construction timeframe for each phase.

However, since the site is located in federal and state non-attainment areas for PM_{10}, the projected total construction emissions for both phases would result in a short-term effect on the existing air quality conditions (Effect AQ-1). Implementation of MM AQ-1 would reduce construction related particulate matter emissions.

In addition, emissions of non-attainment/maintenance pollutants from construction activities are potentially subject to General Conformity Rule requirements. Under this rule, applicable emissions that are not addressed in current SIPs may need to be offset. Total annual emissions for each phase (Table 4.1-12) were estimated based on the total duration of the construction period (180 days) and compared with the federal action applicability criteria presented in Table 4.1-2. Emissions in each phase are below the applicable criteria. However, total annual emissions of PM_{10}, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 15.51 tons per year.

Table 4.1-12 Alternative 5 (Smaller Project)General Federal Action Conformity Analysis (First year of operations)

Emission Type	Source	Emissions (tons per year)					
		VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
hase M							
Construction exhaust emissions	Non-road equipment	0.35	1.42	3.04	0.00	0.16	0.16
	On-road vehicles	0.04	0.14	0.45	0.00	0.02	0.02
Construction fugitive dust emissions	Construction activities	-	-	-	-	0.32	0.05
	Roads (on-site and off-site)	-	-	-	-	2.25	0.25
Subtotal construction emissions		0.39	1.56	3.50	0.00	2.75	0.47
Operational exhaust emissions	Heavy-duty diesel truck	0.02	0.07	0.21	0.00	0.01	0.01
	ATVs	0.09	1.76	0.23	0.00	1.94	0.19
Operational fugitive dust emissions	Roads	-	-	-	-	1.93	0.19
Subtotal operational emissions		0.06	1.19	0.15	0.00	1.31	0.14
Subtotal emissions Phase I first year		**0.72**	**3.84**	**6.22**	**0.01**	**8.97**	**1.30**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No
hase E pansion to M							
Exhaust emissions	Non-road equipment	0.57	2.29	4.90	0.01	0.25	0.25
	On-road vehicles	0.09	0.36	1.17	0.00	0.06	0.05
Fugitive dust emissions	Construction activities	-	-	-	-	0.44	0.22
	Roads (on-site and off-site)	-	-	-	-	5.80	0.06
Subtotal Construction Emissions		**0.66**	**2.65**	**6.06**	**0.01**	**6.54**	**0.58**
Operational exhaust emissions	Heavy-duty diesel truck	0.01	0.04	0.14	0.00	0.01	0.01
	ATVs	0.05	1.14	0.01	0.00	0.00	0.00
Operational fugitive dust emissions	Roads	-	-	-	-	1.31	0.13
Subtotal Phase II first year		**0.48**	**3.32**	**3.72**	**0.01**	**4.63**	**0.46**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No

Notes:
n/a: Not available
1. Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.
2. Estimations based on a 180-day construction period and a 185-day operational period over the first year of operations of each phase.

Implementation of MM AQ-1 would reduce effects on air quality resulting from the release of fugitive dust. Implementation of MM AQ-2 would reduce air quality effects resulting from the combustion of fossil fuels.

Operation and Maintenance (Phases I and II)

Operations of both phases would be totally automated. The various power components would be turned on and off automatically in the morning and night, respectively. Electrical power components that would be operated include solar field DC electrical collector systems, DC to AC inverters and step-up transformers, 33-kV collector system, project switchyard, and 33-kV

generation tie line. Maintenance needs for both phases would include panel washing (quarterly), array visual and infrared inspection, vegetation control (as needed), and inverter and switchyard maintenance on a monthly and yearly basis. The equipment would also include ATVs to go inside the array for physical inspection and parts replacement.

It is expected that potential emission sources resulting from operations and maintenance activities would be mainly related to vehicle traffic on roads, including ATVs and water trucks for panel washing. Permanent staff would consist of up to three persons, including the security officer, and additional staff would be involved only during routine maintenance activities. The projected increase in annual emissions for inspection and maintenance is presented in Table 4.1-13, and a detailed summary of operational emission estimates is presented in Appendix B.

Table 4.1-13 Alternative 5 (Smaller Project) Operation and Maintenance Emissions

Emission Type	Source	Emissions (tons per year)					
		ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Exhaust emissions	Heavy-duty diesel truck	0.000	0.001	0.001	0.001	0.000	0.000
	ATVs	0	0	0.001	0.000	0.000	0.000
Fugitive dust emissions	Vehicles on roads	-	-	-	-	0.008	0.001
Subtotal operational emissions		**0.005**	**0.101**	**0.002**	**0.003**	**0.005**	**0.001**
MDAQMD daily significance threshold		25	25	100	15	15	25
Exceed significance threshold?		**No**	**No**	**No**	**No**	**No**	**No**
Federal action applicability criteria		100	100	100	n/a	100	n/a
Exceed federal action applicability criteria?		No	No	No	No	No	No

Notes: Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Estimations of operational emissions show that the expected exhaust and fugitive dust emissions would not exceed the thresholds established by the MDAQMD or the federal action applicability criteria for general conformity. While increased emissions would affect air quality conditions, such impacts would be reduced by implementation of MM AQ-2. Projected emissions were calculated based on existing information from current project design; potential additional sources of air pollutant emissions from on-site equipment are not included. Additionally, this estimation does not include irregular increases in emissions due to unscheduled maintenance, which would result in short-term effects in the Proposed Action area. The effects would be reduced through implementation of MM AQ-2.

Effect AQ-2: Long-term cumulative effect on air quality conditions resulting from operations

Since estimated operational and maintenance emissions of air criteria pollutants would not exceed the MDAQMD impact thresholds, project-related contributions to the existing air quality in the area would result in a long-term change to current conditions in the area. These effects would be reduced through implementation of MM AQ-1 and MM AQ-2.

Decommissioning

The expected lifespan of the Proposed Action is 30 years. According to the Applicant, if the site should be removed from power generation service, it would be made suitable for reclamation. All equipment, buildings, concrete foundations, and driven piles would be removed from the site,

resulting in a potential short-term increase in air pollutant emissions in the area (Effect AQ-3). This analysis assumes that emissions would be in a magnitude similar to those estimated for construction for Phase I (worst-case scenario from construction). This would result in short-term effects on the projected background conditions of the area, especially in levels of particulate matter.

Effect AQ-3: Short-term effect on air quality conditions resulting from decommissioning

As a construction activity, demolition is regulated by MDAQMD Rule 403.2, requiring mandatory actions on fugitive dust control. In addition, as part of the Proposed Action design, the Applicant would develop a decommissioning plan consistent with BLM requirements in a manner that protects public health and safety and is environmentally acceptable.

Implementation of dust control and emission control plans, as described in MM AQ-1 and MM AQ-2, including planting vegetative ground cover in disturbed areas as soon as possible following construction activities as part of the Applicant's decommissioning plan, would ensure that emissions control measures and best practices are incorporated to comply with applicable air quality standards.

Climate Change and Greenhouse Gas

Alternative 5 would directly generate GHG emissions during construction, routine operational activities, maintenance, and decommissioning. CO_2 and CH_4 would be emitted from on-road vehicles and non-road equipment during construction and from vehicles used during routine operational activities. Estimated emissions from construction and operational activities based on the information provided by the Applicant are shown in Tables 4.1-14, 4.1-15, 4.1-16. A comparison of the Proposed Action GHG emissions (51.5 $MTCO_2e$) to the existing power plant inventory for California (107,243,302 $MTCO_2e$), not including construction) shows that emissions resulting from Alternative 5 would be are 0.00005 percent. Detailed summaries of the calculations used to estimate GHG emissions from construction and operational activities are included in Appendix B.

Table 4.1-14 Alternative 5 (Smaller Project) GHG Emissions during Construction (per Phase)

Emission Type[a]	Source	GHG Emissions CO_2e (metric tons)
Exhaust emissions	Non-road equipment	332
	On-road vehicles	45
Fugitive dust emissions	Construction activities	-
	Roads (on-site and off-site)	-
Subtotal construction emissions per Phase		**377**
Total proposed action construction emissions (Phase I and II)		**754**

Notes:
[a]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Table 4.1-15 Alternative 5 (Smaller Project) GHG Emissions during Operation and Maintenance

Emission Type[a]	Source	GHG Emissions CO_2e (metric tons)[b]
Exhaust emissions	Heavy-duty diesel truck	0.5
	ATVs	0.9
Fugitive dust emissions	Roads	-
Operational and maintenance direct emissions		**1.3**

Notes:
[a]GHG emissions from electrical consumption and additional project equipment other than vehicles are not included in this estimation.
[b]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

Table 4.1-16 Alternative 5 (Smaller Project) Annualized Emissions from the Proposed Action

Proposed Action Source	GHG Emissions CO2e (metric tons)[d]
Direct operational emissions[a]	1.3
Direct construction emissions[b]	25.1
Direct decommissioning emissions[c]	25.1
Total annualized GHG emissions	**51.5**

Notes:
[a]GHG emissions from electrical consumption and additional project equipment other than vehicles are not included in this estimation.
[b]GHG emissions from construction were amortized over a 30-year- period.
[c]GHG emissions from decommissioning were amortized over a 30-year-period.
[d]Total emissions values are based on results presented in Appendix B, on a full decimal-based format. Results displayed on this table may not add up exactly due to rounding errors.

In addition, fugitive emissions of SF_6 and refrigerant could be emitted from the switchyard and solar PV power block equipment. The use of electricity to drive operational equipment on-site would also generate an indirect increase of GHG emissions at power generating stations linked to local electrical grids.

Currently, there is no formal BLM guidance, applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHG or evaluating GHG and climate change effects. However, a comparison with existing significance criteria on GHG in California, such as the interim GHG significance thresholds South Coast Air Quality Management District (SCAQMD),[2] and the existing regional emission inventories in California indicates that potential contributions from the direct GHG emissions would be considered a long-term effect. In addition, in order to reduce potential GHG emission contributions, the Applicant has proposed to incorporate the following practices as part of the design of Alternative 5:

- All construction equipment would be properly tuned, according to the manufacturer's specifications;

[2] SCAQMD Interim GHG Threshold: 10,000 metric tons per year of CO_2e

- Fuel for all off-road and portable diesel-powered equipment would be California Air Resources Board-certified motor vehicle fuel (non-taxed version suitable for use off-road);
- All on- and off-road diesel equipment would not be allowed to idle for more than five minutes; and
- Alternatively fueled construction equipment, i.e., compressed natural gas or biodiesel, would be used.

Since Alternative 5 is intended to generate electricity from a renewable source of energy, no increase of consumption of fossil fuels and related combustion emissions are expected. A typical 30-MW fossil fuel fired power in California would produce 965,553 MTCO2e over its 30 year lifespan. Subtracting the alternative project GHG emissions (51.5 MTCO2e) from these avoided emissions also indicates that the Proposed Action would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. Therefore, a beneficial effect would result from the Proposed Action under this criterion.

The Alternative 5 would not be developed within a forested area, resulting in no effects on forest resources. However, it has been documented that desert soils also have a carbon storage capacity (25.4 tons per acre, UNEC 2010), which, although it is considerably minor compared to the carbon storage capacity of forested areas (102.4 tons per acre, UNEC 2010), is considered a carbon sequestration option due to the global extension of drylands (World Resources Institute 2003). Only 238 acres of the site (516 acres) would be developed. Of this only 12.5 acres would be graded. The remaining 230.5 acres would have the vegetation cut, but the soil would not be disturbed. This would result in a loss of 317.5 tons of carbon storage capacity. Considering the relative proportion between the Proposed Action area (516 acres) and the total regional extension of the CDCA Area (approximately 300,000 acres), potential effects of the project over the existing carbon storage capacity would be considered long-term.

4.1.3 Cumulative Effects

Cumulative effects to air quality would consist of the incremental additions of criteria air pollutants to the atmosphere. For the purposes of this analysis, the CESA for this resource area is within ten miles of the site of the Proposed Action. Local air quality conditions are unknown, but air quality within the entire MDAQMD is affected by both fugitive dust from local sources and occasionally by region-wide windblown dust during moderate to high wind episodes. These region-wide events include contributions from both local and distant dust sources, which frequently result in violations of the National Ambient Air Quality Standards (MDAQMD 1995).

All of the projects identified in Table 3.18-1 may cumulatively affect air quality within the CESA since they will contribute fugitive dust and other air emissions. Most of the effects, however, would be limited to the construction phases of the Proposed Action. Air quality effects anticipated under the alternatives would result in additional PM_{10} contributions during construction. If both construction phases were to overlap, short-term exceedences of PM_{10} would result in a cumulative effect. Anticipated levels of PM_{10} would be 8.97 and 7.85 tons per year for Phase I and Phase II, respectively. These contributions would not result in exceedences under federal conformity determination levels. Long-term increases in fugitive dust (0.008 tons per year) would result from loss of vegetation cover. This would not exceed federal or state conformity levels.

If the other solar projects' construction activities were to overlap with the Proposed Action, there would be a cumulative increase in fugitive dust. Assuming that the other projects' particulate matter contributions are similar to those expected under the Proposed Action and alternatives, the cumulative effect would be below federal or state conformity levels and not considered significant. Additional particulate matter emissions would occur from the expected residential/commercial developments within the CESA. These contributions to atmospheric dust levels cannot be quantified at this time, but given the scale of the developments, and the fact that they would likely not be built during the Proposed Action's construction phases, it is not expected that they will cause a significant cumulative effect.

Implementation of Alternative 5 would have similar construction-related short-term and long-term cumulative effects on air quality conditions in the area, especially particulate matter emissions.

4.1.4 Residual Effects

Implementation of the proposed mitigation measures would reduce adverse residual effects on air quality resulting from the release of fugitive dust during construction of the Proposed Action. There would be no residual effects during operations and maintenance. During decommissioning, the proposed mitigation measures would reduce adverse residual effects on air quality from the release of fugitive dust.

Short-term cumulative effects on existing PM_{10} levels would occur as a result of the Proposed Action. Long-term effects would also result from the permanent removal of vegetation from the site, which would make the site more susceptible to regional wind events.

Short-term cumulative effects on existing PM_{10} levels would occur as a result Alternative 5. Long-term effects would also result from the permanent removal of vegetation from the site, which would make the site more susceptible to regional wind events.

The Alternatives 3, 4 and 5 would not increase GHG emissions and would generate electricity from a renewable source. The Proposed Action would result in avoided emissions of 965,553 $MTCO_2e$ over the Proposed Action's 30 year lifespan, producing a net benefit in the reduction of GHG emissions.

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4.2 Noise

This section discusses the effects on the ambient noise and vibration levels that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.2.1 Indicators

The primary indicator of noise levels for this analysis is the A-weighted average noise level measured in decibels (L_{eq}). The one-hour average noise level (dBA L_{eq} [1-hour]) is often used to characterize ongoing operations or long-term effects. The maximum dBA level (dBA L_{max}) is used to document the highest intensity, short-term noise level. Another commonly used measure of noise effects is L_{dn}. The L_{dn} value matches the L_{eq} value for noise generated from 7 a.m. to 10 p.m. but accounts for increased public sensitivity to noise at night by the A-weighted equivalent sound level for a 24-hour period with an additional 10 dB imposed on the equivalent sound levels for nighttime hours of 10 p.m. to 7 a.m.

San Bernardino County does not have regulations quantitatively limiting noise generation or effects from the Proposed Action during the construction phase. The County does have regulations regarding noise generation from operations as discussed in Section 3.2.

The Proposed Action would affect ambient noise and vibration levels if it would:

- Result in the generation of noise levels or exposure of persons and sensitive species to noise levels in excess of standards established in applicable federal, state, and local general plans or noise ordinances at nearby noise-sensitive areas.; or
- Result in generation of, or exposure of persons to, groundborne vibration or groundborne noise levels in excess of 75 VdB (generally considered intrusive for residential uses) unless allowed by federal, state, or local codes or ordinances.

4.2.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

Effects on the existing ambient noise and vibration levels may arise from Proposed Action construction, operation and maintenance, and decommissioning equipment and vehicles as well as from the introduction of construction or operations and maintenance-related traffic on local roads near the Proposed Action.

4.2.2.1 Alternative 1: No Action/No Plan Amendment

The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed; no construction activities would occur; and, there would be no project-related effect on ambient noise and vibration.

4.2.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed; no construction activities would occur; and there would be no project-related effect on ambient noise and vibration.

4.2.2.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Construction Phase I and II

Effect NOI-1: Short-term increase in ambient noise and vibration levels as a result of construction activities

Noise levels from common construction equipment at various distances can be estimated conservatively by assuming that the only sound-reducing mechanism is the divergence of the sound waves in open air. Propagation of groundborne vibration from equipment and vehicles is also assumed to be mitigated with greater distance. Construction noise and vibration levels related to the Proposed Action would vary during the construction period, depending on the construction phase and number and location of operating construction equipment. The site preparation phase would involve noise-generating activities such as clearing and grubbing, earthwork, and rough site grading; while the installation of solar panel arrays would involve the installation of steel beams using percussive or vibration equipment in a manner similar to installing freeway guardrails.

Individual pieces of equipment would generate noise levels in a range from 74 to 89 dBA at 50 feet from the source (Table 4.2-1). The worst case result of composite construction noise is derived by adding the individual equipment noise levels logarithmically, which would result in a maximum level of 97 dBA. In addition, a temporary increase in traffic noise on SR 247 and local roads would occur as a result of equipment delivery and workers commuting to the site.

Table 4.2-1 Alternative 3 (Proposed Action) Construction Equipment Noise Levels for the Proposed Action

Equipment List	Equivalent Federal Transit Administration Classification	Typical Sound Pressure Level (dBA) at 50 feet from source
Vibratory post driver	Pneumatic tool	85
Crawler tractors/dozer	Dozer	85
Dump, concrete, and tender trucks	Truck	88
Excavators	Backhoe	80
Forklifts/aerial lifts/booms	Crane, mobile	83
Generator/compressor	Air compressor/generator	81
Graders	Grader	85
Rollers/compactors	Roller	74
Scrapers	Scraper	89
Tractors/loaders/backhoes	Loader	85

Table 4.2-1 Alternative 3 (Proposed Action) Construction Equipment Noise Levels for the Proposed Action

Equipment List	Equivalent Federal Transit Administration Classification	Typical Sound Pressure Level (dBA) at 50 feet from source
Vibratory plate (handheld)	Compactor	82
Highway tractor	Scarifier	83
Flatbed truck	Truck	88
Water truck	Truck	88

Source: Federal Transit Administration 2006

Although real composite noise levels from construction activities would depend on the duration of each task and the exact number and usage factor of each piece of equipment and vehicle, it is estimated that construction activities would produce a short-term, adverse increase over the existing ambient noise levels at the site boundary of the Proposed Action (50 feet from the source). In addition, the use of percussive or vibratory equipment during the installation of the solar arrays may produce a short-term ground-borne vibration (above 75 VdB) and groundborne noise levels. Due to the location of the closest residence (located less than 0.1 mile from the site), these noise and vibration levels would not be attenuated over distance and reduced to background levels at the closest sensitive receptor (located less than 0.1 mile from the site). Because construction of Phase I would begin in the north and move to the south, disturbance from Phase I construction would result in a short-term, adverse effect to the residence. Implementation of MM NOI-1 would mitigation construction noise impacts during Phase I and Phase II construction.

Other sensitive land uses, such as recreation and special management areas may be affected by a short-term increase of noise levels. Effects on recreational users may be detectable along Santa Fe Fire Road but would be short-term and unlikely to impair the recreational resource. Special management areas in the vicinity of the site are located approximately two to ten miles from the site boundary. Therefore, no measurable change would be detected from current conditions, resulting in no effect from Phase I and II construction on sensitive land uses other than residential.

MM-NOI 1: Implement Noise Control BMPs. The Applicant would implement noise control BMPs to minimize noise effects on sensitive noise receptors. The following noise control BMPs would be implemented during construction of Phase I and II:

- Restriction of construction activities (including truck deliveries, pile driving, and vibration equipment use) to the least noise-sensitive times of day—weekday daytime hours between 7 a.m. and 10 p.m., near residential or recreational areas;
- Advance notification through public mailings and signs directed toward residents, landowners, and recreational users within one mile of the site prior to construction. The notice would state specifically where and when construction activities would occur in the area. The number would also provide a communication line or procedures to enable individuals to contact the company in the event that construction noise levels affect them;
- Installation of sound-control devices in all construction equipment, no less effective than those provided on the original equipment;
- Proper maintenance and working order of equipment and vehicles. The Applicant would ensure that all equipment is adequately muffled and maintained;

- Use of noise controls on standard construction equipment and shielding on impact tools;
- Use of broadband noise backup alarms on mobile equipment;
- Installation of mufflers on exhaust stacks of all diesel and gas-driven engines;
- Ensure proper installation of transformer equipment by
  - Placing transformer units near multiple reflective surfaces, such as in corners, near a ceiling or floor, or in a hallway,
  - Using sound-dampening pads between each transformer and the mounting surface,
  - Using flexible conduit couplings between each transformer and the associated wiring system, and
  - Mounting the transformers on surfaces with a large mass to avoid amplifying the sound.

Operation and Maintenance (Phases I and II)

Effect NOI-2: Long-term increase in ambient noise levels as a result of operational noise

Phase I operations would be totally automated. The various power components would be turned on and off automatically in the morning and evening, respectively. Electrical power components that would be operated include solar field direct current (DC) electrical collector systems, DC to alternating current (AC) inverters and step-up transformers, 33-kV collector system, switchyard, and 33-kV tie-in line.

Permanent staff would include two to three persons, including the nightly security officer. Maintenance needs would include panel washing (monthly), array visual and infrared inspection, vegetation control (as needed), and inverter and switchyard maintenance. The equipment would also include all-terrain vehicles to go inside the array for physical inspection and parts replacement.

There would be three potential sources of long-term operational noise during Phase I: noise from operation of electrical equipment, corona noise from the 33-kV transmission tie-in line, and noise from vehicle operations during routine operations and maintenance. In addition, there would be an increase in local traffic noise resulting from workers traveling to and from the site.

Noise from electrical equipment, such as transformers, is characterized as a discrete low frequency hum (Bell and Bell 1994). Among this type of equipment, transformers would be expected to contribute the most to the composite noise at the site. The noise from transformers is produced by alternating current flux in the core that causes it to vibrate (an effect also known as magnetostriction). In addition, transformer cooling fans produce noise when they operate. This noise is produced at a frequency (Hertz [Hz]) of twice the reference line (i.e., 2 x 60 Hz = 120 Hz), which can propagate with favorable weather conditions over long distances with little potential for reduction and create disturbances for residential receptors located at distances of 3,000 to 10,000 feet (Elliot et al. 1998).

The relative loudness of transformers depends on the construction design and techniques, as well as the ambient noise levels at a site (Jefferson Electric 2009). The Phase I equipment would include a total of 10 transformers (one for every two megawatts of power generation) to be enclosed within each photovoltaic power block. The National Electrical Manufacturers Association standard sound levels for 2,000-kVA commercial transformers (e.g., vent-dry type) at a distance of one foot from the source are 66 dBA for self-cooled and 71 dBA for fan-cooled

units (General Electric 1999). The composite noise level from identical sources—which can be predicted based on the final design, location, and technical specifications—would add three dB per identical transformer. However, the closest transformer to the closest receptor is over 500 feet away. Even with the composite noise of 10 transformers in Phase I, the sound level at the closest receptor would not exceed 55 dB. While this would result in a long-term increase in ambient noise levels, it would not be audible to the nearest receptor.

The corona effect is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona generates audible noise during operation of transmission lines and substation equipment. The noise is generally characterized as a crackling, hissing, or humming noise. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductor, the elevation of the line above sea level, the condition of the conductor and hardware, and the local weather conditions. Since the proposed 33-kV tie-in line would be of a lower voltage and short length (70 feet), it is anticipated that corona noise from this line would be inaudible.

Other maintenance activities, such as visual inspections, vegetation mowing, and parts replacement, would be expected to be long-term over the life of the Proposed Action. Potential effects from these activities on the existing ambient noise levels may be detectable for a short duration at the site and on local roads (minor increase in traffic), but given the relative location of the site with respect to sensitive receptors, any potential increases in the noise levels on-site are unlikely to be detectable or of concern to the general public. Therefore, there would be no long-term effects on existing ambient noise and vibration levels from operations and maintenance of the Proposed Action. No additional mitigation has been identified.

Decommissioning

The expected life of the Proposed Action is 30 years. According to the Applicant, in the event that the site should be removed from power generation service, it would be made suitable for reclamation. All equipment, buildings, concrete foundations, and driven piles would be removed from the site, generating a temporary and localized increase in ambient noise levels during decommissioning. The Applicant would develop a decommissioning plan consistent with BLM requirements in a manner that protects public health and safety and is environmentally acceptable. With the implementation of MM NOI-1, adverse effects during decommissioning would be localized and short-term.

4.2.2.4 Alternative 4: Modified Site Layout

Alternative 4 has been analyzed in response to comments received during public scoping in order to reduce effects on visual resources. This alternative is similar to Alternative 3 but would include maintaining a 50-foot setback from Santa Fe Fire Road; using native vegetation within the setback area as a vegetative screen, and modifying the site drainage to provide a water source for the vegetative screen, if feasible.

Potential effects during Phases I and II would be similar to those identified under Alternative 3; however, since the project would be moved 50 feet farther away from the closest sensitive receptor the noise levels at the property line could be attenuated, in addition the proposed vegetative screen could provide an additional barrier to noise, reducing potential effects of operations and maintenance noise on the closest receptors.

4.2.2.5 Alternative 5: Smaller Project Alternative

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase I under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres (See Table 2-5). Phase II of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects during Phase I and II would be short-term, adverse construction noise, ground-borne vibration, and traffic noise similar to Effect NOI-1 under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period. Implementation of MM NOI-1 would mitigate these effects.

Because operation, maintenance and decommissioning activities for Alternative 4 would be the same as those identified for Alternative 3, impacts during operations, maintenance, and decommissioning would be similar to Alternative 3.

4.2.3 Cumulative Effects

As discussed in Section 3.2, it is a general rule that at distances greater than 50 feet, the sound pressure level from a point source of sound drops off at a rate of 6 dB with each doubling of distance away from the source. The drop-off rate also varies with both terrain conditions and the presence of obstructions in the sound propagation path. In addition, sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound. Therefore, with a peak noise at the site of 89 dBA at 50 feet from the source, noise levels would be lower than the allowable San Bernardino County nighttime noise levels of 45 dBA at 2.4 miles from the site. For this reason, this distance was selected as the CESA for the construction phase of the Proposed Action.

Existing noise sources within the Proposed Action area are related to vehicular traffic on local roads, OHV use, agricultural equipment, and wildlife noises. Construction of the Proposed Action would generate short-term adverse noise levels at the closest noise receptor. Concurrent construction noise would be the most likely contributor to potentially greater cumulative noise effects. Two foreseeable projects, SB-32 and SB-33, are within 2.4 miles of the Proposed Action. SB-32 is a residential development, and SB-33 is a project to recognize a 15-acre potbelly pig rescue area. Both are approximately two miles from the site. For SB-32, it is not known whether construction would be concurrent with the Proposed Action. Construction noise at this site would also attenuate over distance. If construction at SB-32 were concurrent with the Proposed Action, cumulative noise levels at the residents between SB-32 and the site of the Proposed Action would be unlikely to exceed allowable daytime noise or vibration levels of 75 dBA. It is not clear that construction would be associated with SB-33, and therefore, noise levels would likely be comparable to an agricultural facility.

Noise generated during operations would be short-term, would not exceed San Bernardino County daytime noise thresholds, and would not be audible at the closest noise receptor. Therefore, operational noise would not contribute to cumulative noise effects in the area.

4.2.4 Residual Effects

There would be no residual effects from construction, operations and maintenance, and decommissioning of the Action alternatives after mitigation.

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4.3 Geology, Topography, and Geologic Hazards

This section discusses effects related to geology, topography, and geologic hazards that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.3.1 Indicators

The Proposed Action would affect geologic resources or be affected by geologic hazards if it would:

- Be located on a geologic unit that is unstable or that would become unstable as a result of the Proposed Action and result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse;
- Result in the physical alteration of or damage to geologic features; or
- Present a significant threat to public safety due to damage to project components by geologic hazards.

4.3.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource.

4.3.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and that the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on geology, topography, or public safety.

4.3.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on geology, topography, or public safety.

4.3.2.3 Alternative 3: Proposed Action

This alternative would approve the ROW application and amend the CDCA Plan to allow solar energy development. Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Effect GEO-1: Geologic units would become unstable and would result in on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse

As discussed in Section 3.3.2.4, the site is categorized as having low susceptibility to and incidence of landslides (Godt 2001). The site is relatively flat and is located on a valley floor. Historically the hills and mountains south of the site have experienced large landslides, such as the Blackhawk Slide that was likely triggered by an earthquake about 17,000 years ago (see Section 3.3.2.2). This type of event is rare and not predictable. Risks associated with earthquakes are discussed in Effect GEO-3.

The site is on an alluvial fan that is composed of loose sediments that have not been cemented into rock. Due to the loose nature of alluvial material, the sediments of alluvial fans can move and shift, particularly during heavy precipitation events, such as flash floods (see Section 3.1.2). Extreme rain events can result in the suspension of sand, gravel, or even boulders and transport them which can cause structural damage.

No construction or operational activity would alter the character of the underlying alluvial fan to make it less stable. Under this alternative, approximately 12.5 acres would be graded and filled as necessary. Over 90 percent of the site would not be graded. Maintenance of the natural terrain and its existing drainage system would facilitate natural drainage through the site.

Construction and operational activity also would require some below grade work. The solar panel frames would be secured to foundation members which are typically H-beams driven to a depth of four to five feet below ground surface. If extremely poor soil conditions exist, augured holes with steel members embedded in concrete could be required. The electrical systems would be installed underground. In addition, concrete pad foundations for inverters and step up transformers would be installed throughout the solar field. Concrete slab foundations would be laid for the control and maintenance building and the switchyard. The installation of these facilities would not cause the alluvium to become more unstable.

Although the site is located on an alluvial fan whose sediments have the potential for movement during large precipitation events, the Proposed Action would be constructed to minimize that potential movement by utilizing the natural on-site drainage. Therefore, it is not likely that the geologic unit would become unstable as a result of the Proposed Action. In addition, all excavations associated with the Proposed Action would be filled with soil or a post or foundation. It would not create subterranean void spaces. The presence of subterranean void spaces can contribute to subsidence, landslides, and/or collapse. Therefore, the Proposed Action would not increase the geologic instability of the area and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse.

Effect GEO-2: Physical alteration of or damage to geologic features.

No unique geologic features were identified at the site, so therefore, there would be no effect on a unique geologic feature.

Effect GEO-3: Project components damaged by geologic hazards present a threat to public safety.

Given that there have been over 100 earthquakes with a magnitude (M) of 5.0 or higher on the Richter scale and two above 7.0 M that have occurred within 100 miles of the proposed site, there is the potential for damage to project components due to fault rupture, earthquakes, or seismic shaking (USGS 2005). An earthquake could cause structural damage on-site. However,

all project structures would have to comply with applicable earthquake building codes; therefore, earthquake-related damage to structural components of the Proposed Action would be minimized and would be confined to the site. Since most of the site would be fenced and in a remote area, very few, if any members of the public would be exposed to potential earthquake damage at the facility. However, workers and wildlife potentially could be exposed to earthquake damage at the facility.

As discussed in Effect GEO-1, flash flooding can result in debris flow in desert environments. The alluvium at and surrounding the site could be transported during flash floods and damage on-site structures, such as solar panels, fencing, etc. The fence surrounding the facility would impede some or all of the debris flow during a flash flood event. The Applicant would perform maintenance after major storms to remove any debris that may have accumulated against the fencing and to repair any damage to the fencing. However, flash flood events could result in on-site damage that could represent a hazard to on-site workers or wildlife. The size, frequency, and intensity of flash flood events and associated damage has not been documented in this area. It is possible that a major flash flood could result in damage down gradient of the site.

Compliance with earthquake building codes and maintaining the natural drainage would minimize potential risk associated with the most likely geologic hazards in the area; however, once these events occur, they can strain or stress the existing infrastructure. With the implementation of MM GEO-1 and GEO-2, potential short- or long-term adverse effects related to the recurrence of these types of events would be reduced and any damage addressed, such that they would be short-term and localized.

MM GEO-1: Inspections After Geologic Events. To minimize or avoid potential hazards from earthquakes and other geologic events, the Applicant would have inspections performed by a BLM-approved appropriate professional (e.g., geologist, geophysicist, geologic engineer, or structural engineer) following geologic events in the vicinity of the site. The appropriate professional would perform the appropriate inspection and make recommendations to ensure that hazards are minimized for the next comparable or larger event. The Applicant would implement the appropriate the recommended corrective actions.

MM GEO-2: Applicant's Insurance Coverage. The Applicant shall acquire the appropriate insurance coverage to address potential off-site damage to structures or injury to people by facility structures that are moved off-site by a geologic event such as an earthquake or flash flood event.

4.3.2.4 Alternative 4: Modified Site Layout

Both alternatives would have the same features and project components. The primary difference with Alternative 4 is the vegetative screen that would be installed which would serve to reduce wind caused soil erosion and the alteration of the drainage to channel runoff back towards this screen. Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.3.2.5 Alternative 5: Smaller Project

Effects under this alternative would be the similar as those identified under Alternative 3. The difference in the area graded (10 acres) and developed (238 acres) would be reduced, but the

type, intensity, and duration of the effects would be similar. The same mitigation would be applicable.

4.3.3 Cumulative Effects

The CESA for geologic hazards would be the immediate vicinity of the Proposed Action area. No other projects within the CESA would alter any unique geologic features or geologic hazards and thus would not cause significant cumulative effects along with the Proposed Action or the alternatives.

As discussed above, the site has low incidence of landslides, and the Proposed Action would be designed and implemented such that it would not increase potential for landslides, lateral spreading, subsidence, liquefaction, or collapse because it would use the natural drainage of the area, only small parts of the facility would be graded, and it would not create subterranean void spaces. Therefore, it would not contribute cumulatively to the local geologic units becoming unstable such that on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse occurs.

Since the Proposed Action would not alter any unique geologic features, it would not contribute to a cumulative effect to unique geologic features.

Structural damage associated with earthquakes would be isolated to the site. Similarly, earthquake damage to existing and foreseeable projects would be confined to each respective project's footprint. Therefore, there would be no cumulative effects associated with earthquake damage.

During a major flash flood event, it is possible that debris from the site could be taken by flood waters and represent a safety hazard. Flood waters would likely flow down gradient or north of the site. If a flash flood had the intensity to damage the fence and dislodge solar panels, it would likely damage the residences that are downgradient of the site. Debris from the Proposed Action and other damaged structures could contribute to the public safety hazards. Due to the unpredictable nature of a flash flood event, it would not be possible to mitigate for this eventuality.

Implementation of Alternatives 1 and 2 would not result in any activity at the site, and therefore, these Alternatives would not contribute to cumulative effects to geologic resources.

Alternatives 4 and 5 would not contribute cumulatively to the local geologic units becoming unstable such that on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse would occur and would not contribute to a cumulative effect to unique geologic features. They would not contribute to cumulative effects associated with earthquake damage. The potential cumulative effects from a flash flood event would be similar for Alternative 4 but would be less for Alternative 5 because there would be a smaller footprint and fewer structures that could be damaged.

4.3.4 Residual Effects

With the implementation of MM GEO-1, residual adverse effects on geology, topography, or public safety from implementation of the Proposed Action would be localized.

4.4 Soils

This section discusses the effects on soil resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.4.1 Indicators

The Proposed Action would affect soil resources if it would:

- Result in substantial soil erosion or loss of topsoil; or
- Result in effects on soils identified for special protection

4.4.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

4.4.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on soil resources.

4.4.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on soil resources.

4.4.2.3 Alternative 3: Proposed Action

The implementation of Alternative 3 could result in the several effects on soils. The following mitigation measures would help ensure that effects on soils are reduced.

Effect SOIL-1: Substantial soil erosion or loss of topsoil.

Several factors affect the potential for soil to be eroded by water or wind, including soil texture, the length and percent of slope, vegetative cover, and intensity of rainfall or wind. As discussed in Section 3.4.2, the Proposed Action site is ranked in Wind Erodibility Group 2 (STATSGO 2006), indicating that the soils are very highly erodible. Under this alternative, approximately 433 acres would be developed, but less than 10 percent of the site would be graded, using a cut and fill method. No soil would be removed and brought on to the site. The area that would be

graded would be the Switch Yard (0.003 acres), the Operation and Maintenance building (0.006 acres), the access road (7 acres), the power line (5 acres) and the parking/laydown area (0.5 acres). Both topsoil and vegetation would be removed and vegetation would not be allowed to re-grow over this approximate 12.5 acre area. This removal of the vegetation and grading of these areas would expose mineral soil and increase its erodibilty, particularly during construction. The site is relatively flat, but it has the potential for infrequent strong rains and high winds. The use of vehicles and equipment on these areas would further increase the potential for both wind and water driven erosion. Therefore, there would a strong potential for wind and water erosion over this 12.5 acres.

To reduce the potential effects from erosion and topsoil removal, the Applicant would implement their storm water pollution prevention plan (SWPPP) during construction. A SWPPP is designed to minimize erosion and decrease potential siltation of water bodies. This would involve temporary installation of siltation prevention devices. As discussed in Section 4.1.2.3, the Applicant also would implement MM AQ-1: Fugitive Dust Control Measures. Specifically implementation of the following fugitive dust control measures would reduce the potential for erosion during construction:

- Pre-watering of soils prior to clearing and trenching;
- Frequently watering or stabilizing excavations, spoils, access roads, storage piles, and other sources of fugitive dust (parking areas, staging areas, other);
- Applying chemical soil stabilizers or water to form and maintain a crust on inactive construction areas (disturbed lands that are unused for four consecutive days)

During construction, there would be a short-term potential for erosion to occur. Through the implementation of the Applicant's erosion control measures, the SWPPP, and MM AQ-1 would minimize the amount of soil erosion and topsoil loss that would occur during construction. In addition, during both construction and operations, the Applicant would perform maintenance after major storms to remove any debris that may have accumulated against the fencing and to repair any damage to the fencing.

The solar arrays would be installed on approximately 420 acres of the site. The solar arrays would be installed on the natural ground surface, following the topography of the area. This area would not be graded. The solar arrays would be spaced 10.5 feet apart. The solar arrays would protect the underlying soil from wind erosion and would reduce the energy of precipitation before it hits the ground surface so the potential for erosion would decrease in some areas. However, precipitation would flow off of the panels and would be concentrated at the lower ends of the panels, so this may create gullies at these locations. The lower end of the panel would be two feet off the ground surface. Ensuring that gullies are removed would be part of the normal maintenance of the site. Although erosion could occur based on the design of the Proposed Action, it would be a short-term adverse effect and the site maintenance would restore potential soil lost. Therefore, the Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area during construction.

Although the Proposed Action would not remove vegetation from the solar panel area, the vegetation would be cut and receive less sunlight than it receives naturally. This could result in a long-term change in the vegetation in the area which could alter the erosion potential. This issue would be particularly an issue during flash floods. Flash flood events naturally cause erosion to occur due to the high volume and speed of flowing water. If a flash flood event occurred at the site and the natural drainages were overtopped, then there would be sheet flow

over some or most of the proposed site. Erosion on compacted and properly maintained graveled areas would be minimized since the gravel would protect the surface and reduce the speed of flowing water. Since the soils underneath the solar panels would only be altered where the posts have been driven and the natural vegetation would remain, the degree of potential erosion surrounding solar panels would only increase relative to pre-construction conditions at post locations. Erosion would likely increase surrounding concrete pads, operations and maintenance building, and the switch yard. This effect would be short-term and adverse; its severity would depend on the size of the flood event. Implementation of MM GEO-1 would address areas where erosion occurred after flood events. Therefore, the Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area during operations.

The Applicant would be required to develop a decommissioning plan. The process of decommissioning the proposed facility would disturb soils in a manner similar to construction. Similar erosion and dust control measures would have to be implemented. Once the facility would be decommissioned, the soil surface would no longer be protected from wind and water erosion by the solar panels and the on-site grading would not be maintained; therefore, there would be an increased potential for erosion. Implementation of MM SOILS-1 would address this potential of increased erosion.

> **MM SOILS-1: Post-Decommissioning.** To prevent excess erosion after decommissioning, the Applicant would document the topographic and erosional condition of the site before and after decommissioning. The Applicant would develop and implement a post-project erosion control plan. The site would be inspected quarterly for the five years following decommissioning to determine its erosional status. The Applicant would submit to the BLM yearly a report documenting erosional status of the site. The BLM would determine if corrective actions are necessary to reduce the amount of erosion.

Effect SOIL-2: Adverse effects on soils identified for special protection.

Due to the lack of protected soils at the site, development of the Proposed Action would not affect soils identified for special protection.

4.4.2.4 Alternative 4: Modified Site Layout

Both alternatives would have the same features and project components. The primary difference with Alternative 4 is the vegetative screen that would be installed which would serve to reduce wind caused soil erosion and the alteration of the drainage to channel runoff back towards this screen. Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3 since only 421 acres of land are being developed. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.4.2.5 Alternative 5: Smaller Project

Effects resulting from Alternative 5 would be the similar to Alternative 4, but less than those identified for Alternative 3. Only 10 acres would be graded as opposed to 12.5 acres; therefore, fewer acres of topsoil would be removed. A total of 238 acres would be developed and solar arrays would be located on approximately 228 acres, as opposed to 420 acres of solar arrays on 433 developed acres. Since the alternative would decrease the number of structures, specifically concrete pads and post, and the area over which erosion would occur and topsoil

removed would be less than Alternative 3, then the effects from this alternative would be similar but less than those for Alternative 3. MM SOILS-1 and MM GEO-1 would be applicable to this alternative.

4.4.3 Cumulative Effects

The CESA for cumulative effects to soil resources is an area within five miles of the Proposed Action. The three other proposed solar projects would cause effects to soil resources similar to those expected under the Proposed Action. Similarly, any maintenance or construction actions related to the PGE Cushenbury Natural Gas Line (Ref. 9) would also contribute soil effects and would conceivably cause a cumulative effect if undertaken at the same time as construction for the Proposed Action. Soil loss would be mitigated by BMPs and other measures.

Construction of the Proposed Action would involve grading certain areas of the site. Erosion could occur in these areas until they are compacted and covered with gravel. The Applicant would implement a SWPPP to minimize the amount of any soil erosion during construction. The design of the Proposed Action and the Applicant's maintenance measures during operations would minimize the potential for erosion.

Erosion would occur during flash flood events. With the implementation of MM GEO-1, the potential adverse effects of erosion would be addressed and minimized. As with construction, there would be the potential for erosion and topsoil loss during decommissioning, the legally required erosion control measures would be implemented. MM-SOILS-1 would address any residual adverse effect of erosion post-decommissioning. Therefore, the Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area.

Beginning in July 2010, all dischargers who disturb soil will be required to obtain coverage under the General Construction Permit. Previously a permit was only required if greater than one acre of soil was disturbed. This new permit will require dischargers to develop a SWPPP and implement erosion control BMPs specified in the permit. Implementation of these BMPs would minimize the amount of erosion and topsoil loss that would occur during the construction of the foreseeable projects. Therefore, the Proposed Action would not contribute to a cumulative substantial increase in soil erosion or loss of topsoil.

The Proposed Action would not result in effects on soils identified for special protection; therefore, it would not contribute to a cumulative effect to soils identified for special protection.

Implementation of Alternatives 1 and 2 would not result in any activity at the site, and therefore, these Alternatives would not contribute to cumulative effects to soil resources.

The cumulative effects of Alternatives 4 and 5 would not contribute to substantial soil erosion or loss of topsoil in the area, would not contribute to a cumulative substantial increase in soil erosion or loss of topsoil, and not contribute to a cumulative effect to soils identified for special protection.

4.4.4 Residual Effects

No residual effects on soil resources would result from implementation of the Proposed Action.

4.5 Water Resources/Hydrology

This section discusses the effects on water resources and hydrology that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.5.1 Indicators

The Proposed Action would affect water resources and hydrology if it would:

- Increase the potential for flood hazards;
- Alter existing water flow patterns or drainages;
- Degrade the quality of groundwater for private or municipal purposes;
- Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters; or
- Decrease water supply in the Proposed Action area.

4.5.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.5.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on water resources or hydrology.

4.5.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on water resources or hydrology.

4.5.2.3 Alternative 3: Proposed Action

Effects resulting from the implementation of Alternative 3 could occur during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II.

Effect WATER-1: Increase the potential for flooding hazards.

As discussed in Section 3.5.2.1, FEMA classifies the site of the Proposed Action as Zone D, indicating that there are possible but undetermined flood hazards in the area. However, residents and resource agencies have noted that this area is subject to intense flooding events, including flash floods (BLM 2009).

The Applicant is conducting flooding models using the Hydrologic Engineering Centers River Analysis System [HEC-RAS] of the United States Army Corps of Engineers; however, the data were not available at the time of publication of this document. This modeling may not be appropriate for modeling flows on alluvial fans because HEC-RAS cannot address all variables that may occur during flash floods. Previous modeling by the Applicant has indicated the major drainage channels could experience high flows during episodic rain events. The available information suggests that flooding is possible in the Proposed Action area, but the intensity and frequency of these events is not known. Therefore, it is not possible at this time to estimate what the potential flood risk is at the site and the possible effects. Public safety risks associated with flooding are addressed in Effect GEO-2.

Flood hazards can increase due to multiple factors, including alteration of the natural drainage of an area to prevent adequate water flow, reducing the area within which precipitation and runoff infiltrate and increasing the impervious surface area in a region. Alteration of the natural drainage and flow patterns is discussed in Effect WATER-2.

Of the 516-acre site, 433 acres would be developed and 83 acres would be undeveloped. Of the 433 acres that would be developed approximately 12.5 acres would be graded. The solar arrays would cover 420 acres of the 516-acre ROW. The solar array area would be installed on the natural terrain; that is, this area would not be graded. Of the 420 acres in the solar array field, less than half of the area would be shaded by solar arrays. A string of solar panels would be spaced 10 feet apart and would cover an approximate 9-foot by 51-foot area with a minimum of 1 foot between the arrays. Approximately 4,500 solar panel strings would be installed. Although the solar panel strings would be impermeable, precipitation would flow off of them onto the natural terrain. The area underneath and surrounding the solar panel strings would remain permeable; therefore, the solar panel strings would be diverting precipitation but not preventing its infiltration. Flow off the panels would be concentrated at the panel's edges, but the Applicant would conduct regular maintenance to prevent gullies or troughs from developing.

The remaining approximate 12.5 acres of development would include the switch yard, operations and maintenance building, power line, access road, the power line corridor, and parking/laydown area. Approximately 7.5 acres would be graded, compacted, and covered with gravel. The 20-foot by 2-mile corridor (5 acres) for the power line would not be graded and brushed but would not be covered with gravel. The impermeable surfaces at the facility, aside from the solar arrays, would include the operations and maintenance building, the concrete foundations for the transformers and inverters, and the concrete pad in the switch yard.

The Proposed Action would increase the area of impermeable surfaces and would decrease the area of infiltration. However, due to the relatively small size of these impermeable surfaces within the larger watershed (Mojave River watershed, 4,500 square miles; Blackhawk Canyon subbasin, 13,184 acres; and Cougar Buttes subbasin, 28,553 acres), the Proposed Action would not significantly increase the potential for flooding in the watershed or its subbasins.

Effect WATER-2: Alter existing water drainage or flow patterns.

Under this alternative, the majority of construction would occur on natural terrain without altering the natural drainage or flow patterns. The exception is approximately 12.5 acres that the site would be graded for construction of the switch yard, operation and maintenance building, the parking/laydown area, the access road, and power line corridor. A cut and fill method would be used, but no soil would be removed and brought onto the site. Vegetation would be removed and would not be allowed to re-grow on the parking lot, switch yard, operations and maintenance building, and access road. Except where structures are installed, these areas would be graded, compacted, and covered with gravel.

The natural flow patterns would be altered at these graded areas, the areas where concrete pads and structures are installed into the ground, and within the solar array field. The concrete pads, posts used to mount the solar panels, and transmission line poles would be impediments to flow and, depending on the volume of flow scour, could occur at these locations. However, since the primary drainage channels within the site would be left intact and sheet flow would still occur through the remainder of the site, this type of flow pattern alteration would not alter the overall flow pattern for the area.

Effect Water-3: Decrease the quality groundwater for private and municipal purpose.

Groundwater quality would not be altered by the Proposed Action. Groundwater is located at 350 to 360 feet below ground surface. The Proposed Action would only use small amounts of herbicides and petroleum products during construction and operations. Implementation of the Applicant's Spill Prevention and Response Plan during construction and operations and the SWPPP during construction and decommissioning would decrease the risk of a spill occurring, and if one occurred, it would be cleaned up according to federal, state, and local regulations. Therefore, the Proposed Action would not degrade the quality of groundwater for private or municipal purposes.

Effect Water-4: Degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters.

During construction and decommissioning activities, increased erosion could result in a decrease in surface water quality by increasing turbidity (i.e., the clay and silt load in surface water). Potential contaminants include petroleum hydrocarbons and herbicides during construction and operation. The Applicant would use siltation prevention measures during construction as well as implement their SWPPP and their Spill Prevention and Response Plan. During operations, the Applicant would continue to implement their Spill Prevention and Response Plan. With the implementation of the SWPPP and the Spill Prevention and Response Plan, potential adverse effects to surface water quality would be minimized. Therefore the proposed action would not degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters if the SWPPP and Spill Prevention and Response Plan are properly implemented.

Effect Water-5: Decrease water supply in the Proposed Action area.

During construction water would be used for dust control and soil compaction. The Applicant also plans to use polymers and flocculants for temporary dust control. The water use for construction of the first 20 MW project phase is estimated at approximately 1.75 million gallons (5.4 acre-feet). This phase is estimated to have the heaviest water use due the road construction and hardening and building construction. The second 25 MW phase is estimated to require approximately 1.25 million gallons of water (4.6 acre-feet). Water used during

construction would be provided through a contract with one of the local large industrial companies or municipal water companies that have high capacity wells and water systems (CES 2009a).

During operation and maintenance, water would be used primarily for panel washing. Although the actual water requirements for operations and maintenance are not known, the estimated amount of water required would be between 10,000 to 20,000 gallons for the first 20 MW installation and 22,500 to 45,000 gallons per year if the entire 45 MW field is built (CES 2009a).

The water obtained for both construction and operations would be from a permitted off-site source; therefore, it would not decrease the water supply in the Proposed Action area.

4.5.2.4 Alternative 4: Modified Site Layout

Both alternatives would have the same features and project components. The same amount of water would be used during both construction and operations and maintenance under this alternative as would be used under Alternative 4. The primary difference with Alternative 4 is the vegetative screen that would be installed and the alteration of the drainage. The alteration of drainage under Alternative 4 would channel runoff back towards this screen. Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3 since only 421 acres of land are being developed. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.5.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required. Operations and maintenance water use would be 10,000 gallons annually.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects resulting from Alternative 5 would be similar to those identified for Alternative 3. However, because only 238 acres would be developed and solar arrays would be located on approximately 228 acres, this alternative would slightly reduce the area graded to approximately 10 acres and decrease the area where infiltration would not occur. Water use during construction would be 5.4 acre feet for phase I, and 1.84 acre feet for construction phase II. Operations and maintenance water use would be 27,000 gallons.

4.5.3 Cumulative Effects

The CESA for water resources is the Lucerne Valley watershed, within ten miles of the Proposed Action site. All projects identified in Table 3.18-1 are within the CESA and given their activities could cause cumulative effects to water resources. Given the size of the watershed within which the Proposed Action would be located, and the fact that the natural drainage patterns of the site would be maintained, the Proposed Action would not increase the potential for flooding in the area and, therefore, would not contribute cumulatively to an increased hazard for flooding.

Although the presence of structures and graded area would alter some of the on-site natural flow patterns, the primary drainage channels within the site would be left intact and sheet flow would still occur through the remainder of the site. This type of flow pattern alteration would not alter the overall flow pattern for the area and would not contribute cumulatively to changes in flow patterns or drainages in the area.

Groundwater quality would not be altered by the Proposed Action because groundwater is located at 350 to 360 feet below ground surface and excavation would be to depths of less than 20 feet below ground surface. If spills were to occur, the Applicant would clean them up according to federal, state, and local regulations. Therefore, the Proposed Action would not contribute cumulatively to the degradation of groundwater quality for private or municipal purposes.

The Applicant would use sedimentation prevention measures during construction as well as implement their SWPPP and their Spill Prevention and Response Plan. During operations, the Applicant would continue to implement their Spill Prevention and Response Plan. These measures would decrease the potential for adverse effects to surface water quality. Most water bodies in the area are ephemeral. As a result, no information is available about the existing surface water quality conditions. Activities that could lead to increased erosion or sedimentation would include vegetation removal, excavation, and grading. Construction activities associated with the foreseeable projects could lead to an increase in erosion and siltation; however, as discussed in Section 4.4.3, beginning in July 2010, activities that disturb soil will be required to obtain coverage under the General Construction Permit. Under this new permit, dischargers will be required to implement erosion control BMPs specified in the permit. Implementation of these BMPs would minimize or prevent the amount of erosion and sedimentation that would occur during the construction of the foreseeable projects. Therefore, the Proposed Action would not contribute to a cumulative degradation of surface water quality by increasing erosion, increasing sedimentation, or introducing contaminated waters.

During construction and operation and maintenance of the Proposed Action, water would be obtained from a permitted off-site source; therefore, it would not decrease the water supply in the Proposed Action area and would not contribute cumulatively to a decrease in the local water supply.

Implementation of Alternatives 1 and 2 would not result in any activity at the site, and therefore, these Alternatives would not contribute to cumulative effects to hydrologic resources.

Alternatives 4 and 5 would not contribute cumulatively to an increased hazard for flooding; changes in flow patterns or drainages in the area; degradation of groundwater quality for private or municipal purposes; surface water quality by increasing erosion, increasing sedimentation, or introducing contaminated waters; or a decrease in the local water supply.

The primary contributors to cumulative effects would be the three proposed solar projects, if they were to be built concurrently with the Proposed Action and if a flood event were to occur. It is possible that a short-term cumulative effect to water resources from these projects could occur under this scenario.

4.5.4 Residual Effects

No residual effects on water resources or hydrology would result from implementation of the Proposed Action.

4.6 Biological Resources

This section discusses effects on biological resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided. This discussion format is repeated for each of the following sections: Vegetation (Section 4.6.2), Wildlife (Section 4.6.3), and Special Status Species (Section 4.6.4).

4.6.1 Indicators

In general, the Proposed Action would affect biological resources by limiting the ability of special status individuals to survive, reproduce, forage, or move across the site of the Proposed Action. The Proposed Action would also affect biological resources by damaging or altering the ecological connections within sensitive plant and animal communities. Impact indicators are the same for all of the biological resource types addressed (vegetation, wildlife, and special status species). Adverse effects on biological resources would occur if the Proposed Action would:

- Violate a legal standard for protection of a species or its critical habitat;
- Change the diversity or substantially alter the numbers of a local population of any wildlife or plant species or interfere with the survival, growth, or reproduction of affected wildlife and plant populations;
- Result in a substantial long-term loss of special status species habitat;
- Result in direct or indirect effects on a special status species or population or their habitats or that would contribute to loss;
- Result in the federal or state listing of the species (e.g., by substantially reducing species numbers or by causing permanent loss of habitat essential for the continued existence of a species);
- Interfere substantially with the movement of native resident or migratory wildlife species, wildlife corridors, or wildlife breeding sites; or
- Introduce new or invasive species to an area or substantially expand extant populations of invasive species.

4.6.2 Vegetation

Vegetation in the Proposed Action area is open space dominated by creosote bush and white bursage, with desert wash and disturbed communities. Succulent plants are also present, and there are some invasive weeds. The implementation of the Proposed Action would effect vegetation on and surrounding the site. Impact indicators, direct and indirect effects, cumulative effects, mitigations, and residual effects are discussed below.

4.6.2.1 Indicators

The impact indicators are the same for all biological resource types addressed (vegetation, wildlife, and special status species), as outlined in Section 4.6.1.

4.6.2.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. Effects on vegetation that could result from the implementation of the alternatives during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on vegetation resources. The site would continue to be managed under the current CDCA Plan.

Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to designate the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on vegetation resources.

Alternative 3: Proposed Action

Under Alternative 3, construction and operations and maintenance activities would cause the following direct effects on vegetation:

Effect BIO-1: Loss of native vegetation communities.

Direct effects to yucca plants (e.g., Joshua trees) during construction would be short-term. These plants would be flagged for salvage and removed. As part of the transplantation process, individuals directly affected by the Proposed Action would be stored in the adjacent unaffected ROW during construction activities. In addition, no long-term adverse indirect effects on yucca plants (e.g., due to noise, vibration, dust) would be anticipated because construction and maintenance activities would be short-term.

Routes of travel designated Open by BLM would be used for ingress and egress to the site. Temporary workspaces and staging areas would adversely affect native vegetation over the short-term, but vegetation would recover following the mitigation measures below. Long-term adverse effects to vegetation would occur as a result of surface disturbing activities associated with construction, such as grading. Grading and grubbing activities would cause the direct loss of approximately 12.5 acres of creosote bush-white bursage, white bursage, desert wash, and/or already disturbed vegetative communities.

Although the Proposed Action would not remove vegetation from the solar array area, the vegetation would be cut and receive less sunlight than it receives naturally. Approximately 420 acres of the 516-acre ROW will be mowed, reducing vegetation to between 6 and 12 inches in height, for development of the solar arrays. Re-sprouting at the base of these plants after mowing would likely occur, although the long-term effects to vegetation from this activity, and

the installation of the solar panels, would depend on the scale, intensity, and duration of the activity.
Surface stabilization and reclamation within and along the boundaries of the site would be accomplished by removing all construction debris from the area and returning the soil to its original grade around the perimeter of the site. These activities would occur within 30 days of construction unless otherwise approved by resource agencies.

Vegetation that is not directly affected by clearing or mowing could be indirectly affected by shading from the solar panels, which may reduce the amount of sunlight available for photosynthesis over the long-term. This would affect smaller vegetation (less than two feet in height).

Overall, the adverse effects under Alternative 3 could include direct mortality, loss of plant habitat, plant injury, alteration of plant community structure, and community fragmentation, while dust during construction could indirectly decrease plant photosynthesis. These effects would be both short- and long-term in nature and predominantly limited to the site of the Proposed Action, with the exception of edge effects at the perimeter of the site. Implementation of MM BIO-1 through MM BIO-5 would reduce effects on native vegetation communities.

MM BIO-1: Minimize Effects on Vegetation. No effects to vegetation in areas outside the construction footprint would be authorized. As appropriate, areas of native vegetation would be flagged for avoidance during perimeter and desert tortoise exclusion fence construction. Within the site, healthy Joshua trees and all cacti, other than cholla, would be relocated.

These plants would be made available to the public for personal relocation to private property and transplanted prior to the initiation of any ground disturbing activities. No vegetation would be permanently removed outside the Proposed Action area. If unforeseen circumstances require disturbance beyond the Proposed Action area, the Applicant would notify BLM and USFWS immediately, and such activity shall be deferred until approved by BLM.

MM BIO-2: Manage Invasive Weeds. An Invasive Weed Management Plan, approved by the BLM, shall be developed to minimize the potential for introduction and spread of invasive plant species during construction and operation of the facility prior to the initiation of ground disturbing activities. Best Management Practices (BMPs) would be identified and incorporated into educational training.

MM BIO-3: Biological Monitors. The Applicant would provide a third-party biological monitor (BM) (or BMs) to oversee compliance with BMPs and mitigation measures for protected species. The BMs would be authorized biologists, approved by the BLM, USFWS, and CDFG, would hold all required permits or agency approvals, and would be on-site during all ground-disturbing activities. The BM would have a copy of all stipulations when work is being conducted on-site. BMs would have authority to halt activities that violate mitigation measures. BMs may also flag and instruct construction crews to avoid sensitive areas. All instances of noncompliance or incidental take of special status species would be reported to the BLM within 24 hours of occurrence. Replacement of authorized biologists would require BLM, USFWS, and CDFG approval. Authorized biologists would be assigned to monitor each area of activity where conditions exist that may result in take of protected wildlife (e.g., clearing, grading, construction, and reclamation activities). A BM would be assigned to each construction team. BMs would maintain a detailed record of all special status species encountered.

A monthly summary letter report shall be provided to the BLM, documenting all effects to sensitive species, any compliance violations, and suggested remedies to conflicts during the construction phase of the Proposed Action. This report would include the following for each desert tortoise:

1) the locations (narrative and maps) and dates of observations;
2) general condition and health, including injuries and state of healing and whether animals voided their bladders;
3) location moved from and location moved to;
4) diagnostic markings (i.e., identification numbers or marked lateral scutes); and
5) digital photographs of each handled tortoise.

After construction, a report would be submitted annually (due December 31 of each year) to the BLM documenting all fence monitoring and repair work conducted during the previous year.

MM BIO-4: Best Management Practices. Construction crews would be instructed to use BMPs, which would be identified prior to construction and included in applicable operations and education program.

MM BIO-5: Worker Education Program. All employees and contractors working on the site would complete an education program addressing onsite biological concerns prior to the start of work. The education program would be administered by a qualified biologist who is familiar with special status species that have potential to occur in the Proposed Action area. Program content would be approved by the USFWS, the BLM, and appropriate state agencies. At a minimum, the program would cover species identification, distribution, general behavior and ecology, sensitivity to human activities, threats (including introduction of exotic plants and animals), legal protection, penalties for violations of federal and state laws, reporting requirements, and project-related mitigation measures. All field workers would be instructed that activities must be confined to locations within the approved project areas. In addition, the program would include fire prevention measures to be implemented by employees during construction of the Proposed Action. The program would instruct participants to report all species observations during construction activities to a BM. Records of worker training would be maintained.

Effect BIO-2: Loss of succulent plant species.

Succulent plants that would potentially be affected by the Proposed Action occur in low numbers. For example, approximately five cottontop cacti and up to 50 beavertail cacti could be affected.

Those succulent plants located in areas proposed for construction would be flagged for salvage and removed. Effects to succulent species would be short-term because suitable habitat for this species is present adjacent to the Proposed Action area. As part of the transplantation process, individuals directly affected by the Proposed Action would be salvaged and stored in the adjacent unaffected ROW during construction activities. In addition, no long-term adverse indirect effects on this species (e.g., due to noise, vibration, dust) are anticipated because construction and maintenance activities would be temporary in nature. Adverse effects on succulent plant species would be minimized with the incorporation of MM BIO-1, MM BIO-3 through MM BIO-5. Following these mitigation measures would enable transplanted succulent plants to recover successfully.

Effect BIO-3: Introduction or spread of invasive, non-native, or noxious plant species.

Effect BIO-3 would directly affect native vegetation, and disturbance to these communities could allow the increase in invasive weed species, such as Sahara mustard, to spread and infest the disturbed areas.

Grading and grubbing activities would disturb soil around the perimeter of the site, thus creating opportunities for non-native invasive weed species to colonize in areas where they had not previously occurred. Invasive weed species could outcompete native plants for such resources as water and space. Additionally, soil disturbance could reduce the native seed bank associated with the site. Dust generated during construction could adversely affect on-site and off-site native vegetation communities by reducing photosynthetic activity. Reduction of native plant species could leave denuded areas at risk for the potential spread of non-native invasive weed species. Loss of native communities and the spread of non-native invasive weeds could also occur during operations and maintenance activities, such as vegetation clearing along the perimeter fence.

During precipitation events, solar panels would be placed in the flat horizontal position. Precipitation runoff would concentrate along the dripline below the panels rather than being uniformly distributed, changing the soil water content, causing erosion of the soil at the drip line and promoting growth of weeds. Implementation of MM BIO-2 and MM BIO-4 would control the introduction and spread of invasive, non-native, or noxious plant species during construction and operation of the Proposed Action.

Alternative 4: Modified Site Layout

Alternative 4 would involve the same initial effect on native communities (Effect BIO-1); however, the 100-foot corridor (50-foot setback from each side of the perimeter or 4.4 acres) along Santa Fe Fire Road would provide an opportunity for some native vegetation to be salvaged from the construction site and transplanted. Similarly, Alternative 4 would involve the same initial effect on native plant species (Effect BIO-2). The potential for invasive species would likely be increased, as with Alternative 3, due to mechanically disturbed soil and habitat (Effect BIO-3). Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

Alternative 5: Smaller Project

Under Alternative 5, construction and operations and maintenance activities would cause similar direct and indirect effects as described under Alternative 3. However, only 10 acres would be graded and developed. Approximately 238 acres of the 516-acre ROW would be mowed, reducing vegetation to between 6 and 12 inches in height, for development of the solar arrays. This alternative would reduce the area of disturbance and, therefore, reduce the amount of vegetation that would be removed compared to Alternative 3. MM BIO-1 through 5 would reduce effects associated with Alternative 5.

4.6.2.3 Cumulative Effects

The geographic extent of the CESA for vegetation resources is a 6-mile radius from the Proposed Action site. The area was chosen because it encompasses several reasonably

foreseeable projects and developments that could cumulatively affect the region's plant diversity and susceptibility to invasive plants. .

Within this area, foreseeable actions include:

- Chevron photovoltaic geo-testing land use permit, located onsite (Figure 3-18-1);
- Caltrans Camprock Road (SR 247) bridge and road realignment, approximately 3.5 miles southwest of the site;
- Multiple proposed residential developments; and
- Three proposed solar projects.

Although all the foreseeable projects are likely to include removal of native vegetation and soil disturbance, the solar projects would have the largest areas of disturbance. The solar projects range in size from 2400 acres to over 17,000 acres and would likely have similar types of disturbance as the Proposed Action. However, the majority of these proposed sites are outside of the CESA. Effects from these projects are likely to include loss of succulent and yucca plant species and the introduction or spread of nonnative or noxious plant species. Fewer native plant communities, succulent and yucca plant species, and increased density of noxious weeds in the region would cause wildlife to forage on the fewer remaining native plants and succulents. It is not possible to estimate the amount of vegetation that would be removed by the foreseeable projects. The cumulative spatial extent of vegetation disturbance would be confined to those areas proposed for development. The proposed site is not pristine because it has been disturbed by human presence (a few residences and roads and remnant mining). Plants of concern, such as succulents and Joshua trees, would be salvaged and transplanted out of the Proposed Action area. The foreseeable solar projects would likely have to implement similar measures. Within the CESA, the Proposed Action would contribute to a cumulative loss of native vegetation; although the net loss of native vegetation from the foreseeable projects and the Proposed Action cannot be estimated accurately, the majority of the CESA would remain desert scrub.

Most of the foreseeable projects, such as the residential developments would have to implement only limited mitigation measures. The foreseeable solar projects would likely be required to implement mitigation measures to prevent the spread of invasive, nonnative, or noxious plant species or noxious weeds, similar to the measures that would be used by the Proposed Action.

Implementation of Alternatives 1 and 2 would not result in any activity at the site of the Proposed Action, and therefore, these Alternatives would not contribute to cumulative impacts to vegetation.

Alternatives 4 and 5 would have similar types of cumulative impacts as Alternative 3; however, since Alternative 5 would have a smaller footprint, its contribution to cumulative impacts would be less than Alternative 3.

4.6.2.4 Residual Effects

Residual effects would occur as a result of implementing Alternative 3. Effects on native vegetation (Effect BIO-1) in the area surrounding the Proposed Action would be partially mitigated by MM BIO-2. Residual effects could include the loss of 433 acres of native vegetation on the site.

Effects on succulent species located on the site (Effect BIO-2) would be short-term and entirely mitigated by MM BIO-1 and MM BIO-3 to avoid a net loss of succulent plants in the area, although there could be some residual effects since some individual plants would be lost during the transplantation process.

Vegetation that are frequently mowed, shaded, or subject to increased levels of water would eventually die and be replaced by short-lived species like invasive weeds. Effects associated with invasive weeds (Effect BIO-3) would be entirely mitigated by MM BIO-2 during construction and operations and maintenance. Potential effects resulting from dust generation (Effects BIO-1 and BIO-3) would be partially mitigated by the BMPs set forth in the Fugitive Dust Control Permit. Residual effects include the spread of weed species into areas along the Proposed Action boundary where they had not previously been. Minimizing effects on vegetation (MM BIO-1), managing invasive weeds (MM BIO-2), providing biological monitors (MM BIO-3) and BMPs (MM BIO-4), providing education training addressing biological issues (MM BIO-5), would prevent or reduce effects associated with Effects BIO-1 through BIO-3.

The residual effects on vegetation would affect a localized area and occur over both the short- and long-term. Construction and operation of the Proposed Action would substantially change the structure and species composition of the on-site plant communities over the lifetime of the Proposed Action. The loss of up to 433 acres of native vegetation would alter or interfere with plant populations in the Proposed Action area. On-site conditions would favor more disturbance-tolerant and shade tolerant species, and the site would be vulnerable to invasion by nonnative plants. Following the mitigation measures listed above, the loss of vegetation would be reduced.

Residual effects resulting from the implementation of Alternatives 4 and 5 would be similar to those described under Alternative 3. MM BIO-2 would reduce effects from invasive weeds (Effect BIO-3) in the setback proposed under Alternative 3. Similar to Alternative 3, there would be no substantial adverse effects on resources identified in the impact indicators.

4.6.3 Wildlife

The Proposed Action area includes habitats that support a diversity of wildlife species. Common wildlife includes birds, mammals, and reptiles.

4.6.3.1 Indicators

The impact indicators are the same for all biological resource types addressed (vegetation, wildlife, and special status species), as outlined in Section 4.6.1.

4.6.3.2 Direct and Indirect Effects by Alternative

Effects to wildlife that could result from the implementation of the alternatives during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Alternative 1: No Action/No Plan Amendment

The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no project-related construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on wildlife resources. The site would continue to be managed under the current CDCA Plan.

Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to designate the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on wildlife resources.

Alternative 3: Proposed Action

Under this alternative, construction and operations and maintenance activities would cause the following direct effect:

Effect BIO-4: Disturb wildlife or result in wildlife mortality.

Vegetation clearing and grading associated with construction would directly affect wildlife by removal and crushing of shrubs and herbaceous vegetation, resulting in loss and fragmentation of cover, breeding, and foraging habitat. Furthermore, these activities and vehicle use could cause direct mortality to wildlife; slower-moving wildlife, such as small mammals, ground nesting birds, and especially reptiles, have a higher risk of mortality. Reptiles use their environment to thermoregulate. Because they do not shelter from heat and cold and are thus relatively exposed, they may not be able to avoid grading and construction activities.

Noise, vibration, and human activity would likely cause most wildlife species to avoid the Proposed Action area until the disturbance conditions have concluded. The presence of humans, construction equipment, and dust would cause wildlife to alter foraging and breeding behavior and could cause wildlife to avoid suitable habitat. To avoid avian disturbance prior to construction, the Applicant would attempt to clear Proposed Action areas of suitable nesting habitat during non-breeding season (September 1 through January 31). Once the Proposed Action is constructed, transmission poles could also pose a direct collision hazard to birds. Most species are expected to reoccupy adjacent habitats following completion of construction activities and recovery of the vegetation.

No long-term indirect effects on wildlife due to noise, vibration, or dust are anticipated because construction and maintenance activities would be temporary in nature, although wildlife would be indirectly affected because of the presence of the PV farm. Human activities in the Proposed Action area potentially provide food or other attractants in the form of trash, litter, or water, which could draw unnaturally high numbers of opportunistic predators and scavengers such as the common raven, kit fox, and coyote.

Loss and degradation of habitat would cause wildlife to rely more heavily on habitat in surrounding areas. Competition could cause wildlife to forage for longer periods and/or to have lower overall nutrition. Loss of burrows due to construction, ground vibration, or avoidance behavior would also cause wildlife to search for or dig new burrows. Infrastructure built as part of the Proposed Action would alter wildlife movement in the area and just outside the boundary of the Proposed Action (especially for ground-dwelling mammals and reptiles). Fences and transmission poles could also cause increased predation of reptiles, small mammals, and small birds around the Proposed Action site because raptors would use the infrastructure for perches.

Indirect effects on wildlife would occur due to Effects BIO-1 through BIO-3. Effect BIO-1 would indirectly reduce available forage and shelter habitat for wildlife, degrading and fragmenting existing higher quality habitat. Effect BIO-2 would indirectly affect wildlife because many species

depend on succulents as a source of water. Effect BIO-3 would indirectly affect wildlife because weed species, like Sahara mustard, generally have no or lower nutrition value for native wildlife.

With implementation of MM BIO-2, MM BIO-4, MM BIO-5, and the mitigation measures MM BIO-6 and MM BIO-7 below, adverse effects on wildlife in the Proposed Action area would be avoided.

> **MM BIO-6: Preconstruction Nest Surveys.** The majority of vegetation clearing would be conducted from August to February to avoid the breeding season of raptors and migratory birds; however, this period also coincides with the rainy season, which may make clearance activity in the desert difficult. If vegetation must be cleared during the breeding season, clearance surveys for nesting birds would be conducted before each phase of construction. Active nests would be avoided, and a buffer of 500 feet would be established around the active nest site. No construction activities would take place within this buffer until the biologists confirm the nest is no longer active. Also, noise levels at the nest site must be kept at ambient levels or below 60 dB L_{eq} hourly, whichever is greater. If sound levels cannot be maintained through redirecting noise sources (i.e., working in a different area) then noise insulation features would be installed (i.e., hay bails, plywood walls, etc.). Such sound noise insulation features would be installed between the sound source and the nest but be at least 20 meters from the nest itself.
>
> **MM BIO-7: Avian Protection.** Transmission poles would be designed “avian-safe” in accordance with *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee 2006).

Effect BIO-5: Introduction of the Invasive Argentine Ant.

The Applicant estimates that the panels will require washing once per year during the summer when power prices and, correspondingly, power production are highest. Panel washing will require between 10,000 to 20,000 gallons for Phase I and 12,000 to 25,000 gallons for Phase II (totaling between 22,500 to 45,000 gallons per year under Alternative 3).

The introduction of an artificial water source into the project area may provide suitable habitat for the Argentine ant (*Linepithema humile*), an invasive species in California typically associated with water sources. This species often displaces native ant species. In turn, imperil other species in the ecosystem, such as native plants that depend on native ants for seed dispersal, or lizards that depend on native ants for food. Implementation of MM BIO-8 would immediately detect the introduction and ensure the prevention of this invasive species the spreading throughout the project area and offsite.

> **MM BIO-8: Introduction of Argentine Ants.** Monitoring of this species presence would continue throughout the life of the project and coincide with monitoring for invasive plant species. Water for cleaning solar panels would be discharged onsite to avoid creating suitable habitat offsite. If this species establishes itself onsite, the Applicant would consult with the BLM to develop eradication measures such as the use of pesticides or slow-acting poison.

Alternative 4: Modified Site Layout

Alternative 4 would have effects similar to those described for Alternative 3. Alternative 4 would provide a 100-foot vegetated corridor and an artificial supply of water from site drainage along Santa Fe Fire Road. Although Alternative 4 would provide increased habitat for wildlife, water

and foraging opportunities would draw wildlife into an area of greater traffic and risk for mortality.

Alternative 5: Smaller Project

Under this alternative, construction and operations and maintenance activities would cause similar direct and indirect effects as described under Alternative 3. However only 238 acres of the 433-acre ROW would be developed with solar arrays. This alternative would reduce the loss of wildlife habitat. MM BIO-1 through 8 would be applicable to this alternative.

4.6.3.3 Cumulative Effects

The wildlife CESA and cumulative projects are defined in Table 3.18-1 and Section 4.6.1.4. Existing projects have contributed to habitat loss in the CESA. However, desert scrub habitat covers hundreds of square miles in the region (see Figure 3.6-2). Given that most of the foreseeable projects involve development and construction, effects on wildlife would include habitat loss, avoidance behavior, and mortality from grading, construction or vehicle use. Mortality resulting from identified foreseeable projects and the Proposed Action is not expected to substantively affect populations in the area because there are no site-restricted populations. Furthermore, it is unlikely that there would be a cumulative effect from avoidance behavior due to distances between the Proposed Action, existing structures, and foreseeable projects. If any of the proposed large solar projects were to be constructed, varied construction schedules would alleviate the scale of disturbance at any one time. The proposed solar facility would be surrounded by open space in which wildlife could move freely and could avoid construction activities. Reduced overall habitat in a localized area could cause increased wildlife competition. Based on the impact indicators specified, the Proposed Action would not contribute to a cumulatively adverse effect to wildlife.

Implementation of Alternatives 1 and 2 would not result in any activity at the site of the Proposed Action, and therefore, these Alternatives would not contribute to cumulative effects to wildlife.

Alternatives 4 and 5 would have similar cumulative effects as Alternative 3; however, since Alternative 5 would have a smaller footprint, its contribution to cumulative effects would be less than Alternative 3.

4.6.3.4 Residual Effects

No residual effects on wildlife would result from implementation of the Proposed Action. Although 433 acres of native and disturbed wildlife habitat could be lost, the loss would not substantially alter or interfere with wildlife populations in the Proposed Action area. Loss of habitat would not be considered to substantially interfere with wildlife movement. Monitoring for invasive species (MM BIO-2 and MM BIO-8), providing biological monitors (MM BIO-3) and education training addressing biological concerns (MM BIO-5), reducing available nest habitat (MM BIO-6), and implementing avian protective measures (MM BIO-7) would prevent or reduce the entire effects associated with Effect BIO-4. Residual effects resulting from the implementation of Alternatives 4 and 5 would be similar to those described under Alternative 3.

4.6.4 Special Status Species

4.6.4.1 Indicators

The impact indicators are the same for all biological resource types addressed (vegetation, wildlife, and special status species), as outlined in Section 4.6.1.

4.6.4.2 Direct and Indirect Effects by Alternative

Effects to special status species that could result from the implementation of the alternatives during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on special status species. The site would continue to be managed under the current CDCA Plan.

Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to designate the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no project-related effects on special status species.

Alternative 3: Proposed Action

Under Alternative 3, construction, operations, and maintenance activities would cause the following adverse effects:

Effect BIO-6: Loss of special status plants or habitat for special status plant species.

Clearing and grading activities would directly remove special status plants from the area, would cause temporary and permanent soil disturbance that would impede future use by special status plants, and would denude the area of seed banks for those species. The Proposed Action would also remove approximately 12.5 acres of creosote bush-white bursage, white bursage, and/or desert wash communities that are associated with special status plants. Dust generation from construction activities could cause the indirect loss of plants by covering the leaves and thereby impairing photosynthetic activity.

Construction activities, ongoing maintenance, including vegetation clearing, and the frequent use of vehicles on-site during both construction and operations could introduce invasive and noxious weeds to the site. Once these weeds become established, they proliferate very quickly and can out-compete native special status plants. The habitat can become monotypical, thereby reducing quality and diversity for wildlife dependent on native habitat. There are 12 special status plants with potential to occur on the site. None of these plants were found on-site during surveys. And while 10 of these special status plants are not present under current conditions, two (white pygmy poppy and Little San Bernardino Mountains linanthus) may occur in the

Proposed Action area and could be adversely affected by the Proposed Action. Adverse effects on special status plants would be both short- and long-term.

Overall, the adverse effects under Alternative 3 could include direct mortality, loss or injury of special status plants, loss of their habitat, alteration of their community structure, and community fragmentation, while dust during construction could indirectly decrease photosynthesis. These effects would be both short- and long-term in nature and predominantly limited to the site of the Proposed Action, with the exception of edge effects at the perimeter of the site. Implementation of MM BIO-1 through MM BIO-5 would reduce effects on special status plant communities.

Effect BIO-7: Loss of special status wildlife or habitat for special status wildlife species.

Clearing and grading activities, construction, and vehicle use during construction and operation and maintenance are all sources of direct mortality to wildlife species. Collisions with equipment and vehicles can occur for slower-moving species, species that have subsurface burrows, or ground-nesting birds. Some species are very susceptible to visual and noise disturbances caused by the presence of humans, construction equipment, and generated dust. Nesting birds may abandon nests due to these disturbances, and bats are also susceptible. Grading and construction activities could indirectly affect wildlife through habitat loss such as the removal and/or modification of 433 acres of creosote bush-white bursage, white bursage, and desert wash communities. These vegetation communities provide forage, shelter, and nesting opportunities for many special status wildlife. The presence of infrastructure may indirectly cause mortality to wildlife by increasing the risk of predation on certain species by native predators, such as ravens, and introduced predators, such as feral dogs and cats. Effects on special status wildlife would be short- and long-term, and both localized and extensive.

Le Conte's thrasher, northern harrier, and prairie falcon have been observed on the site and may be adversely affected by the Proposed Action. These species use the area for forage and, in the case of the thrasher, potentially for nesting. These birds would be susceptible to visual and noise disturbance as described above, potentially resulting in alteration of foraging behaviors to avoid the site. This would cause avoidance of suitable habitat and energetic costs to locate other suitable habitat in the area around the Proposed Action. While the harrier and falcon can likely forage elsewhere, the thrasher may be at higher risk from the Proposed Action if the species is using the vegetation on-site to nest. The thrasher nests low to the ground in dense shrubs and cacti species and could lose nests directly due to collisions and clearing and grading activities. The thrasher could also abandon its nests due to disturbance. Removal of vegetation from the site would remove forage habitat for the northern harrier and prairie falcon and nesting and forage habitat for the Le Conte's thrasher, resulting in direct, short- and long-term loss of food and shelter for the birds.

Suitable habitat exists on the site for burrowing owl, and this species was observed in the area in the past. If owls are present on the site during construction, they may not be able to move quickly enough to avoid mortality due to collisions with vehicles and equipment or collapse of burrows during clearing and grading. Increased vehicle use on the site during operation and maintenance could also increase collisions and mortality of the burrowing owl on-site.

Visual and noise disturbances could trigger habitat avoidance behavior that could alter successful foraging and nesting for individuals in the area. Permanent loss of forage and nest habitat resulting from construction would also adversely affect the owl by reducing available suitable habitat within its range.

Three special status mammal species were not observed within the Proposed Action area during field surveys. These are the western mastiff bat (*Eumops perotis*), Mohave ground squirrel, and pallid San Diego pocket mouse (*Chaetodipus fallax fallax*). The Proposed Action would remove potential habitat used by these species; therefore, they would be adversely affected. With implementation of MM BIO-2 through MM BIO-7, and consultation with state agencies (MM BIO-9), adverse effects on special status wildlife or their habitat in the Proposed Action area would be avoided.

MM BIO-9: Consultation about Burrowing Owl. The Applicant would coordinate with CDFG about implementation of MM BIO-7 (Preconstruction Nest Surveys).

Effect BIO-8: Loss of desert tortoise or loss of habitat for desert tortoise.

Desert tortoise are present on-site and would be adversely affected by the Proposed Action. Effects would be both short- and long-term. The Proposed Action activities could potentially extend to areas outside the boundary of the Proposed Action. For example, the tortoise could be susceptible to mortality from collisions with vehicles entering and leaving the site.

The tortoise is a slow-moving animal that uses subsurface and hillside burrows in loose, gravelly soils. It is known to burrow in the soft shoulder of dirt and gravel roads. Desert tortoise was observed in the area, and burrows were located on and in proximity to the site. The tortoise could be susceptible to mortality from the inadvertent ingestion of hazardous chemicals leaking from vehicles and equipment.

Clearing of the site could potentially introduce feral dogs that could harass, injure, or kill desert tortoises. Similarly, construction of the exterior fence for the site could increase the presence of natural predators by providing perching locations for predatory ravens, which are a leading source of mortality for the tortoise. Fencing of the site would also adversely affect the tortoise by potentially impeding and altering breeding migrations. Vibrations from heavy equipment could cause burrows to collapse, resulting in either direct mortality to tortoise present in the burrows or indirect loss of habitat. Both of these adverse effects would be localized.

Making new burrows would require heavy energetic expenditure for the animals and could leave them exposed prior to reconstruction of burrows. This situation could lead to stress and eventual death of animals. Stressed tortoises void their bladders frequently, resulting in an increased risk of dehydration. Tortoises under stress are also at increased risk of contracting and transmitting upper respiratory tract diseases.

Construction and mechanical soil disturbance would adversely affect tortoise habitat on-site by encouraging the spread of invasive plant species. Invasive weeds, especially Sahara mustard, have low or no nutrition value for this reptile; thus, proliferating weed species throughout the Proposed Action area could indirectly result in loss of high quality forage habitat. Direct removal of succulent plant species would likewise remove available forage. The Applicant has completed consultation with the USFWS and CDFG. All terms and conditions associated with these consultations would be implemented. Construction of the Proposed Action would require the relocation of desert tortoise occupying the site. While all precautions will be taken, including Authorized Biologists onsite at all times during construction to handle desert tortoises, relocation of tortoise could lead to the injury or death of individuals. To reduce the impact of Effect BIO-8 and ensure continued protection of this species throughout the life of the Proposed Action, MM BIO-10 and MM BIO-11 would also be implemented. Furthermore, the Applicant would supplement the loss of habitat off-site under MM BIO-12.

MM BIO-10: Desert Tortoise Proof Exclusion Fence. A tortoise proof exclusion fence would be installed around all construction areas prior to the initiation of earth disturbing activities. The fence would be constructed under the direction of an Authorized Biologist and would be located to avoid all desert tortoise burrows. To the extent possible, burrows would be placed on the outside of the enclosure. The fence would be constructed of ½-inch mesh hardware cloth. It would extend 18 inches above ground and 12 inches below ground. Where burial of the fence is not possible, the lower 12 inches would be folded outward against the ground and fastened to the ground so as to prevent desert tortoise entry. The fence would be supported sufficiently to maintain its integrity. The fence would be checked at least monthly during construction and operations and maintained when necessary by site operator to ensure its integrity. Provisions would be made for closing off the fence at the point of vehicle entry. Placement and erection of the fencing would be approved and inspected by an authorized biologist. Bird perching deterrents would be installed as part of the fence construction. After fence installation, the authorized biologist would conduct a 100 percent coverage protocol survey for desert tortoises within the construction site. All desert tortoises found would be marked and removed from the enclosure and placed outside the nearest fence. All removal and handling would be in accordance with *Guidelines for Handling Desert Tortoises During Construction Projects* (Desert Tortoise Council 1999). Once the survey has been completed, no further interior surveys would be necessary unless there was a breach in the fencing. If the fence was breached for more than two weeks without repair, the BLM would be notified and additional surveys may be required at the discretion of the BLM. All desert tortoise-proof fencing would be removed after site rehabilitation.

MM BIO-11: Desert Tortoise Protective Measures. Desert tortoise protective measures would be implemented during construction activities and during operations and maintenance activities, as set forth within the Biological Assessment (BA). These protective measures would comprehensively minimize take of desert tortoise. These protective measures would include, but would not be limited to:

- Until the exclusionary fence is complete, Authorized Biologists would conduct preconstruction clearance surveys for desert tortoises within 48 hours of the start of any ground disturbing construction activity;
- Desert tortoises would be handled only by Authorized Biologists (or by desert tortoise monitors under the direct supervision of an authorized biologist);
- Desert tortoises would only be handled when necessary;
- A construction monitoring team of at least one Authorized Biologist and one desert tortoise monitor would be assigned to each fence installation construction area; and
- After the fence installation, the Authorized Biologist would conduct a 100 percent coverage protocol survey for desert tortoises within the site.

Appendix C, *Biological Assessment for the Chevron Solar Project Site Lucerne Valley, California*, has further information about the protective measures. If there is a conflict between the protective measures outlined in this EIS and the BA, the measures in the BA would govern.

If a dead or injured desert tortoise is located, the Applicant would notify the BLM within three business days. The BLM must then notify the appropriate USFWS field office of the incident within three business days. The information provided must include the date and time of the finding or incident (if known), location of the carcass, a photograph, cause of death, if known, and other pertinent information. Desert tortoise remains would be left in place (or

just outside of the construction footprint or fenced area). Injured animals would be transported to a qualified veterinarian by the authorized biologist for treatment at the expense of the Applicant. If an injured animal recovers, the USFWS would be contacted for final disposition of the animal.

MM BIO-12: Desert Tortoise Off-site Mitigation. All loss of desert tortoise habitat shall be off-set consistent with the requirements of the WEMO Plan and wildlife agency permits/consultations. The Applicant would coordinate with the BLM to develop off-site mitigation to compensate for effects to desert tortoises and their habitat by replacing or providing substitute habitat at a different location. This off-site mitigation is supplemental to MM BIO-10 and MM BIO-11. The Applicant would mitigate for the loss of desert tortoise habitat at a ratio of 1:1 (i.e., acquisition of one acre of compensation lands for every acre lost). Off-site mitigation may include In-kind placement, Out-of-kind replacement, or an In-lieu fee.

Effect BIO-9: Effects on bird species protected by the Migratory Bird Treaty Act and California Fish and Game Code.

The Proposed Action could result in direct or indirect effects on birds protected by the Migratory Bird Treaty Act, including northern harrier, prairie falcon, golden eagle, red-tailed hawk, and any other migratory bird species. If vegetation clearing is conducted during the avian breeding season, active nests could be destroyed. Alteration of foraging behaviors due to on-site disturbances may also cause avoidance of suitable habitat. This would have energetic costs and would indirectly contribute to stress and mortality of these birds. The presence of Proposed Action infrastructure may increase collision mortalities. Alteration of the prey base and loss of prey to increased mortality from construction activities may decrease raptor foraging success. Again, reduction in prey could indirectly contribute to stress and mortality of these predatory birds.

Adverse effects to bird species or habitat loss would be localized over the short-term with the implementation of MM BIO-1, MM BIO-2, MM BIO-4, MM BIO-6, and MM BIO-7.

Alternative 4: Modified Site Layout

Alternative 4 would have similar effects on special status species as those described for Alternative 3. The effects during Phases I and II under Alternative 4 would be similar to those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW. Alternative 4 would provide a 100-foot vegetative setback and an artificial supply of water from site drainage along Santa Fe Fire Road. Although Alternative 4 would provide increased habitat for wildlife, water and foraging opportunities would draw wildlife into an area of greater traffic and risk for mortality. This would be particularly relevant for desert tortoise, nesting and foraging birds, and foraging raptors.

MM BIO-1 through MM BIO-12 would be necessary to reduce effects from implementation of Alternative 4.

Alternative 5: Smaller Project

Under this alternative, construction and operations and maintenance activities would cause similar direct and indirect effects as described under Alternative 3. However, only 238 acres of the 516-acre ROW would be developed with solar arrays. This alternative would reduce the

potential effects to special status species compared to Alternative 3. MM BIO-1 through MM BIO-12 would be necessary to reduce effects from implementation of Alternative 5.

4.6.4.3 Cumulative Effects

The CESA and foreseeable projects for biological resources are defined in Table 3.18-1 and Section 4.6.1.4. Effects on special status species from these projects would likely include loss of special status plants and seed banks; soil disturbance; introduction or spread of non-native or noxious plant species; wildlife mortality from grading, construction, or vehicle use; avoidance behavior; and some habitat loss. Potential mortality from the foreseeable projects and the Proposed Action would not be expected to substantively affect special status populations in the area. For desert tortoise, no critical habitat is present within the CESA, and thus, there would be no cumulative loss of that habitat. Desert tortoise would, however, be permanently excluded from the entire 516 acre site as a result of the installation of the perimeter fence (per MM BIO-15). Therefore, the construction of the solar facility would represent a loss of 516 acres of suitable desert tortoise habitat. It is unlikely that there would be a cumulative effect from avoidance behavior due to distances between projects and varied construction schedules. Animals can move within open spaces surrounding and between these projects. Reduced overall habitat in the general area may cause increased competition. These effects would be adverse and long-term and could alter special status species population abundances, but are not expected to cause an actionable cumulative effect, such as potential extirpation or change in status.

Implementation of Alternatives 1 and 2 would not result in any activity at the site of the Proposed Action, and therefore, these Alternatives would not contribute to cumulative effects to special status species.

Alternative 4 would have a similar cumulative effect as Alternative 3. Because Alternative 5 would have a smaller footprint, its contribution to cumulative effects would be less than Alternative 3.

4.6.4.4 Residual Effects

Although the Proposed Action site covers 516 acres, only 2 percent (12.5 acres) would be graded and/or grubbed. This would not substantially effect special status species habitat and would not alter or interfere with special status wildlife and plant populations in the Proposed Action area over the long-term. Furthermore, minimizing effects on vegetation (MM BIO-1); managing invasive species (MM BIO-2 and MM BIO-8); providing biological monitors (MM BIO-3), BMPs (MM BIO-4), educating workers of the onsite biological concerns (MM BIO-5); conducting preconstruction nest surveys (MM BIO-6); implementing avian protective measures (MM BIO-7); consulting agencies (MM BIO-9) implementing on-site protective measures (MM BIO-10 and MM BIO-11), and acquiring off-site habitat (MM BIO-12) would prevent or reduce the entire effects associated with Effects BIO-5 through BIO-8. Residual effects resulting from the implementation of Alternatives 4 and 5 would be similar to those described under Alternative 3.

4.7 Cultural Resources

This section discusses effects on cultural resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.7.1 Indicators

In general, the Proposed Action could affect cultural resources by either directly or indirectly altering the characteristics of a historic property that is eligible for inclusion or listed in the National Register of Historic Places (NRHP) per 36 CFR, Part 800.5. The Proposed Action would adversely affect historic properties if it would:

- Physically destroy or damage 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, Part 68) and applicable guidelines;
- Remove the property from its historic location;
- Change the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- 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 Native Hawaiian organization; or
- Transfer, lease, or sell a property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

4.7.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct; no indirect effects were identified for this resource area.

4.7.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on cultural resources.

4.7.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on cultural resources.

4.7.2.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Construction (Phases I and II)

Phases I and II of the Proposed Action would include preconstruction survey activities consisting of staking/flagging, clearing, and earthwork, followed by grading (on 7.5 acres of the site), construction of access roads, installation and construction of concrete pads and foundations, and installation of solar photovoltaic panels and other elements of the Proposed Action.

No cultural resources eligible for inclusion in the NRHP are known to occur in the Proposed Action area, in the proposed locations for temporary access roads, or within a one-mile radius of the site perimeter (Chambers Group 2009).

Effect CULT-1: Adverse effect on historic resources.

The Proposed Action could violate cultural resource standards, could cause an adverse change in the significance of a historic property or archaeological resource, or could disturb human remains. Construction of the Proposed Action would involve ground disturbance, resulting in potentially adverse effects on previously unidentified surface and subsurface cultural resources, including human remains. Evaluations of sites identified during the BLM Class III inventory (Chambers Group 2009) against NRHP criteria concluded there is no evidence of intact deposits of subsurface cultural material; however, this does not preclude the potential for an unanticipated discovery during construction activities. With the implementation of MM CULT-1, Alternative 3 would result in no adverse effect on cultural resources.

> **MM CULT-1: Addressing Unanticipated Discoveries.** Prior to any construction activity in both Phase I and II, the Applicant would implement actions to address the unanticipated discovery of cultural resources. The actions (herein referred to as “features”) would limit potential adverse effects on cultural resources occurring during construction, operations and maintenance, and decommissioning of Phase I and Phase II of the Proposed Action. Specifically, the features would ensure that the requirements of Section 106 of the NHPA and National Programmatic Agreement and other applicable laws, policies, and regulations governing cultural resources are followed in the event cultural resources are discovered during construction of the Proposed Action. Features would include immediately stopping all construction activities when a cultural resource is discovered and contacting the archaeologist at the BLM Barstow Field Office who would determine the appropriate management actions to be taken. Features would reference BLM Manual 8140, *Protecting Cultural Resources,* which states:

If a proposed action or an existing land use has the potential for affecting the characteristics which contribute to the uses(s) determined appropriate for a cultural property, or the qualities which qualify a property for the National Register, the Field Office manager, with the assistance of qualified professional staff, shall ensure that appropriate conservation measures are carried out. The preferred strategy for treating potentially adverse effects on listed or eligible properties is avoidance. If avoidance is imprudent or infeasible, a range of alternative physical and administrative conservation measures should be considered. Physical conservation measures include data recovery, stabilization, monitoring, protective barriers and signs, relocation, and adaptive reuse. Administrative conservation measures include withdrawing lands from under the general land laws and mining laws, transfer of jurisdiction to other federal agencies, closure to public access and off-highway vehicles, Area of Critical Environmental Concern designation, land and easement acquisition, leasing or transferring lands to State or local governments under the Recreation and Public Purposes Act, and efforts to inform and educate the public. Commonly used physical and administrative conservation measures are discussed in 8140.1 (BLM 2004).

Operations and Maintenance (Phases I and II)

Operation of the Proposed Action would primarily be automated. Maintenance activities associated with the Proposed Action would include panel washing and inverter inspection, vegetation control as necessary, and routine inspection of switchgear. In the event that cultural resources are identified during operations or maintenance activities, implementation of MM CULT-1 would ensure that there are no adverse effects.

Decommissioning

The expected life of the Proposed Action is 30 years. Should the site of the Proposed Action be decommissioned, all equipment, buildings, concrete foundations, and driven piles would be removed. Consistent with BLM requirements, a detailed decommissioning plan would be developed in a manner that both protects public health and safety and is environmentally acceptable. In the event that cultural resources are identified during decommissioning activities, implementation of MM CULT-1 would ensure that there are no adverse effects. In addition to implementation of MM CULT-1, the Applicant would comply with any new regulations pertaining to cultural resources that are in effect at the time of decommissioning.

4.7.2.4 Alternative 4: Modified Site Layout

Alternative 4 would reduce effects on visual resources and water use with a setback from Santa Fe Fire Road. The setback between the project perimeter fence and Santa Fe Fire Road would be increased to 50 feet. The effects during Phases I and II under Alternative 4 would be similar to those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW. Cultural resources that may exist in the setback area would not be affected because the area would not be disturbed.

4.7.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative

would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects to cultural resources resulting from this alternative would be similar to those identified under Alternative 3; however, potential to uncover cultural resources during construction would be slightly less than the Proposed Action because there would be less area disturbed.

4.7.3 Cumulative Effects

For the purposes of this analysis, a cumulative effect would occur if the incremental effect from the Proposed Action or alternatives would contribute to a significant loss of cultural or historic resources. To ensure adequate coverage of all related resources, the CESA for cultural or historic resources is 6 miles. Refer to Table 3.18-1 for a list of projects within that area. No resources eligible for inclusion in the National Register of Historic Places have been identified within the Proposed Action area. Furthermore, given the design features and proposed mitigation measures, effects to unanticipated discoveries would be protected. Therefore, no incremental effects are expected, and thus, no cumulative effects would result from the Proposed Action.

4.7.4 Residual Effects

Residual effects resulting from erosion due to water drainage could possibly affect unidentified surface or subsurface cultural resources. Presence of the solar field would not require significant modifications of the natural drainage patterns at the site. The solar panels would be mounted in a manner that follows the existing topography and, as a result, would not substantially change the natural flow of water across the site. Vegetation would be cleared; however, plant root systems would generally be left in place, except where grading and trenching is required for placement of solar module foundations, underground electric lines, inverter and transformer pads, roads and access ways, and other facilities.

Micrograding would be used to cut access paths between the panel rows. Rough site grading, excavation, and backfilling would be performed using heavy duty earthmoving equipment.

Phase 2 would be constructed in the same manner as Phase I, but Phase II would not require construction of permanent and short-term work areas or another switchyard or operation and maintenance building. Many of the same laydown and construction areas for Phase I would be reused for Phase II.

To minimize or avoid potential effects from erosion, all the Action alternatives would include siltation prevention measures that would be discussed in the Stormwater Pollution Prevention

Plan that would be approved by the BLM and the RWQCB. No residual effects on cultural resources would result from the Action alternatives and implementation of MM CULT-1.

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4.8 Paleontological Resources

This section discusses effects on paleontological resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and an agency recommended mitigation measure are presented; third, a discussion of residual and cumulative effects is provided.

4.8.1 Indicators

NEPA requires that important natural attributes of our national heritage are considered when assessing the environmental consequences of any Proposed Action. NEPA does not refer to paleontological resources specifically; however, NEPA Section 101(b)(4) states that it is the responsibility of the federal government to "preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice." NEPA does not provide impact indicators specifically for paleontological resources.

It is the policy of the BLM, however, that potential effects on scientifically significant paleontological resources be identified and proper mitigation be implemented (BLM 2008). Pursuant to BLM policy, the Proposed Action would adversely affect paleontological resources if it would damage or destroy fossils or cause the loss of valuable scientific information by disturbing the geology in which fossils are found.

4.8.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct.

4.8.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on paleontological resources.

4.8.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on paleontological resources.

4.8.2.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Construction (Phases I and II)

Phases I and II of the Proposed Action would include preconstruction survey activities consisting of staking/flagging, clearing, and earthwork, followed by grading (on 7.5 acres of the site), construction of access roads, installation and construction of concrete pads and foundations, and installation of solar photovoltaic panels and other elements of the Proposed Action.

An adverse effect on a paleontological resource could occur if damage resulted from earth moving or other construction activities.

Effect PALEO-1: Construction activities could destroy or disturb an unknown paleontological resource.

A paleontology literature and records review for the Proposed Action was conducted by the Division of Geological Sciences of the San Bernardino County Museum and included a search of the Regional Paleontologic Locality Inventory (RPLI). The results of the RPLI search indicate that the Proposed Action has a low potential to affect significant nonrenewable fossil resources because the Quaternary alluvium it would be located on has low paleontologic sensitivity. However, Pleistocene older alluvium and other fossil-bearing rock would have high potential to contain significant vertebrate fossils. Such sediments may be encountered during subsurface construction activities, resulting in accidental damages to paleontological resources. With implementation of MM PALEO-1, Alternative 3 of the Proposed Action would not result in an adverse effect to an unknown paleontological resource.

> **MM PALEO-1: Addressing Unanticipated Discoveries.** Prior to any construction activity for Phases I or II, the Applicant would implement actions (herein referred to as “features”) to limit potential adverse effects to paleontological resources in the event of an unanticipated discovery. Specifically, the features would be consistent with the management plans of the BLM Barstow Field Office and all other applicable laws, policies, and regulations governing paleontological resources. The features would include immediately stopping all construction activities when a paleontological resource is discovered and immediately contacting the archaeologist at the BLM Barstow Field Office who would determine the appropriate management actions to be taken. The features would reference BLM Manuals 8270 and 8270-1, *Paleontological Resource Management,* and *General Procedure Guidance for Paleontological Resource Management*, respectively.

Operations and Maintenance (Phases I and II)

No effect on paleontological resources would result during operations and maintenance of the Proposed Action.

Decommissioning

The expected life of the Proposed Action is 30 years. Should the site of the Proposed Action be decommissioned, all equipment, buildings, concrete foundations, and driven piles would be removed. Consistent with BLM requirements, a detailed decommissioning plan would be

developed in a manner that both protects public health and safety and is environmentally acceptable. Implementation of MM PALEO-1 would ensure no adverse effects on unanticipated paleontological resources identified during decommissioning activities. In addition to implementation of MM PALEO-1, the Applicant would comply with any new regulations pertaining to paleontological resources that are in effect at the time of decommissioning.

4.8.2.4 Alternative 4: Modified Site Layout

Short-term and long-term effects during Phases I and II under Alternative 4 would be similar to those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.8.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects to paleontological resources resulting from this alternative would be similar to those identified under Alternative 3; however, potential to uncover paleontological resources during construction would be slightly less than the Proposed Action because there would be less area disturbed.

4.8.3 Cumulative Effects

A cumulative effect on fossils would include a significant loss of fossils or cause the loss of valuable scientific information by disturbing the geology in which fossils are located. For the purposes of this analysis, the CESA for cultural or historic resources is 6 miles. Refer to Table 3.18-1 for a list of projects within that area. Given the proposed mitigation measure to protect fossils should any be discovered during construction, it is not expected that the Proposed Action or alternatives would cause a cumulative effect on fossils.

4.8.4 Residual Effects

No residual effects on paleontological resources would result from implementation of the Action alternatives.

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4.9 Land Use and Realty

This section discusses effects on land use and realty that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed; and third, a discussion of residual and cumulative effects is provided.

4.9.1 Indicators

The Proposed Action would affect land use and realty if it would:

- Restrict land use authorizations of the BLM; or
- Directly conflict with the goals, policies, or objectives of applicable land use plans.

4.9.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.9.2.1 Alternative 1: No Action No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on land use and realty.

4.9.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on land use and realty.

4.9.2.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Alternative 3 includes an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. However, an amendment to the CDCA Plan would not be required to reroute a portion of Zircon Road south of its current location to permit its continued public use. This change would be considered plan maintenance. With the amendment, the Proposed Action would comply with the goals, policies, and objectives of the CDCA Plan.

During the scoping process, several comments suggested that the Proposed Action would affect "pristine" land, "undisturbed" land, or land with special management constraints. As described in Section 3.9, the site has previously been disturbed with historic low-level mineral exploration and contains no special management constraints. The nearest special management area, the Carbonate Endemic Plants ACEC, is located 1.8 miles south of the site,[1] The site also contains several occupied buildings of unknown origin that are likely not permitted and graded dirt access roads, indicating there are residents living on the property illegally. There are no BLM-authorized land uses on the site.

The site is located on land designated MUC M (moderate), which allows energy generating facilities, including solar development; however, the site would extend 1.4 miles into a three-mile-wide CDCA Plan-designated "contingent" utility corridor (Corridor "S"). The Energy Production and Utility Corridor Element of the CDCA Plan currently allows only linear utilities, such as highways, pipelines, transmission lines, communications lines, and natural gas pipelines, to be sited within the corridor. As a result, a plan amendment to allow large-scale solar generation that may block the construction of such projects may appear to conflict with the goals of the CDCA Plan. The Proposed Action, however, has been sited directly west of rugged terrain, which forms a natural barrier to utility development. Because the cost of building any infrastructure over this terrain would be significantly more expensive than circumventing it, potential developers would be more likely to site linear infrastructure to the north of the Proposed Action. Therefore, the Applicant's analysis of the corridor (CES 2009) concluded that sufficient area would remain in the corridor for reasonably foreseeable future utility projects as depicted in Figure 3.9-2. The Proposed Action would, therefore, have no adverse effect on the BLM's ability to site future utilities within the corridor and would not conflict with either the Energy Production and Utility Corridor Element or the MUC M designation of the CDCA Plan.

4.9.2.4 Alternative 4: Modified Site Layout

Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.9.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road

[1] Additional details on Special Management Areas and Visual Resources are presented in Sections 3.10 and 3.12 of this EIS.

south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects to land use during Phases I and II of this alternative would be similar to those identified under Alternative 3; however, fewer acres would be developed and would, therefore, be available for other allowable uses. As explained under Alternative 3, it is unlikely that the site of the Proposed Action would be used for future linear infrastructure development because of rugged terrain to the east of the site. Therefore, the construction, operation, and maintenance of Alternative 5 would not conflict with the goals of the Energy Production and Utility Corridor Element of the CDCA Plan as future linear infrastructure development would be more likely to occur north of the Proposed Action area (see Figure 3.9-2).

4.9.3 Cumulative Effects

As noted above, the Proposed Action could affect the lands and realty program by restricting BLM land use authorizations or directly conflicting with the goals, policies, or objectives of applicable land use plans. Under current management, BLM issues permits, leases, and grants for lands under its jurisdiction throughout the California Desert District. For the purposes of this analysis, the CESA for lands and realty is 6 miles. Refer to Table 3.18-1 for a list of projects within that area.

The elimination of 516 acres from multiple uses for the Proposed Action would reduce the amount of land available for other uses for the project's lifespan. Critical among these uses for the lands program are commercial film permits. Given that several other key areas within the CDCA, including lands within the Twentynine Palms Marine Corps Air Ground Combat Center Land/Airspace Acquisition Study, have been or may be closed to commercial filming and photography, the additional loss of the 516 acres would be a cumulative effect.

No other lands and realty program related issues have been identified.

4.9.4 Residual Effects

No residual effects on land use and realty would result from implementation of the Action alternatives.

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4.10 Special Management Areas (Special Designations)

This section discusses the effects on Special Management Areas (SMAs) that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed; third, residual and cumulative effects are provided.

4.10.1 Indicators

In general, the Proposed Action would not affect SMAs. The site is not located in an SMA, and there are no SMAs within one mile of the site.

4.10.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.10.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on SMAs.

4.10.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on SMAs.

4.10.2.3 Alternative 3: Proposed Action

The Proposed Action would be located approximately eight miles east of the junction of Barstow Road and Old Woman Springs Road on partially disturbed mining land. The nearest SMA to the site is the Carbonate Endemic Plants ACEC 1.8 miles south. At this distance, the SMA is far enough from the site that there would be no effect on it as a result of construction, operation and maintenance, or decommissioning.

State Route 247 is a County-designated Scenic Route. Drivers along State Route 247 would have short-term views of the Proposed Action site during construction, operations and maintenance, and reclamation. Impacts to sensitive viewers is evaluated in more detail in Section 4.12.

4.10.2.4 Alternative 4: Modified Site Layout

Effects under this alternative would be the same as those associated with the Proposed Action (Alternative 3), except for three modifications to reduce environmental effects. First, to reduce

effects on visual resources, the setback between the solar arrays and Santa Fe Fire Road would be increased to 50 feet. Second, the increased setback would be planted with native vegetation to provide a vegetative screen between Santa Fe Fire Road and the solar arrays. Third, the drainage plan for the site would be revised to redirect sheet flow from the site into the setback. Since this alternative would remain within the property line of the site, construction, operation and maintenance, and decommissioning of this alternative would have no effect on SMAs.

4.10.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects under this alternative would be the same as those associated with the Proposed Action (Alternative 3). Because this alternative would remain within the property line of the site of the Proposed Action, construction, operation and maintenance, and decommissioning of this alternative would have no effect on SMAs.

4.10.3 Cumulative Effects

A cumulative effect on SMAs would include conflicts from the Proposed Action when combined with other activities' effects in the CESA for SMAs. State Route 247 is a county-designated scenic route, and Caltrans has determined that the entire length of SR 247 is eligible for designation as a State scenic highway. No other SMAs are located within a mile of the Proposed Action. Other past, present, and reasonably foreseeable future activities (refer to Table 3.18-1) along the route could combine with those of the Proposed Action to cause a cumulative effect. If the intensity of this development should exceed guidelines for scenic highway designation, it is possible that the Proposed Action could cause a cumulative effect and jeopardize the designation status.

4.10.4 Residual Effects

No residual effects on SMAs would result from implementation of the Action alternatives.

4.11 Recreation

This section discusses effects on recreational resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of cumulative and residual effects is provided.

4.11.1 Indicators

The Proposed Action would affect recreational resources if it would:

- Violate a legal standard for protection of recreation areas;
- Reduce the use or exceed the capacity of an existing recreation area; or
- Disrupt or disturb access to a recreation area.

4.11.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.11.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on recreation.

4.11.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the Proposed Action site would not be disturbed, thus there would be no effect on recreation.

4.11.2.3 Alternative 3: Proposed Action

This alternative would result in the approval of the ROW application and CDCA Plan amendment and realignment of Zircon Road. The realignment would be through the Proposed Action site to allow its continued public use; however, it would not be in designated wilderness areas or primitive areas.

Construction (Phases I and II)

During construction, portions of Santa Fe Fire Road may be temporarily inaccessible; however, the road would not be completely closed to vehicle traffic during construction of the Proposed Action. During this time, recreational users attempting to access the San Bernardino National Forest would be able to use Santa Fe Fire Road. The temporary closure of portions of Santa Fe

Fire Road during grading and hardening would result in short-term effects on access but long-term beneficial effects on the quality of the road. Closure of Santa Fe Fire Road would not affect any other designated recreational area.

The proposed realignment of Zircon Road would not be located in a wilderness or recreation area and would not result in damage to soil, watershed(s), vegetation, air, or other resources within the project site. Furthermore, the road realignment would not adversely affect natural aesthetic scenic values and would be compatible with surrounding uses. Implementation of the mitigation measures described in this and other EIS sections would reduce effects on recreational resources.

Zircon Road in its present form would remain open until the realignment is completed. The site would be cleared of desert tortoises, and fencing for desert tortoise (MM BIO-10) would be installed around all construction areas prior to the initiation of earth disturbing activities, including the areas along the northern and southern edges of the realigned roadway. Prior to construction, any cacti/yucca within the project boundary, including the realigned portion of Zircon Road, would be flagged for salvage and removed, as feasible. Dust control measures and erosion control measures identified in the Applicant's Draft Dust Control Plan (Appendix G) and Draft Stormwater Pollution Prevention Plan (Appendix I) would also be implemented throughout the entire site.

Therefore, the realignment of Zircon Road would not cause a loss of access through the project area and would not conflict with OHV use and other existing or proposed recreational uses of neighboring public lands. Through implementation of the desert tortoise fencing, vegetation salvage, dust and erosion control measures, potential impacts to soil, watershed, vegetation, air quality, and disruption of wildlife or wildlife habitats would be minimized.

Construction of the Proposed Action would affect off-site recreational uses through short-term disruption of access from fugitive dust from clearing and grading and long-term alteration of the views as seen from recreation areas; however, visual effects are discussed in greater detail in Section 4.12.

Effect REC-1: Construction activities would temporarily disrupt recreational access to the San Bernardino National Forest.

To minimize effects on recreational users, the following mitigation measure would be implemented:

> **MM TRAN-1: Implement Traffic BMPs During Construction of Phase I and II.** Refer to Section 4.13, "Transportation/Motorized Vehicle Access."

Effects on recreational users would be further reduced during construction activities through implementation of the mitigation measure below:

> **MM REC-1: Signage.** During construction of Phase I and II, the Applicant would post signs at the junction of Old Woman Springs Road and Santa Fe Fire Road one month prior to the closure of Santa Fe Fire Road. These signs would notify the public of the duration of construction and applicable traffic control measures. The Applicant would be responsible for maintaining the signs until Santa Fe Fire Road is reopened for public use.

Effect REC-2: Construction of the Proposed Action would introduce additional visual contrast into the viewshed of the Lucerne Valley as seen from State Route 247 and the San Bernardino National Forest.

Effects of the alteration of these viewsheds and corresponding mitigation can be found in Section 4.12, "Visual Resources."

Operation and Maintenance (Phases I and II)

Operation and maintenance of the Proposed Action would not result in effects on recreational users. While maintenance personnel would likely use Santa Fe Fire Road and Zircon Road (BLM "open" routes), their presence would not prohibit the use of these roads by recreational users. Both roads would remain open.

Decommissioning

Decommissioning of the Proposed Action would result in a short-term increase in vehicle traffic on Santa Fe Fire Road, which is also used for OHV recreation. The disturbance would result in a short-term effect on recreational users of Santa Fe Fire Road.

4.11.2.4 Alternative 4: Modified Site Layout (Phases I and II)

Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. Therefore, Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3.

4.11.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed, reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance. Impacts associated with the relocation of Zircon Road under Alternative 5 from construction, operations and maintenance, and decommissioning would be the same as those identified for Alternative 3.

4.11.3 Cumulative Effects

The CESA includes local and regional scales (refer to Table 3.18-1). Locally, under the Proposed Action the rerouting of Zircon Road would change the existing route to avoid the solar plant. The route change would not affect long-term recreational activities, such as OHV use. Also, the Proposed Action would contribute to adverse cumulative effects by altering the visual

quality of the landscape, although these effects would be within the standards set by the BLM visual resource management system.

On a regional scale, the Proposed Action, together with other BLM and non-BLM activities in the CDCA, would contribute to a change in the overall landscape that may adversely effect recreational uses. The Proposed Action would alter the landscape on 516 acres with the solar infrastructure and the interconnection line. Complete build out would likely require upgrades to the existing local transmission system to off-take the power. These actions would cause a cumulative effect, but it is unlikely that the Proposed Action would add sufficient power to the electric transmission system to require additional high voltage transmission lines or new substations.

Long-term effects on recreational users would result from the alteration of the viewshed of Lucerne Valley as seen from San Bernardino National Forest. Cumulative impacts on visual resources are discussed in Section 4.12.3, “Visual Resources.” With implementation of the mitigation measures described in this and other EIS sections, impacts on recreational resources would be reduced.

4.11.4 Residual Effects

No residual effects on recreational resources would result after implementation of mitigation measures for any of the Action alternatives.

4.12 Visual Resources

This section discusses effects on visual resources that would occur with implementation of the Proposed Action or alternatives, cumulative effects, and mitigation measures to reduce visual effects.

4.12.1 Indicators

There are two levels of analysis associated with the Proposed Action. The first is the disclosure of potential effects associated with the designation of the Interim VRM Classification. This is a general analysis and discussion based on the range of land uses allowed within the CDCA.

The second tier of analysis is with respect to the Proposed Action. Visual resource effects are created when the physical characteristics of facilities associated with proposed actions contrast with natural characteristics of the landscape setting. Contrast is measured a systematic evaluation of the basic design elements of form, line, color, texture and scale, in accordance with the BLM's Handbook H-8431-1 Visual Resource Contrast Rating.

A full description of the Proposed Action (Alternative 3) and the Modified Site Layout (Alternative 4) accompanied by a discussion from key observation points (KOPs) are used to analyze effects. The effects are evaluated for conformance with VRM objectives and design mitigation measures determined to minimize visual effects. If the original Contrast Rating reveals non-conformance of the Proposed Action, then the design needs to be modified to meet the VRM Class objectives and supported by updated simulations and contrast evaluations.

Contrast ratings were not prepared for Alternatives 1 and 2 since these alternatives do not result in any landscape alterations.

4.12.2 Key Observation Points

Photographs taken from KOPs were taken with a 35mm camera and fixed 50mm lens, with a resulting horizontal field of view of approximately 40 degrees. This field of view approximates the actual field of view experienced if viewed as a 10-inch-wide image at a distance of about one foot.

Each alternative and phases of development (construction, operation, and decommissioning) were evaluated for effects and conformance to the Interim VRM Class objective.

KOPs are selected from careful evaluation of the most critical viewpoints which may include travel routes, scenic overlooks, communities or outlying residential neighborhoods, National Parks, National Wildlife Refuges, campgrounds, etc. Other factors considered include angle of view, viewing distance, number of viewers, length of time in view, project scale relative to the landscape setting, season of use, and light conditions.

The Proposed Action area is situated within the foreground of Old Woman Springs Road (KOPs 2 and 3), one residence, and the Santa Fe Fire Road OHV route). These viewpoints with foreground views have moderate visual sensitivity. KOP locations are determined based on user sensitivity and/or use volume (Figure 3.12-5). Several residences near Cougar Buttes (KOP 1) are located in the foreground distance zone of the Proposed Action, and the town of Lucerne Valley is located in the foreground-middleground distance zone. KOP 4 from within the San

Bernardino National Forest along SR 18 has views of the Proposed Action area in the background distance zone. Blackhawk Mountain blocks direct views of the Proposed Action area from SR 18. The KOPs are listed in Table 4.12-1 and are mapped in Figure 3.12-5. Character Photo A is shown in Figure 4.12-1, and views from KOPs 1 through 4 are depicted in Figures 4.12-2, 4.12-3, 4.12-4, and 4.12-5.

Table 4.12-1 Character Photographs and Key Observation Points

Key Observation Points	Aspect
Character photographs	Taken from nearby rolling hill landscape
Key Observation Point KOP 1	Taken from dispersed residences near Cougar Buttes
Key Observation Point KOP 2	Taken from SR 247 eastbound
Key Observation Point KOP 3	Taken from SR 247 westbound
Key Observation Point KOP 4	Taken from SR 18 southbound

The site is presently undeveloped, with the exception of dirt roads. Based on the BLM's scenic quality rating system, a scenic quality class of C (Low) is assigned to the rating unit. The Viewer Sensitivity Level is moderate. The natural features of the site form a loosely intact visual pattern, and the visual integrity in the natural landscape is low. The site is situated at an elevation of approximately 3,200 feet. The site is composed mainly of creosote bush scrub.

The site has views to and from the Blackhawk Mountains and the Cougar Buttes (approximately five miles to the south and three miles to the north, respectively). Overall visibility of the site and its surrounding area are shown in Figure 3.12-3. The greatest potential for public views of the site is from the Old Woman Springs Road (SR 247), as seen from KOPs 2 and 3 (Figures 4.12-3 and Figure 4.12-4), and Santa Fe Fire Road. The area immediately surrounding the site is lightly populated with dispersed rural residential viewpoints, as seen in KOP 1 (Figure 4.12-2).

4.12.3 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.12.3.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied, and the CDCA Plan is not amended. Under this alternative, there would be no construction and the site would not be disturbed; thus, there would be no effect on visual resources.

4.12.3.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, there would be no construction and the site would not be disturbed; thus, there would be no effect on visual resources.

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Figure 4.12-1 **Character Photo A** – View from a slight elevation south of the project site

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Figure 4.12-2 **Key Observation Point 1** – View from a cluster of rural residences north of the project site

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Figure 4.12-3 **Key Observation Point 2** – Eastward view of the project site from Old Woman Springs Road

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Figure 4.12-2 **Key Observation Point 1** – View from a cluster of rural residences north of the project site

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Figure 4.12-3 **Key Observation Point 2** – Eastward view of the project site from Old Woman Springs Road

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4.12.3.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction; operations and maintenance; or decommissioning activities associated with either Phase I or II are analyzed in this section.

Project Appearance

The proposed facilities are described in detail in Chapter 2. Chain-link fencing and desert tortoise fencing would be installed around the site perimeter for security and protection of sensitive biological resources. Project equipment other than the solar collectors would have non-reflective surfaces and neutral colors to minimize their visual effects. Project construction activities typically would occur during normal Monday through Friday working hours.

Project operation would require on-site nighttime lighting for safety and security. To reduce off-site lighting effects, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed on-site so that light or glare would be minimized.

Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting was not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off-site.

The Proposed Action's effects on visual conditions during hours of darkness would be moderate to high. Some nighttime lighting would be required for operational safety and security. There would be a small amount of additional visible lighting associated with the project structures and open site areas. When lights were on, they would not be highly visible off-site and would not produce off-site glare effects. The off-site visibility and potential glare of the lighting would be minimized by specification of non-glare fixtures and placement of lights to direct illumination into only those areas where it would be needed.

To the extent feasible and consistent with worker safety codes, lighting required for nighttime construction activities would be directed toward the center of the construction site and shielded to prevent it from straying off-site. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations. In spite of these measures, there could be times, when and if there were to be nighttime construction, when the site could temporarily appear as a brightly lit area as viewed from nearby locations.

Construction (Phases I and II)

Effect VIS-1: Short-term change to the visual character of the environment.

During the construction period, construction activities and materials, equipment, trucks, and parked vehicles all could be visible on the site and thus temporarily change the existing visual environment. Construction activities would be conducted in a manner that would minimize (visible) dust emissions. Therefore, visual changes associated with construction period activities at the site would be short-term.

Operation and Maintenance (Phases I and II)

Effect VIS-2: Long-term change to the visual character of the environment.

During operation, when viewed from eye level, during most hours of the day, the solar field would be relatively unobtrusive. From elevated locations, the solar facility would have a greater visual effect because a greater portion would be visible. On sunny days, the solar collectors would create a visual impression that more closely would resemble a body of water than a power plant or other industrial facility because the solar collectors would be reflecting the blue sky. On a cloudier day, the visual impression would appear grayer. Viewed from vantages where the backs of the solar panels were visible, the visual effect would be greater as the nonreflective backs of the mirrors would contrast with the surrounding environment.

The solar facility likely would create a fairly substantial visual contrast, particularly for viewsheds directed toward the backs of the solar panels. The interim VRM Class IV objective is to "provide for management activities that allow major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high" (BLM 1986).

As discussed below, overall effects are minor based on KOP-specific considerations. According to the BLM interim VRM Class IV management objectives, the Proposed Action's contribution to visual resources will not be considered significant. The project would be an industrial facility in a lightly populated area, and there would be a noticeable change to the view for residents and visitors. All potentially considered scenic vistas that would have full visibility of the site occur from elevated positions located more than two miles away from where the project contrast would be seen in the foreground-middle ground distance zone, resulting in moderate rather than strong visual contrasts (Figure 3.12-5).

The site is not in a designated area of natural beauty or scenic recreational area. However, the County of San Bernardino has designated SR 247 as a scenic route. As mentioned earlier, the State only extends scenic highway eligibility to this roadway. The character photo (Figure 4.12-1) shows existing, representative views of the site. As described in Section 3.12, the site is generally unremarkable, with no distinguishing geological features or distinctive vegetation. However, visual resources of the surrounding valley and mountain environment are noticeable with overall views that would be degraded to a degree. The presence of the proposed facilities would create a moderate contrasting change in the visual quality of the overall landscape.

The Proposed Action would be visible from an eligible state scenic highway (SR 247) at less than a quarter mile away. KOPs 2 and 3 show views of the site from SR 247 (Old Woman Springs Road). Duration of view is short, and the highway is not officially designated by Caltrans but does carry the San Bernardino scenic route status; therefore, the Proposed Action would not result in an adverse effect from these views.

The Proposed Action would not result in a major adverse effect upon nighttime views in the area from introducing a new source of light or glare. As discussed earlier, project light fixtures would be restricted to areas required for safety, security, and operations. Lighting would be directed on-site; it would be shielded from public view, and non-glare fixtures would be specified. Switches, sensors, and timers would be used to minimize the time that lights that are not needed for safety and security are illuminated. These measures would be expected to substantially reduce the off-site visibility of project lighting. Lighting that might be installed to facilitate possible nighttime construction activities (if needed) would be directed toward the center of the construction site and shielded to prevent light from straying off-site, as consistent with worker safety codes. Task-specific construction lighting would be used to the extent

practical while complying with worker safety regulations. With these measures, lighting associated with construction and operations would not pose a hazard or substantially affect day or nighttime views of the site.

In sunlight, for viewers looking directly at the solar panels, at a distance or an elevated position, the solar field at its most reflective state would mirror the sky and could appear like a lake at hours of the day when the mirrors were oriented toward the viewer (e.g., looking from the south with the sun behind the viewer on a sunny afternoon). It would not produce significant glare. At night, the solar collectors would not be visible from the viewpoints identified.

The Proposed Action would result in increased levels of visual contrast by introducing new permanent above-ground structures into the landscape. However, these changes would not directly conflict with the management objectives associated with the interim VRM Class established for the site. In summary, visual changes associated with operations and maintenance would be long-term.

Decommissioning

During decommissioning, effects would be similar to those for construction with equipment, trucks, and parked vehicles visible on the site and thus temporarily changing the visual environment. However, decommissioning activities would be conducted in a manner that would minimize (visible) dust emissions. Therefore, visual changes associated with decommissioning would be short-term.

4.12.3.4 Alternative 4: Modified Site Layout

Under Alternative 4, the project would be set back 50 feet and a vegetative screen would be installed. As a result of this, recreationists traveling the Santa Fe Fire Road en route to Blackhawk Canyon would see shielded views of the Proposed Action site which would reduce the visual effect of the experienced under Alternative 3. Motorists travelling Old Woman Springs Road (SR 247) westbound (KOP 3) would also see shielded views of the proposed action site which would reduce the visual effect experienced under Alternative 3. All other viewpoints would have the same views as Alternative 3 and the effects on visual resources would be the same during Phases I and II.

4.12.3.5 Alternative 5: Smaller Project

Visual effects during construction of Phase I and II would be similar to effects under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period. Since a smaller amount of area is being developed and the amount of energy being produced is less, the facility itself would be smaller and be less of a contrast to the surrounding area. Visual changes associated with operations and maintenance would be long-term; however, they would be less than that experienced under Alternative 3.

4.12.4 Cumulative Effects

The CESA for visual effects includes all projects that would be located within 15 miles of the Proposed Action. All projects outside of 15 miles would be located within the “seldom seen” distance zone, and would, therefore, not contribute to cumulative effects.

Construction of the Proposed Action would result in both short- and long-term effects on visual resources. Short-term effects on visual resources would be confined to Santa Fe Fire Road and, therefore, would not contribute cumulatively to the effects of other projects in the area.

Long-term effects on visual resources would be additive to the three other solar projects proposed for the region (Figure 3.18-1). While the Proposed Action is much smaller in comparison to the other projects, it could remotely resemble a saturation point to public land users in the region. However, the Proposed Action is located at minimum five miles and in most cases over six miles from the other larger scale solar projects. Furthermore, the Proposed Action's footprint of 516 acres is much smaller compared to the 31,236 acres of solar projects shown on Figure 3.18-1. It is highly unlikely to be able to see all four solar projects at once due to topographic obstructions and the geographic separation.

Each of the other activities shown on Table 3.18-1 are of such scale and type such that they cannot be directly compared to the effect of large-scale solar energy development on public lands in the region.

Long-term effects on visual resources would result from the alteration of the viewshed of Lucerne Valley as seen from elevated viewpoints. While these long-term effects would be consistent with the interim VRM Classes established for the site, and while they would only affect distant views, they would cumulatively contribute to the degradation of visual resources. Therefore, the Proposed Action would cumulatively contribute long-term unavoidable effects on visual resources.

4.12.5 Residual Effects

Adverse residual effects on visual resources associated with construction and decommissioning of the alternatives would be short-term. Adverse residual effects on visual resources associated with operations and maintenance would be long-term.

4.13 Transportation/Motorized Vehicle Access

This section discusses the effects on transportation and motorized vehicle access that may occur with implementation of the Proposed Action or alternatives. First, the criteria used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.13.1 Indicators

The Proposed Action would affect transportation and motorized vehicle access if it would:

- Decrease or disrupt existing primary access on public roads through the area;
- Degrade existing road conditions as a result of construction;
- Impair U.S. Forest Service access to Santa Fe Fire Road; or
- Cause loss of authorized access to private parcels or mining claims.

4.13.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under the NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

Effects may arise from physical changes to roads, such as closures and reroutes, construction activity, introduction of construction, or operations/maintenance-related traffic on local roads or changes in daily or peak-hour traffic volumes created by either direct or indirect workforce changes in the area.

4.13.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed, and there would be no project-related effect on transportation or motorized vehicle access.

4.13.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed, and there would be no project-related effect on transportation or motorized vehicle access.

4.13.2.3 Alternative 3: Proposed Action

This alternative would result in the approval of the ROW application and CDCA Plan amendment. With implementation of the mitigation measures described below, the Proposed

Action would result in short- and long-term effects to traffic volumes, no effect to the level of service (LOS), short-term effects to access, and long-term beneficial effects to road conditions.

Effect TRAN-1: Short-term effects on traffic volume as a result of construction

Construction of both phases of the Proposed Action would require activities and equipment movement near and within public roadway ROWs, resulting in short-term increases in the use of local roadways. Heavy equipment would be transported to the site and would likely remain for the duration of construction.

Construction of both phases of the project would result in short-term increases in traffic volume of a maximum of 90 trips per day (45 morning and 45 evening trips) due to the construction labor force (assuming they all drive separately) and an additional unquantified short-term increase in traffic volume due to delivery of construction equipment and supplies to the site.

This increase in traffic volume would occur primarily on SR 247, Foothill Road, and Santa Fe Fire Road as these are the predominant roads that would be used to access the site. A lesser increase in traffic volume may occur on Interstate 15 (I 15), SR 18, and Bear Valley Road. Zircon Road and Santa Fe Fire Road may experience short-term effects as these roads are improved. Up to a maximum of 90 additional trips per day would not change the LOS of SR 247, nor would it affect the LOS of I 15, SR 18, or Bear Valley Road. During Phase II the labor force would mirror the labor force discussed for Phase I. This may result in short-term effects on traffic volume as a result of construction. but not an effect to the LOS with the implementation of MM TRAN-1.

Effect TRAN-2: Short-term effects on access and road conditions as a result of construction

During Phase I, a 33-kilovolt distribution line segment would be constructed across Foothill Road, resulting in short-term effects on Foothill Road as traffic may be stopped periodically while the line is constructed. Disruptions, however, would be temporary and only occur during construction.

During Phase I, Zircon Road would be rerouted within the Proposed Action area to maximize the efficiency of the arrays. Zircon Road would remain a BLM-designated open route, which would be improved by grading, adding an additional four to six inches of gravel, and compaction, where it crosses the Proposed Action area. The reroute of Zircon Road would not cause loss of authorized access to private parcels or mining claims. The original Zircon Road would not be closed until the realignment as been completed. The realignment of Zircon Road would result in long-term, beneficial effects to the quality of the road.

During Phase I, the Applicant would improve Santa Fe Fire Road by grading, adding an additional four to six inches of gravel, and compacting the road for the length of the Proposed Action area. During grading and hardening, portions of Santa Fe Fire Road may be temporarily inaccessible; however, the road would not be completely closed and, therefore, would not cause loss of authorized access to private parcels or mining claims because detour routes would be made available. The residence located adjacent to the site at the intersection of Foothill Road and South Santa Fe Road would have full access to their home during construction. The temporary closure of portions of Santa Fe Fire Road during grading and hardening would result in short-term effects to access but long-term beneficial effects to the quality of the road.

During both phases, oversized loads could cause short-term transportation disruptions and may require wider turning clearance requirements. In the unlikely event that construction activities would require roadway lane closure, it is expected that short detour routes would be made available to avoid creating substantial delays for motorists or emergency vehicles. State and local laws and regulations would be followed for oversized loads. Santa Fe Fire Road would remain open throughout Phase II; therefore, the Proposed Action would not impair U.S. Forest Service access to this road nor would it prevent access to the nearby resident.

Effects on access and road conditions would be reduced by implementing mitigation measures TRAN-1 and TRAN-2.

MM TRAN-1: Implement Traffic BMPs During Construction. The Applicant would implement traffic BMPs to minimize construction-related traffic impacts to access. Specifically, the BMPs would ensure an adequate flow of traffic in both directions by providing sufficient signage to alert drivers of construction zones, notifying emergency responders prior to construction, conducting community outreach, and controlling traffic around schools. The measures would include the following:

- To the extent feasible, truck traffic would be scheduled for off-peak hours to reduce effects during periods of peak traffic;
- Truck traffic would be phased throughout construction;
- Truck traffic would use designated truck routes when arriving to and departing from the proposed work sites;
- If lane closures are required, the Applicant would comply with BMPs established by the Work Area Protection and Traffic Control Manual (California Joint Utility Traffic Control Committee 1996);
- During the rerouting of Zircon Road, the current route would remain open until the new segment is complete;
- During the improvement of South Santa Fe Fire Road, only one side of the road would be closed at a time. The resident directly adjacent the site would not be hindered from accessing their home;
- Traffic control measures, such as flag men, that would be implemented to ensure the safe operation of construction equipment accessing the site and recreational users on Zircon and Santa Fe Fire Road;
- The Applicant would encourage employees to carpool to reduce the number of trips to and from the work site; and
- Signs and public notices about work would be distributed before disruptions occur, identifying detours to maintain access, the use of flagmen or escort vehicles to control and direct traffic flow, and scheduling roadway work during periods of minimum traffic flow.

MM TRAN-2: Repair Damaged Streets. Unanticipated damage to local streets would be repaired. Streets would be restored to their pre-project condition.

Operation and Maintenance (Phases I and II)

Operation and maintenance of both phases of the Proposed Action may result in a long-term increase in traffic volume of up to six trips per day (for a staff of three, including morning and evening trips). There would be additional irregular increases in traffic volume due to scheduled and unscheduled maintenance. The additional traffic volume generated during operations and maintenance would be a long-term increase in traffic volumes and would not decrease or disrupt existing primary access on public roads through the area nor would it affect the LOS.

Decommissioning

Typical activities during decommissioning would include facility removal, breaking up of concrete pads and foundations, removal of access roads that are not maintained for other uses, and revegetation of the site. Short-term increases in the use of local roadways would occur during the decommissioning period from the transport of heavy equipment and labor force. Heavy equipment would remain at the site until reclamation is completed, and the labor force would be expected to add no more than 24 trips a day to local roads (assuming 12 people each driving to and from the site). Overweight and oversized loads could cause short-term disruptions to local traffic.

4.13.2.4 Alternative 4: Modified Site Layout (Phases I and II)

Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW.

4.13.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effect TRAN-1: Short-term effects on traffic volume as a result of construction

Implementation of Alternative 5 would result in similar effects to traffic volume as Alternative 3. The number of trips from workers and construction equipment as well as the delivery of supplies at the peak of construction would be the same as under Alternative 3; however, the effect would be for a shorter period since the construction phases under this alternative are shorter than the construction phases under Alternative 3. Implementation of MM TRAN-1 would ensure there would be no effect to the LOS.

Effect TRAN-2: Short-term effects on access and road conditions as a result of construction

Implementation of Alternative 5 would result in similar effects as Alternative 3. The effects to Foothill Road, Santa Fe Fire Road, and Zircon Road would be the same. There would be short-term traffic disruptions due to oversize loads. However, since this alternative is smaller than Alternative 3, this disruption would be for a shorter period of time. Effects on access and road conditions would be reduced by implementing MM TRAN-1 and MM TRAN-2.

4.13.3 Cumulative Effects

No long-term direct effects were identified for transportation systems or motorized vehicle access. The Proposed Action would reroute Zircon Road and replace the access with another equal access as a designated route of travel. Given that the Proposed Action would not cause direct or indirect effects, no cumulative effects on transportation or motorized vehicle access would result from the Proposed Action.

4.13.4 Residual Effects

Under all action alternatives, there would be short-term and long-term increases in traffic volume that could not be eliminated completely through mitigation. These increases would be very small and would not affect the LOS of any road in the area.

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4.14 Human Health and Safety/Hazardous Materials

This section discusses the effects on human health and safety that may occur with implementation of the Proposed Action or alternatives. First, the criteria used to identify and analyze effects are presented; second, potential effects are discussed, and agency recommended mitigation measures are presented; third, a discussion of residual and cumulative effects is provided.

4.14.1 Indicators

The Proposed Action could affect human health and safety by exposing the public and the environment to hazardous materials. Effects on human health and safety would occur if the Proposed Action would:

- Use, store, transport, or dispose of petroleum products or hazardous materials in a manner that results in a release to the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material or that creates a substantial risk to human health;
- Expose human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance or unearthing of contaminated soils or groundwater of hazardous waste into soils.
- Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA) in CFR 29, Part 1910, and the California Occupational Safety and Health Agency (Cal/OSHA) in CCR Title 8, or expose members of the public to direct or indirect contact with hazardous materials from Proposed Action construction or operations; or
- Expose people or structures to a risk of loss, injury, or death involving electrocution or cause excessive exposure to wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

4.14.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.14.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed, and there would be no project-relataed effect on human health or the environment.

4.14.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar

development. Under this alternative, the Proposed Action would not be constructed, and there would be no project related effect on human health or the environment.

4.14.2.3 Alternative 3: Proposed Action

The Proposed Action (Alternative 3) would have no indirect effects. The following discussion identifies potential direct effects from construction, operation and maintenance, and decommissioning of the Proposed Action.

Effect HAZ-1: Use, store, transport, or dispose of petroleum products or hazardous materials in a manner that results in a release to the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material or that creates a substantial risk to human health.

Construction Phase 1 and 2

During construction of the Proposed Action, hazardous materials, such as vehicle fuels, oils, and other vehicle maintenance fluids, would be used and stored in construction vehicles. There would be no fuel stored on-site. Small quantities of herbicides would also be used for weed control. Minor spills and leaks of hazardous materials from vehicles or equipment could occur, which could result in exposure of the public or wildlife to contaminants. Because the quantities of materials to be used on-site would be relatively small, any spill would have localized effects. Since there are no on-site permanent surface water bodies, any potential contamination would be limited to soil contamination.

In order to reduce the potential for spills and leaks of hazardous materials and reduce the severity of the effect in the event of an inadvertent spill, the Applicant would implement their Spill Prevention and Response Plan, which outlines the procedures to avoid spills and what the Applicant would perform if a spill occurred. The Applicant would also be required to implement a SWPPP. Among other measures, the SWPPP would discuss where hazardous materials would be stored during construction and the protective measures, notifications, and cleanup requirements for accidental spills or other releases of hazardous materials.

With implementation of the Applicant's Spill Prevention and Response Plan and the SWPPP and compliance with all applicable federal, state, and local regulations addressing hazardous materials and wastes, the Applicant would use, store, transport, and dispose of petroleum and/or hazardous material in manner designed to prevent a potential release to the aquatic or terrestrial environment. If a release were to occur, proper implementation of the Spill Prevention and Response Plan and the SWPPP would limit the area that could be contaminated and ensure that any release is cleaned up in a manner that complies with federal, state, and local regulations.

Operations and Maintenance (Phases I and II)

The operation and maintenance of the Proposed Action would involve the periodic and routine transport, use, and disposal of minor amounts of hazardous materials, primarily fuel and lubricating oils. Minor spills or releases of these hazardous materials could occur due to improper handling, storage, or maintenance, leading to potential soil or groundwater contamination. The Applicant anticipates also using small quantities of herbicides on-site for weed control. Material safety data sheets would need to available on-site for all hazardous chemicals used on the site. A Spill Prevention and Response Plan would be implemented for those hazardous materials stored on-site during operations.

During operation, leaks or spills could occur if the transformers at the substations were damaged from a seismic event, fire, or other unforeseen incident. However, leaks would likely be contained within the walls of the substation and the transformers would have biodegradable oil.

Underground storage tanks would not be used in the operation of the facility. Any stored liquids would be properly stored in aboveground storage areas and would be contained in structures on-site.

If more than minor amounts of hazardous materials would be used on the Proposed Action site, the operator would be required to file written hazardous material handling plans with the San Bernardino County Fire Department, including a hazardous materials business plan, 30 days prior to the start of Proposed Action operations, and the California Accidental Release Prevention Risk Management Plan, which must be submitted 90 days prior to the start of operations (CES 2009).

With the implementation of a Spill Prevention and Response Plan and adherence to and compliance with federal, state, and local regulations addressing hazardous and nonhazardous waste, effects associated with release of hazardous materials on the aquatic or terrestrial environment in an amount equal to or greater than the reportable quantity for that material would not create a risk that would be harmful to human health or the environment.

Decommissioning

The effects for decommissioning of the Proposed Action are identical to those described in the above section, with the exception of the potential disposition of the PV system materials. Hazardous materials are used in the manufacture of PV system materials and in the equipment used during their assembly. The circuitry and inverters of solar panels may contain hazardous materials at levels below those regulated by the State of California or the EPA, and emerging thin-film and nanotechnology-based cells pose unknown health and environmental dangers. To address concerns that disposal of materials may result in an increased risk to human health or the environment, the Applicant would develop a recycling option that does not contribute to the overall waste load on local landfills (MM HAZ-1).

> **MM HAZ-1: Solar PV Cell Recycling Commitment.** The Applicant would commit to return solar panel products to the original manufacturers, or send them to a certified recycling facility, after the solar PV cells are decommissioned. Solar panel material would be recycled, in compliance with local standards and California Hazardous Waste Control Law.

With the implementation of MM HAZ-1, the Proposed Action would not contaminate soil or groundwater or expose to humans or wildlife at levels that would be expected to be harmful.

Effect HAZ-2: Expose human or ecological receptors to potentially hazardous levels of chemicals or explosives due to the disturbance or unearthing of contaminated soils or groundwater of hazardous waste into soils.

The site is undeveloped and vacant and has never been officially used for any commercial, agricultural, or industrial purposes. A review of federal and state databases confirmed that the site is not located on or near a hazardous materials site (DTSC 2009). In addition, based on the fact that the site has never been used, agricultural pesticides and herbicides have not likely been used on the site. However, soils and groundwater on the site have not been sampled and

characterized. Groundwater is expected to occur at an average of 350 feet below ground surface.

It is unlikely that a hazard to the public or environment would occur as a result of soil disturbance at the site during construction of the Proposed Action. Disturbance of groundwater is also not expected to occur during site construction because foundations would not be drilled to these depths. However, the site has not been fenced or secured, and there is a potential chance that illegal dumping has occurred on the site, and transients have been known to use the area. For example, two mobile homes were located on the site for an unknown period of time. They have since been removed. Therefore, there could be other areas of the site with small amounts of contaminated soil to which the public, workers, or wildlife could be exposed. To reduce potential exposures to contaminated soils, the Applicant shall implement the following procedures:

> **MM HAZ-2: Characterize discolored or odorous soil to be excavated.** To ensure that workers, the public, and wildlife are not exposed to potential contaminants, it is recommended that if soil is unearthed that is discolored or has an odor that work be stopped in that area. The soil should then be sampled and characterized prior to further site excavation activities in the area with discolored or odorous soils. If the soil is found to be contaminated based on federal or state regulations, then the Applicant should implement the appropriate and relevant procedures to properly characterize, contain, and dispose of the contaminated material.

With implementation of MM HAZ-2, the Proposed Action would not expose people or wildlife to contaminants in the soil at levels that would be expected to be harmful.

HAZ-3 Expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal Occupational Safety and Health Administration (OSHA) in CFR 29, Part 1910, and the California Occupational Safety and Health Agency (Cal/OSHA) in California Code of Regulations (CCR) Title 8, or expose members of the public to direct or indirect contact with hazardous materials from Proposed Action construction or operations.

With implementation of the Applicant's Site Safety Plan, Spill Prevention and Response Plan, the SWPPP, and MM HAZ–1 and MM HAZ-2, the Proposed Action would not expose workers to contaminated or hazardous materials at levels in excess of those permitted by the Federal OSHA in 29 CFR, Part 1910, and Cal/OSHA in CCR Title 8, or expose members of the public to direct or indirect contact with hazardous materials from construction, operations, and decommisioning.

Effect HAZ-4: Expose people or structures to a risk of loss, injury, or death involving electrocution or cause excessive exposure to wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The Proposed Action may expose people or structures to a risk of loss, injury, or death involving electrocution or exposure to wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Construction and operation of the Proposed Action would expose workers to potential electrocution hazards. However, the Applicant has committed to designing all medium- and high-voltage electric systems and components to National Electrical Code and National Electrical Manufacturers Association standards. Low-voltage direct current systems would be designed to best PV industry design practices. All construction work would be conducted in strict compliance with the Applicant's

construction site safety plan and associated electrical and trenching safety plans. The Applicant conducts routine safety meetings and inspections to ensure compliance and to protect people and the environment.

Currently, fire hazards on the property are managed by the BLM. Fire hazards in the vicinity of the Proposed Action are designated as moderate by the California Department of Forestry and Fire Protection (CALFIRE). The solar facility may increase the potential for additional incidents related to fire and fire safety. Though none of the materials used for permanent portions of the Proposed Action are considered flammable (e.g., solar panels and anchors), electrical arcing and sparking from exposed wiring between panels or substations could result in a fire hazard. The Applicant would reduce the risk of this effect by maximizing the quantity of connection wiring that would be undergrounded. Fire alarms and portable fire extinguishers would also be provided to meet fire protection requirements (CES 2009). In addition, the isolation of the Proposed Action area in terms of vicinity to urban settlement would pose a minimal risk to life and property.

To decrease the hazard of fire, the Applicant would comply with the revised 2007 California building and fire codes and the San Bernardino County building and fire codes. The Applicant would be required to construct the Proposed Action in accordance with these state and local standards and submit designs and plans to San Bernardino County for review and consultation with regards to fire risk and hazards, among other considerations. The Applicant also would have to implement fire safety measures, in accordance with OSHA Safety and Health Regulations for Construction. Construction employees and those working with electrical equipment would follow electrical safety-related work practices requirements in Subpart S of 29 CFR, Part 1910, Sections 1910.331-1910.335, of OSHA, to include protective measures and equipment for employees whose occupations require them to work directly with electricity, including rubber insulating gloves, hoods, sleeves, matting, blankets, line hoses, and industrial protective helmets. The Applicant would also consult the CALFIRE Solar Photovoltaic Installation Guideline for additional consideration of state guidance for solar PV systems to include markings, access, pathways, smoke ventilation, location of DC conductors, and ground mounting.

In addition, implementation of fire prevention training and measures, as recommended for MM HAZ-3, would ensure that measures would be taken to address potential fire hazards.

MM HAZ-3: Fire Prevention Training and Measures. The Applicant would implement the following measures to address potential fire hazards in the Proposed Action area:

- *Fire Prevention Training.* The Applicant would coordinate with the California Office of the State Fire Marshall to provide PV training to county fire responders, construction, operational, maintenance staff. The intent of this training would be to familiarize both responders and workers of the codes, regulations, associated hazards, and mitigation processes related to solar electricity. This training would include techniques for proper system shutdown and fire suppression procedures for PV systems.
- *Fire Prevention Measures.* The Applicant would employ the following measures during construction and operation of the Proposed Action:
    - Work crews would be required to park vehicles away from flammable vegetation, such as dry grass and brush. At the end of each workday, heavy equipment should be parked over mineral soil, asphalt, or concrete, where available, to reduce the chance of fire,

- Fire suppression equipment, such as fire extinguishers, would be made available on the site at all times. All heavy equipment would be required to include mechanisms for fire suppression, including spark arresters or turbo-charging (which eliminates sparks in exhaust) and fire extinguishers, and
- Smoking would be prohibited except in designated areas.

With the implementation of MM HAZ-3 and the other measures previously described, the risks of effects related to the exposure of people to electrocution or people and structures to wildland fires would be further reduced.

Effect HAZ- 5: Intentional Destructive Acts

As mentioned in Section 3.13, the facilities proposed under Alternative 3 present an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack, since this is a small scale, localized energy development project that serves a small area, and is of low value at the national, political or energy development level (BLM 2010). No mitigation has been identified.

4.14.2.4 Alternative 4: Modified Site Layout

The effects during Phases I and II under Alternative 4 would be similar to those identified under Alternative 3. Alternative 3 and 4 have identical construction durations; However, Alternative 4 would grade five fewer acres than Alternative 3 and would develop nine fewer acres. In addition, the proposed energy generation for both alternatives would be the same at 45 MW. The mitigation measures would be the same as for Alternative 3.

Regarding intentional destructive acts, the facilities proposed under Alternative 4 present an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack, since this is a small scale, localized energy development project that serves a small area, and is of low value at the national, political or energy development level (BLM 2010). No mitigation has been identified.

4.14.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance. Because the footprint is smaller and the construction period shorter for this alternative, the likelihood of potential small spills would be reduced proportionately; however, the types of effects and related mitigation measures would be the same for this alternative as those for Alternative 3.

Regarding intentional destructive acts, the facilities proposed under Alternative 5 present an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack,

since this is a small scale, localized energy development project that serves a small area, and is of low value at the national, political or energy development level (BLM 2010). No mitigation has been identified.

4.14.3 Cumulative Effects

The CESA for hazardous materials and public health and safety is the area surrounding the site of the Proposed Action. All of the hazards identified in this section would be confined to the site or the immediate area due to the proposed mitigation measures and BMPs incorporated into the design of the Proposed Action and alternatives. Given the land activities surrounding the site, only local residences would have the potential to contribute hazardous materials to a spill or other accident involving hazardous substances from the Proposed Action. Assuming that these residences would only have household chemicals, it is reasonable to conclude that there would not be a cumulative effect from hazardous materials as a result of Alternatives 3, 4, and 5.

Implementation of Alternatives 1 and 2 would not result in any activity at the site, and therefore, these Alternatives would not contribute to cumulative effects that would be generated by hazardous materials and hazardous waste or the increased risk of electrocution or fire.

4.14.4 Residual Effects

With implementation of the mitigation measures, no residual effects on human health and safety or the environment would result from the Proposed Action, Alternative 4 or Alternative 5 due to exposure to hazardous materials.

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4.15 Social and Economic Conditions

This section discusses effects on the social well-being and economic conditions that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented, and second, potential effects are discussed. This discussion format is repeated for both Social (Section 4.15.2) and Economic (Section 4.15.3) Conditions. Finally, a discussion of residual and cumulative effects is provided.

4.15.1 Indicators

NEPA provides no specific thresholds of significance for socioeconomic impact assessment. Significance varies based on the setting of the proposed action (40 CFR 1508.27[a]), but 40 CFR 1508.8, states that indirect effects may include those that are growth inducing and others related to induced changes in the pattern of land use, population density, or growth rates. In addition, the regulations state that "…Effects include…cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect would be beneficial" (40 CFR 1508.8).

For the purposes of this analysis, the Proposed Action would affect social and economic conditions if it would:

- Result in a permanent or temporary population increase larger than local services, infrastructure, or population can accommodate or
- Result in a tax burden to local residents not offset by the Proposed Action's generation of new public revenues.

4.15.2 Social

This section discusses potential effects to the social well-being of groups representing the concerns of area stakeholders. Affects to the social welfare of these groups may potentially occur during implementation of the Proposed Action alternatives. Potential social effects described in terms of effects to social well-being relate to how a particular social group, individual or stakeholder interprets how the Proposed Action may affect their environment and how such an effect relates to the integrity, quality use, and enjoyment of socioeconomic resources. Stakeholder comments received and evaluated during the scoping process were reviewed to determine the values and quality of life concerns that would influence the social well-being of the groups. Resources are broadly defined and can include for example, historically used open spaces and quality habitat supporting recreation and wildlife appreciation and other resources necessary to maintain the historic quality of life that influences the social well-being of these stakeholders. Social well-being can potentially be affected by each Phase of the Proposed Action (e.g., construction, operations and maintenance, or decommissioning). Social well-being can also be influenced by the level of participation and perceived degree of control that stakeholders have over their environment, its resources, and the government institutions that have stewardship obligations to manage these resources in a sustainable manner.

4.15.2.1 Direct and Indirect Effects by Alternatives

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

Alternative 1: No Action (No Project/No Plan Amendment)

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended.

The social opportunity cost of the land relates to the uses, functions, and services that the Proposed Action's encumbered land would provide to the community and inhabitants in the absence of building and operating the solar plant. The former uses of this land are not necessarily the same as future uses without the Proposed Action. The BLM has indicated that under the No Action Alternative, the land that would have been occupied by the solar plant footprint would be allowed to remain undeveloped in the future, and this land would continue to provide the following historic services and functions (BLM 2009):

- Serve as a rural undeveloped area for visual resources;
- Provide habitat for species, including threatened and endangered species, such as the desert tortoise; and
- Provide a site with historic cultural resources related to mining and other human activities.

Under the No Action Alternative, the Proposed Action would not be constructed, and there would be no effect on social and economic conditions.

Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed, and there would be no effect on social and economic conditions.

Alternative 3: Proposed Action

The following section discusses direct and indirect effects that may result from implementation of the Proposed Action. Potential effects from the Proposed Action during construction, operation and maintenance, and decommissioning are discussed with respect to population and housing, economic base, public services and utilities, tax revenues to local jurisdictions, property value effects, and consistency with applicable land use plans.

<u>Demographics and Social Trends</u>

Population and Housing

Construction (Phases I and II)

Construction would be expected to have a short-term, beneficial effect on the Lucerne Valley's population level. The effect would not cause a temporary population increase that would

necessitate additional local public services or infrastructure capacities that could not be provided from existing resources.

Construction during both phases would require only a peak labor workforce of 45 workers. Some workers would be local (i.e., permanent residents of San Bernardino County), but it is expected that some would be migrating to the work site from outside of the area. Given the short length of each construction phase, it is unlikely that the transient workforce component would migrate to the area with families and dependents. Therefore, there would be no noticeable short-term population effect and no effect on any public service capacities or level of service standards.

Construction is expected to have a beneficial effect on the Lucerne Valley's housing resources. The workers who migrate to the area would likely stay in hotels or motels and would use RV facilities and campsites. Since there are only a few workers who are anticipated to migrate to the area, the temporary housing stock within both Lucerne Valley and the surrounding Victor Valley area is sufficient to accommodate these workers. Hotels and motels within the immediate vicinity and within commuting distance to the site of the Proposed Action would receive the benefit of increased occupancy and related spending from temporary workers; therefore, there would be a short-term beneficial effect.

Operations and Maintenance (Phases I and II)

The operational phase of the Proposed Action would be anticipated to have a long-term beneficial effect on the area's population levels and housing stock. Assuming Phase I and II are both built, the Proposed Action would be expected to permanently employ three full-time workers. For the cleaning of panels, quarterly or semiannual teams of temporary maintenance workers would be deployed sporadically. It is assumed that these workers would be hired from within the area.

Affected Groups and Attitudes

Lucerne Valley Economic Development Association (LVEDA): Under Alternatives 1 and 2, the LVEDA would not achieve the compatible infrastructure development goals that form part of this group's mission. There would be no physical effect on the group although its infrastructure goals and group mission (i.e., influencing its sense of purpose and social well-being) would have to be satisfied through an alternative project. Under Alternative 3 the social well-being of LVEDA (and its representatives) would be enhanced because compatible sustainable infrastructure development would be implemented within the Lucerne Valley. Alternative 4 would have the same effect to the Proposed Action site since only a few acres less would be developed. Alternative 5 would have the same effect as Alternative 3 since the alternatives are close enough in size where short term and long term effects would not change.

Environmental Groups / Nongovernment organizations (NGOs): Under Alternatives 1 and 2, because the land (comprising the footprint of the Proposed Action) would continue to provide its historic services and functions in an unabridged form (BLM 2009), environmental groups would most likely experience a positive sense of well-being from these alternatives as the land would retain its rural desert qualities, and there would be no effect on visual resources nor encroachments or alterations to any habitats. The land would continue to provide habitat for species, including threatened and endangered species, such as the desert tortoise; and also continue to provide a site with historic cultural resources related to mining and other human activities. Under Alternative 3, the project footprint would change the historic relationship that these users have with the land, but would not necessarily alter it in a detrimental manner. There

is a possibility that some positive aspects of social well-being associated with the use and enjoyment of select acreage of wildlife habitat that is taken over by the project footprint could be affected both on a short- and long-term basis. However, mitigation measures can reduce some of these potential negative social well-being effects (See Recreation Section). Alternatives 4 and 5 would have a similar effect as Alternative 3, although Alternative 5 would have a smaller footprint and, therefore, less of an adverse effect.

Recreational Users: Under Alternatives 1 and 2, recreational users would continue to have unfettered use of the public property where historic activities such as OHV use, horseback riding, hiking, and flora and fauna viewing and appreciation take place. The resources attracting these users would be maintained in a historic unaltered form. There would be no negative effects to the social well-being of these users under Alternatives 1 and 2. Under Alternative 3, the project footprint would change the historic relationship that these users have with the land, but would not necessarily alter it in a detrimental manner. There is a possibility that some positive aspects of social well-being associated with the use and enjoyment of select acreage of wildlife habitat that is taken over by the project footprint could be affected both on a short- and long-term basis. However, mitigation measures can reduce some of these potential negative social well-being effects (See Recreation Section). Alternatives 4 and 5 would have a similar effect as Alternative 3, although Alternative 5 would have a smaller footprint and, therefore, less of an adverse effect.

Local Private Land Owners / Residents / Large Lot Owners: The social attitudes within this group are diverse, and the likely social welfare effects that are generated by each alternative would be varied as well. Under Alternatives 1 and 2, the social well-being of residents who embrace solar energy infrastructure development within the Lucerne Valley would be affected in various ways. Some residents who support full-fledged development of renewable energy potential on public lands would feel discouraged and disappointed under Alternatives 1 and 2. Other residents who oppose Alternative 3 would feel vindicated, and their social well-being would be enhanced as the Proposed Action would not be carried out under Alternatives 1 and 2. Some residents who oppose Alternative 3 would experience a positive sense of satisfaction or enhanced social well-being under Alternatives 1 and 2. It is highly likely that social attitudes run the gamut from being pro-renewable energy development, to being against a change to the desert environment, to being indifferent to the proposed development. Some local land owners are also concerned about permanent changes to the natural high desert environment, wildlife, and potential effects to property values. Under Alternatives 1 and 2 these latter concerns would not have to be realized by residents who harbor may these views. Alternatives 4 and 5 would have the same effect as Alternative 3.

Project Workers and Suppliers to the Renewable Energy Industry: Under Alternatives 1 and 2, project workers and suppliers to the industry would not have the opportunity to contribute to the construction and operation of the solar plant, and their sense of social well-being would be affected by the uncertainty surrounding the loss of potential economic opportunities. However, under Alternative 3, the group would experience a positive sense of social well-being as their resources, skills, and goods and services could potentially be mobilized to build, operate, and sustain the solar plant. Alternative 4 would have the same effect and Alternative 3 since the same number of workers and suppliers would be required to construct the project. Alternative 5 would have a similar effect as Alternative 3, although the footprint would be smaller and require fewer materials.

Utility Off-taker and End-use Energy Consumers: Under Alternatives 1 and 2 the utility (or wholesale purchaser and / or distributor) would not have the energy supply that would have

been generated by the solar assets in the Lucerne Valley. Alternative renewable energy generation projects would have to be developed elsewhere in order to provide a positive sense of well-being to this stakeholder associated with processing and delivering the electricity output to final users. Under Alternative 3, the utility/wholesale processor would experience a positive sense of social well-being and satisfaction by knowing that they are contributing to California's renewable energy generation portfolio targets for electricity generation and earning profits. Under Alternatives 1 and 2, final end-use customers would not realize the benefits of the renewable energy solar farm's output, and would not have the sense of social well-being that may come from knowing that a portion of their total regional demand is being met by emission-free generated power. Substitute and alternative power supplies would have to be sourced to meet the portion of the electricity power demand that the solar farm would have supplied to the power grid in California. Under Alternative 3 the final end use customers would enjoy the social benefit of having a portion of their final demand met from renewable solar resources. The social benefit relates to a sense of satisfaction that a portion of their final demand is derived from emission-free solar power generation assets. Alternatives 4 and 5 would have a similar effect as Alternative 3; however, Alternative 5 would generate less renewable power.

Civil Rights

No civil rights effects associated with age, race, creed, color, national origin or sex have been identified.

4.15.3 Economics

This section describes potential effects to the economy during the construction and operational phases of the Proposed Action.

Economic Base: Income, Earnings, and Employment

Construction (Phases I and II)

Construction of Phases I and II of the Proposed Action is expected to have a short-term beneficial effect on the regional economy and area personal income and employment levels. Construction of Phase I would mobilize resources (manpower and spending on goods and services) for eight months that would provide a short-term beneficial stimulus to San Bernardino County. Construction of Phase II would extend the stimulative effect to 16 months.

Phase I of the Proposed Action is expected to cost approximately $90 million dollars. Of this amount, an estimated $20 million would be spent directly on local content goods and locally available services. It is likely that select materials (such as concrete and aggregates, and select earthmoving equipment) would be purchased or leased from within the area as some of these items are readily available, and it would be cheaper to procure them locally. The majority of equipment is expected to be imported from outside of the Lucerne Valley area. California has a large number of companies involved in manufacturing and installing solar systems, and the supply chain is extensive (Solar Energy Industries Association 2008).

To estimate the total economic effects, including indirect and induced effects, the Impact Analysis for Planning, Inc., model (IMPLAN) multipliers for San Bernardino County were used (Southern California Association of Governments 2009). Table 4.15-1 shows the estimated total economic effects using the multipliers.

Assuming that $20 million of construction phase direct spending (related to wages and purchases of materials and equipment) occurs in San Bernardino County, the initial $20 million

in direct local content expenditures would generate a grand total of $36.1 million in total output to the region. Indirect effects include the effects occurring along the supporting supply chain as goods and services are purchased from vendors and subcontractors supporting the installation. Induced effects represent the cumulative effects from household spending, reflecting labor earnings from direct and indirect related economic activity. San Bernardino's total personal income was approximately $56 billion in 2007 (Bureau of Economic Analysis 2009).

Table 4.15-1 Order of Magnitude Economic Effect Estimates for San Bernardino County, Construction Phase

	Million Dollars
Total cost of Proposed Action	$90.0
Estimated local content goods and services:	
Direct effects	$20.0
Indirect effects	$6.0
Induced effects	$10.1
Total effects (total output):	**$36.1**

Source: Southern California Association of Governments 2009
Notes: Based on Impact Analysis for Planning, Inc., Type II multipliers for San Bernardino County, 41 Other New Construction. Economic effects are expressed in terms of total industrial output generated from Phase I.

At the peak of construction activity, the Proposed Action is expected to employ a workforce of 45 workers for a three-month period. Figure 4.15-1 shows the construction workforce size by month of installation.

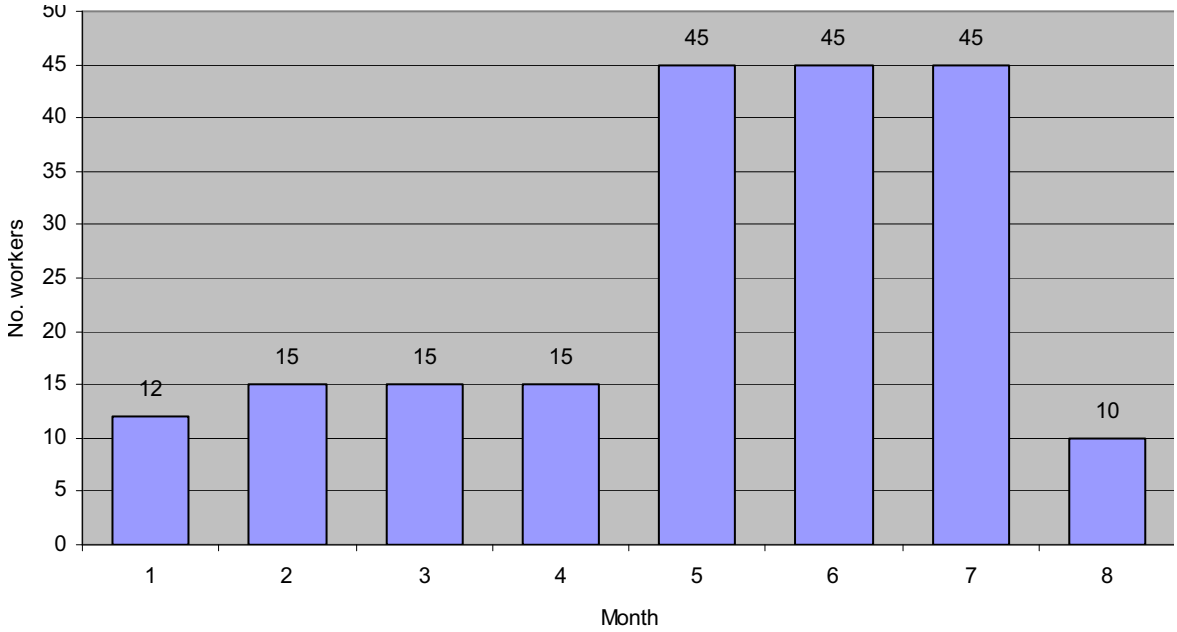

Figure 4.15-1 Construction Labor Force by Month

On average, 25 construction and supervisory personnel would be required on-site for approximately eight months to build Phase I, with 45 personnel being required at peak times. During Phase II, this manpower loading would be repeated.

Operations and Maintenance (Phases I and II)

The operations and maintenance phase of the Proposed Action is expected to have a long-term, beneficial effect on the regional economy and area personal income and employment levels. The effect would recur annually and would last for the 30-year life of Proposed Action assets.

Assuming Phase I and II are both built, the Proposed Action would employ three permanent staff, who would most likely be hired locally. These workers would earn incomes and spend money within the community, which would be beneficial to the local economy. The solar plant would also require sporadic maintenance for array cleaning and washing, vegetation clearing, and plant, equipment systems, and infrastructure monitoring. These operational and maintenance activities would require temporary manpower and involve some contractual spending, but this activity would also have a relatively minor effect on the area's economy.

Solar plants are characterized by large up-front capital costs and relatively small running annual costs. The operational and maintenance expenditures required to sustain the plant are relatively small, estimated at $400,000 per year. Assuming Phases I and II are both constructed, over the 30-year life of the plant, the present value of these annual expenditures would total $6.15 million (without escalation) and $8.65 million (with a 2.5 percent escalation factor), applying a five percent discount rate. The annual $400,000 spending would also be recycled within the local economy from re-spending activities and would also generate a multiplier effect. The direct annual operation and maintenance spending of approximately $400,000 per year would generate indirect and induced effects after the multiplier had run its course. Table 4.15-2 shows the estimated operational period economic effects.

Table 4.15-2 Order of Magnitude Economic Effect Estimates for San Bernardino County, Operation and Maintenance

	Million Dollars
Annual direct spending (operations and maintenance)	$0.40
Cumulative present value (30 yr. w/out escalation, 5% discount rate)	$6.15
Cumulative present value (30 yr. w / 2.5%/yr. escalation, 5% discount rate)	$8.65
Taxable leasehold interest	
Annual taxes (low)	$0.945
Annual taxes (high)	$1.080

Source: Raw data from the Applicant and San Bernardino County Assessors Office
Range in annual taxes based on range in estimated effective tax rates.

Public Services and Utilities

The induced demand from the Proposed Action on public services during construction, operation and maintenance, and decommissioning would not result in extraordinary stresses placed on public service capacities or infrastructure that could not be met by existing and projected public resources. As explained below in more detail, adequate resources exist within San Bernardino County and the Lucerne Valley that can accommodate the Proposed Action's installation demands during construction. Furthermore, operations would not result in a noticeable population migration to the Lucerne Valley. In addition, over the long-term, the Proposed Action would generate annual taxes (from the leasehold interest) that would be sufficiently large enough to more than offset any new demands arising from operations.

Construction (Phases I and II)

The Proposed Action would be expected to have a short-term effect on public services during the construction of both phases. Construction is not expected to result in any undue burdens being placed on public resources that could not be met by existing service capacities and budgets.

Water and Wastewater

During construction of Phases I and II, some water would be required for soil compaction and dust control. Because grading would be limited, it is anticipated that the water requirements would be achievable without imposing any competing undue burdens on the area's existing groundwater or surface water resources. Wastewater is expected to be disposed of by a commercial sanitary service.

Fire and Emergency Medical Services

During a large-scale construction project, there is the potential for emergencies and accidents; however, the county has sufficient resources with which to handle any accidents or fire events. Therefore, it is unlikely that construction of Phases I and II would place any noticeable incremental demands on fire and emergency medical services, especially given their low probability of occurrence.

Medical

It is possible that accidents requiring ambulance services and hospital treatment may occur during the construction phase. The nearest local full service hospital is the Bear Valley Community Hospital in Big Bear Lake. Given the safety plan and construction protocols to be followed, the probability of occurrence of any accidents and their frequency is low. Therefore, the hospital is expected to be able to fully accommodate any accidents requiring medical treatment and ambulance services within their current levels of staffing and resource deployment.

Police

The Applicant would employ private security guards during construction of both phases, who would be trained, uniformed, and unarmed. The guards would control ingress and egress of personnel and vehicles during construction and would guard against potential theft during non-operating hours. It is possible that during select phases of the installation, police services would be required during key mobilization of resources and select movements of materials (for example, to direct traffic at select intersections and to check permits). However, the demands placed on local police services during this phase are likely to be handled within normal business activities and scheduling and are not expected to require any new permanent staffing or unforeseen resource requirements.

Solid Waste

During the construction phase, nonhazardous solid waste would most likely consist of construction and other debris and would be trucked to the nearest transfer station or the nearest Type II landfill. The permitted maximum disposal of the Victorville Sanitary Landfill is 3,000 tons per day (California Integrated Waste Management Board 2009). It is unlikely that the solid waste generated over the course of construction would place any capacity burdens on the landfill's daily intake capacity.

Schools

Given the short-term nature of the construction (Phase I and II are together approximately 16 months in duration); it is unlikely that members of the construction work force who are not local would migrate to the area with their children or dependents. In addition, the peak construction work force (for an estimated three-month period; see Figure 4.15-1) is estimated to be 45 workers per month. The Lucerne Valley School District accommodates over a thousand pupils (Lucerne Valley Unified School District 2009). Therefore, the construction phase is not expected to burden the Lucerne Valley School District in a manner that would require any new investments in personnel, supplies, or facilities.

Operations and Maintenance (Phases I and II)

The Proposed Action would not be expected to have a noticeable long-term effect on public services during operations and maintenance. The solar plant would be a highly automated facility and would require only three permanent staff. In addition, long-term operations and maintenance requirements are not likely to tax public service capacities.

Water and Wastewater

During operations and maintenance, 10,000 gallons to 20,000 gallons for Phase I and between 12,000 gallons to 25,000 gallons for Phase II (22,500 to 45,000 gallons per year) would be required for panel washing. The water would be from off-site resources. Since the facility would be run by three permanent staff, there would be a minimal amount of wastewater generated, which would be easily accommodated by the plant wastewater systems.

Fire and Emergency Medical Services

The solar plant would be equipped with fire alarms and portable fire extinguishers. The plant also would have very few flammable components, and the risk of fire from operating activities is expected to be small. Therefore, it is unlikely that frequent fires requiring county-wide fire services would be necessary or that they would cause emergency fire and medical services to be deployed at a frequency that causes a sustained demand in public service capacities and incremental expenditures.

Police

The perimeter of the solar plant would contain an eight-foot-high security fence, and cameras would be used to survey the perimeter of the site for potential intruders. In addition, the Applicant would provide for nighttime security and therefore would not place any demands on local law enforcement.

Medical

It is possible that accidents requiring ambulance services and hospital treatment may occur during the operational phase. As discussed above, the nearest local full service hospital is the Bear Valley Community Hospital in Big Bear Lake. Given the small number of permanent staff, and the safety plan and construction protocols to be followed, the probability of occurrence of any accidents and their frequency is low. Therefore, the hospital is expected to be able to fully accommodate any accidents requiring medical treatment and ambulance services within their current levels of staffing and resource deployment.

Solid Waste

Since the facility would be run by three permanent staff, there would be a minimal amount of solid waste generated that could easily be accommodated by local solid waste services (collection, transfer, and disposal).

Schools

During operation and maintenance, it has been estimated that only three permanent employees would be needed to operate the solar plant. Given the small number of permanent employees, the operational phase would not result in any noticeable population migration to the area that would have any noticeable effect on future pupil enrollments and public school resources or facilities.

Tax Revenues to Local Jurisdictions

Construction (Phases I and II)

The Proposed Action would be expected to have a short-term beneficial effect on local jurisdiction tax revenues during the construction of Phases I and II. Direct, indirect, and induced spending generated initially by the direct purchases of goods and services during construction would generate sales taxes, and wages paid to workers during construction would generate payroll and income taxes. The majority of the capital costs would be for equipment costs, however, which are not local spending items. It is anticipated that the total local spending would be approximately 20 percent of Proposed Action cost. The potential one-time tax revenues to San Bernardino County would be derived from this portion of local spending.

Operations and Maintenance (Phases I and II)

Operations and maintenance of both phases of the Proposed Action would be expected to have a long-term beneficial effect on San Bernardino County's public revenues. Given the high level of automation and low maintenance requirements of the solar plant, it is likely that public revenues generated over the Proposed Action's useful life (attributable to the leasehold interest annual taxes) would exceed public expenditures arising from incremental public service demands related to operations.

As mentioned in the existing conditions section, the BLM provides payments in lieu of taxes (or PILT) that are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries. PILT payments help local governments carry out such vital services as firefighting and police protection, construction of public schools and roads, and search-and-rescue operations. The payments are made annually for tax-exempt federal lands administered by the BLM. The formula used to compute the payments is contained in the PILT Act and is based on population, receipt sharing payments, and the amount of federal land within an affected county. In fiscal year 2008, San Bernardino County collected $2,877,981 in PILT total payments (US Department of the Interior 2009).

The Proposed Action's acreage and fixed assets in place would generate annually recurring taxes on the BLM leasehold interest over the 30-year operational life. These tax receipts would be beneficial to the local taxing jurisdictions and would sustain public services, providing a long-term benefit to residents and taxpayers.

In California, the Applicant that enters into a lease contract with the BLM for the exclusive right to operate a solar plant on BLM land would have a taxable possessory interest. All of the power-producing assets, structures, and other improvements that would be built would be valued at

their full fee value, subject to any specific exemptions or exclusions allowed by the California Revenue and Taxation Code. Depending on the type of power project, specific provisions of the Revenue and Taxation Code allow for certain new construction exclusions. For example, Section 73 describes the new construction exclusion that specifically applies to solar-generating facilities. Since the land would be owned by BLM, the value of the leasehold interest in the land would be taxable (as a taxable possessory interest) to the lessee and subject to Proposition 13. The improvements to the property would not be valued any differently on BLM land, as compared to privately owned fee land (San Bernardino County Assessor 2009).

The taxable basis of the property for leasehold interest purposes would consist of all real property, including land, structures, and fixtures and any personal property items. In San Bernardino County, the general tax levy is one percent of the taxable value on the roll, plus any voter-approved bonded indebtedness. As a practical matter (since the estimated taxes are forward looking) it is reasonable to also assume that a bonding levy would produce an effective tax rate that is above one percent. Since the Proposed Action would be located in the desert, a range estimate for the effective tax rate would most likely be between 1.05 and 1.2 percent of the total assessed value (San Bernardino County Assessor 2009). Applying the effective tax rates to the taxable value of the project assets of $90,000,000 yields annual taxes owed to the county in the range of $945,000 to $1,080,000 (see Table 4.15-2).

Property Value Effects

Some stakeholders have voiced their concerns about the potential effects on adjacent property values from the installation of the utility scale solar plant. Given that very few utility scale plants have been installed in the US, there have not been any specific local empirical studies that have measured the actual effects on adjacent property values associated with proximity to a solar plant. However, several observations are worth noting that are relevant to assessing this potential effect. Usually where effects from proximity to infrastructure do affect property values, there is some causal nexus to the adjacent property from the plant or facility itself. In the case of utility-scale solar photovoltaics, adjacent property owners would not be subject to potential emissions or particulates (associated with fossil fuel thermal facilities), because there would be none. In addition, noise or visual effects on property values would not be a stigma associated with the Proposed Action that would affect adjacent property owners in the rural desert setting. There would also be no risks associated with potential exposure to radiation that are associated with nuclear facilities.

To have an effect on property values and markets, there must be a project-related link or externality that either causes the direct effect on value or that is perceived by market participants who buy and sell properties as influencing values, whether it actually does have an effect. The site of the Proposed Action within a development corridor located near existing roads and transmission lines, away from residential development, functions as a form of built-in mitigation against potential effects on property values. Therefore, there would likely be no effect on property values.

While there are no comprehensive studies of the effects of utility scale solar plants on rural area property values, there is a recent comprehensive empirical study on wind farm facility effects to adjacent property values. The study looked at several dimensions of stigma or the perception that the view and noise emitted from wind towers and turbine would lower property values to adjacent home owners. The data intensive, regression-based statistical models developed and applied in the study failed to uncover any conclusive evidence of stigma from proximity to the wind towers. Home prices in the sample were not measurably affected by either the view of or the distance to the wind facilities (Hoen et.al, 2009).

Decommissioning

The potential effects on socioeconomic resources from decommissioning options are expected to be beneficial and alternatively either short-term or long-term, based on the particular option chosen.

It is possible that the Proposed Action may be upgraded with a new technology (to continue to exploit the area's strong solar radiation potential) at the end of its estimated 30-year life. If this option is chosen, the plant would continue to provide zero emission electricity to the regional grid and make lasting contributions to meeting the region's projected load growth. In addition there would be short-term construction-related benefits to incomes, employment, and output (from the upgrade project option). Over the long term, the lease would most likely be renewed and taxes would continue to be paid on this possessory interest, and the new upgraded plant would employ both permanent workers and sporadic operations and maintenance worker teams. If the site would continue to be used for solar power generation, there would also continue to be a positive social opportunity cost of the land.

It is also possible that the solar plant would be dismantled and the land made suitable for reclamation. Dismantling and reclamation/restoration activities would also provide a short-term stimulus to the local economy as special teams would be needed to safely disassemble the plant assets and restore the site to its original pristine condition. In addition, the underlying land would be freed up for other potential uses, including the historic uses identified by the BLM as the opportunity cost of the site of the Proposed Action.

Alternative 4: Modified Site Layout

Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW

Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the size of the developed area from 433 to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the Phase I footprint from 180 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effects during Phases I and II under this alternative would be similar to Alternative 5 as discussed above.

4.15.5 Cumulative Effects

For the purposes of this analysis, the CESA for cumulative effects to social and economic conditions would be local as well as regional in geographic scope. For example, local residents and recreational visitors may perceive that a change in the rural character of the Lucerne Valley was the result of the Proposed Action and other projects, combined with the changes in the region that have occurred in the past. For the purposes of this analysis, all of the projects identified on Table 3.18-1 are included since they will all contribute to changes in the rural character of the area.

Given that many people live in the area because of its rural character, the Proposed Action combined with other changes in the landscape may permanently alter the rural feel of the community. Changes in economic conditions may be both beneficial and adverse. New local jobs may be created, which may provide economic benefits to the community, including revenues, but effects to recreation may adversely affect economic conditions.

The analysis shows that the Proposed Action is consistent with the goals and objectives of the Lucerne Valley Community Plan relative to the community's desire to retain its rural desert character. Therefore, the Proposed Action would not be expected to contribute to cumulative effects for social conditions.

Regionally significant cumulative effects are related to changes to the CDCA as a whole. BLM and other federal and non-federal entities have received hundreds of applications for renewable power, transmission lines, and non-energy related projects throughout the CDCA. Over time, if these projects are built, there will be enormous ramifications for the region's social and economic conditions. Within the CDCA as a whole, BLM alone has over 100 proposed solar, wind, and transmission projects that cover tens of thousands of acres. The Proposed Action would convert 516 acres of the CDCA to a single use, which would cumulatively contribute to these other proposed actions. A beneficial social effect would be the addition of up to 45 MW of renewable, low carbon emitting energy to California consumers.

The Proposed Action would add up to 45 MW in renewable energy, which would provide the following net economic benefits:

- Zero emission power output sustaining projected load growth;
- Cumulative electric power output sustaining future economic growth;
- Aggregate construction phase and operational period benefits (i.e., jobs, incomes, and taxes);
- Aggregate short-term tax benefits related to sales taxes during construction and long-term taxes paid on leasehold possessory interests; and
- A larger developed land area and larger social opportunity cost of the land.

4.15.6 Residual Effects

During construction phases of the Proposed Action, there would be short-term, beneficial residual effects on population and housing, the regional economy, and personal income and employment levels, public services, and tax revenues. During operation and maintenance phases, there would be long-term beneficial residual effects on population and housing, the regional economy, and personal income and employment levels, public services, and tax revenues. Effects on social and economic conditions from decommissioning are also expected to be beneficial.

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4.16 Environmental Justice

This section discusses the effects on environmental justice that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed; and third, a discussion of residual and cumulative effects is provided.

4.16.1 Indicators

The Proposed Action would affect environmental justice if it would result in disproportionately high or adverse effects on minority or low-income populations.

4.16.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative.

4.16.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on minority or low-income populations.

4.16.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on minority or low-income populations.

4.16.2.3 Alternative 3: Proposed Action

The Proposed Action would have no indirect effects. The following discussion identifies the potential direct effects of the Proposed Action from construction, operation and maintenance, and decommissioning activities for Phases I and II.

The Proposed Action is not expected to have a disproportionately high and adverse human health or environmental effect on minority and low-income populations in the Lucerne Valley.

The racial composition of the area within the Lucerne Valley area closest to the site (see Zip Code tabulation area [ZCTA] 92356 and Census Tract 104.05 in Table 3.16-1) did not contain minority or low-income disadvantaged communities exceeding 50 percent of the population. The site is within the rural high development corridor located near existing roads and transmission lines and is not proximate to an urban area where pockets of low-income minority communities would reside. Therefore, the Proposed Action would not result in imposing any disproportionate share of adverse effect on any racial, ethnic, or socioeconomic group.

Furthermore, there is no physical effect or output related to the Proposed Action that could have a disproportionately high and adverse human health or environmental effect on a given minority population (were that population in fact located within a range of potential contact).

4.16.2.4 Alternative 4: Modified Site Layout

Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW. The racial composition of the area within the Lucerne Valley area closest to the site (see Zip Code tabulation area [ZCTA] 92356 and Census Tract 104.05 in Table 3.16-1) did not contain minority or low-income disadvantaged communities exceeding 50 percent of the population. The site is within the rural high development corridor located near existing roads and transmission lines and is not proximate to an urban area where pockets of low-income minority communities would reside. Thus, there would be no effect to minority or low-income populations.

4.16.2.5 Alternative 5: Smaller Project

The amount of development for Alternative 5 would be less than Alternative 3, in addition, only 30 MW would be produced vice 45 MW. The racial composition of the area within the Lucerne Valley area closest to the site (see Zip Code tabulation area [ZCTA] 92356 and Census Tract 104.05 in Table 3.16-1) did not contain minority or low-income disadvantaged communities exceeding 50 percent of the population. The site is within the rural high development corridor located near existing roads and transmission lines and is not proximate to an urban area where pockets of low-income minority communities would reside. Thus, there would be no effect to minority or low-income populations.

4.16.3 Cumulative Effects

The CESA for environmental justice includes local census tracts as is required by the analysis for effects to low income or disadvantaged populations. Construction, operation and maintenance, and decommissioning of the Proposed Action would not result in short- or long-term cumulative effects on minority and low-income populations because the racial composition of the immediate area within the Lucerne Valley area closest to the site (ZCTA 92356 and Census Tract 104.05, Table 3.16-1) does not contain minority or low-income disadvantaged communities exceeding 50 percent of the population.

4.16.4 Residual Effects

No residual effects on minority or low-income populations would result from implementation of the Proposed Action.

4.17 Energy and Minerals

This section discusses the effects on energy and mineral resources that may occur with implementation of the Proposed Action or alternatives. First, the indicators used to identify and analyze effects are presented; second, potential effects are discussed; and third, a discussion of residual and cumulative effects is provided.

4.17.1 Indicators

The Proposed Action would affect energy and mineral resources if it would:

- Restrict access to or the availability of mineral or energy resources or
- Result in excessive use of energy and mineral resources.

4.17.2 Direct and Indirect Effects by Alternative

This section describes the effects under each alternative using the respective methodology prescribed under NEPA. To compare effects, this analysis defines the temporal scale (time), spatial extent (area), and intensity of effects for each alternative. All effects discussed in this section are direct. No indirect effects were identified for this resource area.

4.17.2.1 Alternative 1: No Action/No Plan Amendment

Under NEPA, the BLM must consider an alternative that assesses effects that would occur if the Proposed Action were not approved and the application were rejected. The No Action Alternative assumes that the ROW application is denied and the CDCA Plan is not amended. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on energy and mineral resources.

4.17.2.2 Alternative 2: No Action with Plan Amendment

Alternative 2 would deny the ROW application, but the CDCA Plan would be amended to classify the site of the Proposed Action as either suitable or unsuitable for large-scale solar development. Under this alternative, the Proposed Action would not be constructed, and there would be no adverse effect on energy and mineral resources.

4.17.2.3 Alternative 3: Proposed Action

Effects that could result from the implementation of Alternative 3 during construction, operations and maintenance, or decommissioning activities associated with either Phase I or II are analyzed in this section.

Effect EAM-1: Restrict access to or the availability of mineral or energy resources within the Proposed Action area

Access to some prospected or production sites for mineral or energy resources could be inhibited during construction; operations and maintenance; or decommissioning of the Proposed Action; however, due to the lack of known mineral resources at the site, no effect on mineral or energy resources would occur. In addition, the Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this clean energy project, this would not be an adverse effect. Therefore, no mitigation measures are proposed.

Effect EAM-2: Development of the solar field may result in excessive energy use

The Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this clean energy project, this would not be an adverse effect. Therefore, no mitigation measures are proposed.

4.17.2.4 Alternative 4: Modified Site Layout

Short-term and long-term effects during Phases I and II under Alternative 4 would be slightly less than those identified under Alternative 3. Both Alternative 3 and 4 have identical construction durations, and the difference between the total areas graded and developed is five acres less for Alternative 4 compared to Alternative 3. In addition, the proposed energy generation for both alternatives would be the same at 45 MW. The effect to energy and minerals for Alternative 4 would be the same as Alternative 3.

4.17.2.5 Alternative 5: Smaller Project

This alternative would reduce the output of the solar power plant from 45 MW to 30 MW and also reduce the footprint of the Proposed Action from 516 acres to 238 acres. Phase I of this alternative would include the development of the area east of Santa Fe Fire Road and the relocation of Zircon Road, similar to Phase 1 under Alternative 3. Under this alternative, the area south of the relocated Zircon Road would not be developed reducing the footprint of the Proposed Action from 120 to 108 acres. Phase 2 of this alternative would include the development of 120 acres of the Proposed Action area west of Santa Fe Fire Road, as opposed to 240 acres under Alternative 3. Under this alternative, reconductoring of the 33-kV distribution line would not be required.

Similar to Alternatives 3 and 4, Alternative 5 would require an amendment to the CDCA Plan to change the ROW designation to suitable for solar energy development. Rerouting Zircon Road south of its current location to permit its continued public use would not require a CDCA Plan Amendment. This change would be considered plan maintenance.

Effect EAM-1: Restrict access to or the availability of mineral or energy resources within the Proposed Action area

Access to some prospected or production sites for mineral or energy resources could be inhibited during construction; operations and maintenance; or decommissioning of the Proposed Action; however, due to the lack of known mineral resources at the site, no effect on mineral or energy resources would occur. In addition, the Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this clean energy project, this would not be an adverse effect. Therefore, no mitigation measures are proposed.

Effect EAM-2: Development of the solar field may result in excessive energy use

The Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this clean energy project, this would not be an adverse effect. Therefore, no mitigation measures are proposed.

4.17.3 Cumulative Effects

As discussed in Section 3.17.2, there are no oil or gas producers or seeps within five miles of the Proposed Action, and the nearest oil and gas site is a plugged and abandoned dry hole located 7.3 miles from the site. The closest developed mineral resource is 2.1 miles from the site. No known oil and gas or mineral resources exist at the site; therefore, the Proposed Action would not contribute to an adverse cumulative effect on access to or the availability of mineral or energy resources. In contrast, it would contribute cumulatively to increased availability of solar energy resources.

The CESA for non-energy minerals focuses on lost opportunities to access resources throughout the CDCA. The Proposed Action, along with other proposed energy projects in the CDCA would limit future access to hard rock and salable minerals. The other proposed federal and non-federal projects could potentially restrict access to economically developable resources. While it is unknown to what degree these other project sites contain these resources, it is possible that the Proposed Action could contribute to an adverse cumulative effect to mineral resources.

The Proposed Action would use mineral and energy resources during construction, operation and maintenance, and decommissioning. Given the size of the Proposed Action, it would not contribute to a cumulative excessive use of mineral or energy resources. Its use of energy resources would be balanced by its generation of solar energy for 30 years.

4.17.4 Residual Effects

No residual effects on energy and mineral resources would result from implementation of the Proposed Action.

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4.18 Other NEPA Requirements

4.18.1 Unavoidable Adverse Impacts and Irreversible and Irretrievable Commitments of Resources

CEQ regulations at 40 CFR, Part 1502.16, and the BLM NEPA Handbook (H-1790-1, Sec. 9.2.9) require a discussion of adverse impacts that would remain after all reasonable and effective mitigation is applied, as well as disclosure of irreversible and irretrievable commitments of resources if the Proposed Action is implemented. A resource commitment is considered irreversible when direct and indirect effects 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 or forest health. A resource commitment is considered irretrievable when the use or consumption of the resource is neither renewable nor recoverable for future use. Irretrievable commitments apply to loss of production, harvest, or use of natural resources.

The following section describes irreversible and irretrievable commitments that would occur in the Proposed Action area and may be affected by construction, maintenance and operation, and decommissioning activities. A summary of environmental effects for all alternatives is presented at the end of this section in Table 4.18-1.

4.18.1.1 Air Quality and Climate

With the implementation of mitigation measures, construction and decommissioning activities would result in unavoidable adverse impacts on air quality. These are identified in Section 4.1 as residual effects. There would be unavoidable adverse impacts to air quality from particulate matter and vehicle emissions. CES' Proposed Action does not trigger federal conformity levels, and would not, therefore cause irreversible and irretrievable commitment of air resources.

Potential contributions from direct GHG emissions due to CES' Proposed Action would be considered a long-term effect; however, a comparison of the projected GHG emissions to the existing inventories and projections for California indicates that the Proposed Action would not hinder attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020.

Although CES' Proposed Action would not be developed within a forested area, desert soils have a carbon storage capacity that would be lost due to construction of CES' Proposed Action. Considering the relative proportion between the project area (516 acres) and the total regional extension of the CDCA (approximately 300,000 acres), potential effects of the project over the existing carbon storage capacity would be negligible; however, it would nonetheless be an unavoidable adverse impact.

4.18.1.2 Noise

Construction activities would cause increased noise levels, including vibration. This would be a localized and temporary effect and would cease at the end of construction. However, it is expected that low-level noise from transformers and vehicle use related to maintenance and operation activities would add a long-term unavoidable impact on composite noise conditions. Under certain atmospheric conditions, local residential receptors would notice this noise; however, the noise levels are not expected to exceed levels established by local noise ordinances.

4.18.1.3 Geology, Topography, and Geologic Hazards

There would be no unavoidable adverse impacts or irreversible and irretrievable commitments of geologic or topographic resources.

4.18.1.4 Soils

As discussed in Section 4.4, it is expected that CES' Proposed Action would cause elevated levels of dust emissions and loss of topsoils, especially during construction and maintenance activities. Mitigation measures and BMPs, such as the stockpiling of topsoil during ground-disturbing activities for later revegetation efforts, would reduce the severity and occurrence of these effects; however, there would be an irreversible and irretrievable commitment of soil resources on areas where revegetation fails and subsequent erosion occurs.

Soil effects could also occur from petroleum and other hazardous material spills. Should a spill occur, the affected area would be cleaned up according to the approved SPCC Plan. Affected soils would be irretrievably and irreversibly lost, which would be an unavoidable adverse impact.

4.18.1.5 Water Resources/Hydrology

For the purposes of this analysis, an irreversible and irretrievable commitment of water resources would be the permanent contamination of surface water bodies or a groundwater aquifer, the overuse of these resources by CES' Proposed Action to the point where they would not be available for other uses, or change in runoff patterns that would increase erosion, sediment flow, or the risk of flooding.

The Proposed Action would use surface water or groundwater and would instead use off-site and permitted municipal or industrial water sources for dust control and panel cleaning. Therefore, the Proposed Action would not cause an irreversible or irretrievable commitment of water resources in the project area.

Given the Applicant's proposed mitigation measures and BMPs, it is not expected that the Proposed Action would cause unavoidable adverse impacts on water resources.

4.18.1.6 Biological Resources

Loss of 513 acres of native vegetation and five acres of disturbed habitat on the site of the Proposed Action would result in an unavoidable adverse impact; however, with the implementation of mitigation measures and BMPs, effects on native vegetation would be negligible and would not substantially alter or interfere with wildlife or plant populations in the Proposed Action area. Because the effects would be negligible and would affect only a localized region, the loss of native vegetation would not cause an irreversible and irretrievable commitment of the resource.

Of the 12 special status plants with potential to occur within the site of the Proposed Action, none were found on-site during surveys, and only two have a moderate chance of occurring in the Proposed Action area and being adversely affected by the Proposed Action. Should these species be present on the site, the Applicant would attempt to avoid them through modified project design. If they could not be avoided, there would be an unavoidable adverse impact;

however, the effect would be moderate and localized and would therefore not result in an irreversible and irretrievable commitment of the resource.

Localized and long-term unavoidable adverse impacts on wildlife, including special status species would occur. These effects, however, would not result in an irreversible and irretrievable commitment of the resource.

4.18.1.7 Cultural Resources

Construction of the Proposed Action could involve ground disturbance at various locations along the area of potential effect, potentially resulting in disturbance or destruction of subsurface cultural resources. The Proposed Action area, however, does not contain any sites recommended for inclusion on the National Register of Historical Places; therefore, no irreversible or irretrievable commitment of the cultural resources is expected. The Applicant would develop an unanticipated discovery plan for the construction phase in the event that cultural resources were found during site excavation.

4.18.1.8 Paleontological Resources

The geology of the Proposed Action site has low potential for paleontological resources. The Proposed Action is not expected to cause an irreversible and irretrievable commitment of the resource.

4.18.1.9 Land Use

Section 4.9 discusses the Proposed Action's potential effect on an adjacent utility corridor and determined that the Proposed Action would not prohibit future use of the corridor for utilities. The footprint of the Proposed Action would limit future use of 518 acres of land for other uses for the life of the project and would irreversibly and irretrievably commit the resource.

4.18.1.10 Special Management Areas/Special Designations

The closest SMA is the Carbonate Endemic Plants ACEC, located 1.8 miles south of the Proposed Action. Construction, operation and maintenance, and decommissioning would not have an unavoidable adverse impact on the ACEC. No other SMAs or lands with special designations are directly or indirectly affected by the Proposed Action, and no irretrievable and irreversible commitment of resources would occur.

4.18.1.11 Recreation

Construction of the Proposed Action would cause unavoidable adverse impacts on recreation resources by temporarily disrupting access via the Santa Fe Fire Road to the closest recreation areas located in the adjacent San Bernardino National Forest. The effect would be temporary and would not result in irreversible or irretrievable commitments of recreational resources.

4.18.1.12 Visual Resources

Construction of the Proposed Action would cause unavoidable short-term and long-term adverse impacts on visual resources by disrupting the viewshed in the Proposed Action area; however, the area is not in a designated area of natural beauty, so the effects during construction and decommissioning would be moderate, and effects during operations would be

minor. If the site were decommissioned and revegetated at some point in the future, the effects would not result in an irretrievable and irreversible commitment of resources.

4.18.1.13 Transportation and Traffic

Construction of the Proposed Action would cause localized, temporary, and unavoidable adverse impacts on roads and traffic. Traffic would be stopped at times or rerouted during construction of the 33-kV transmission line across Foothill Road, which is expected to last for one day. Vehicular use by construction workers would cause a minor increase in traffic on access routes to the job site during Phase I and II, affecting primarily Foothill Road and Santa Fe Fire Road. This increase would not affect the level-of-service for these roads.

During both phases, oversized loads could cause short-term, temporary transportation disruptions and may require wider turning clearance requirements. Effects on the transportation network and effects on traffic would occur only during construction, and occasionally during maintenance activities. The Proposed Action would not cause a change in the level of service for the affected roads and would not cause a permanent irreversible and irretrievable commitment of the resource.

4.18.1.14 Social and Economic Conditions

The Proposed Action would create up to 45 jobs during construction and up to three permanent jobs for life of the project. Occasional maintenance and repair activities could temporarily increase the number of on site staff. This workforce would have a beneficial economic effect on the local economy. The Proposed Action would increase local revenues, which would be a beneficial effect. The analysis in Section 4.14 indicates that no irreversible and irretrievable commitments of the economic resources would occur. The analysis also indicates that social conditions would not be adversely affected by the Proposed Action.

4.18.1.15 Public Safety/Hazardous Materials

Construction, operations and maintenance, and decommissioning of the Proposed Action could create public health and safety effects, especially on workers. In addition, the Proposed Action could introduce hazardous materials into the environment, mostly in the form of fuel, lubricants, and solvents used in construction and operation of the facilities. Several mitigation measures have been identified to reduce potential effects below federal and state safety limits. Therefore, the Proposed Action would cause an irreversible and irretrievable commitment of the resource or unavoidable adverse public health and safety impacts.

4.18.1.16 Environmental Justice

As disussed in Section 4.16, the Proposed Action and its associated transmission lines are located within a rural development utility corridor and along existing roads. The Proposed Action is not located in or near an urban area and would not disproportionately affect low income or minority populations; therefore, no unavoidable adverse impacts or irreversible and irretrievable commitments of resources are expected.

4.18.1.17 Energy and Minerals

The Proposed Action is located in an area with little or no mining activity, and no energy minerals are found on the site. Therefore, no unavoidable adverse impacts or irreversible and irreversible commitments of energy and mineral resources are expected.

4.18.2 Relationship Between Short-Term Uses and Long-Term Productivity of the Environment

NEPA requires consideration of the relationship between short-term uses of the environment and long-term productivity associated with the Proposed Action. This involves the consideration of whether the Proposed Action would sacrifice a resource value that might benefit the environment in the long-term for some short-term value to the Applicant or the public. For purposes of this discussion, short-term refers to three years or less after the construction phase ends and subsequent restoration and rehabilitation activities. Long-term refers to three years or longer.

Short-term use of the environment during construction and restoration would result in the temporary loss of some resources, such as temporary loss of some habitat and access to recreational facilities, increased noise, and air quality effects. Approximately 518 acres of land would be permanently lost within the Proposed Action area, and some flora and fauna specimens in the area in and around the construction and infrastructure locations would be lost. Longer term effects include the permanent loss of some visual quality from the introduction of the solar arrays and associated infrastructure, access roads in previously undisturbed areas, and landscape scarring.

While there would be some irreversible and irretrievable commitments of some resources, as noted above, there would be no permanent loss of the overall productivity of the environment from the Proposed Action.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.1 Air Quality	No effects	No effects	During construction, total annual emissions of PM10, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 16.82 tons per year. During reclamation there would be potential short-term increase in air pollutant emissions. During construction, routine operational activities, maintenance, and decommissioning, GHG emissions would be generated. A comparison of the GHG emissions (88.3 MtCO2e) to the existing power plant inventory for California (107,243,302 MtCO2e) shows that the emissions resulting from the Proposed Action would be 0.00008 percent. A typical 45-MW fossil fuel fired power plant in California would produce 1,448,330 metric tons of carbon dioxide equivalents (MtCO2e) over its 30 year lifespan. Subtracting the Proposed Action GHG emissions (88.3 MtCO2e) from these avoided emissions also indicates that the Proposed Action would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. This would result in a loss of 317.5 tons of carbon storage capacity.	Effects during Phases I and II under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur using the same vehicles for the same length of time.	During construction, total annual emissions of PM10, if both phases occur in the same year, would be above the CCAA threshold of 15 tons per year with a value of 15.51 tons per year. During construction, routine operational activities, maintenance, and decommissioning, GHG emissions would be generated. A comparison of Alternative 5 GHG emissions (51.5 MtCO2e) to the existing power plant inventory for California (107,243,302 MtCO2e), not including construction) shows that emissions resulting from Alternative 5 would be are 0.00005 percent. A typical 30-MW fossil fuel fired power in California would produce 965,553 MtCO2e over its 30 year lifespan. Subtracting the alternative project GHG emissions (51.5 MtCO2e) from these avoided emissions also indicates that Alternative 5 would assist in the attainment of the state's goals of reducing GHG emissions to 1990 levels by 2020. This would result in a loss of 254 tons of carbon storage capacity.
4.2 Noise	No effects	No effects	Individual pieces of equipment would generate noise levels in a range from 74 to 89 dBA at 50 feet from the source (Table 4.2-1).	Effects under this alternative would be slightly reduced. Since Alternative 3 is the same	Effects under this alternative would be short-term, adverse construction noise, ground-borne vibration, and traffic noise similar to the effects

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			Due to the location of the closest residence (located less than 0.1 mile from the site), these noise and vibration levels would not be attenuated over distance and reduced to background levels at the closest sensitive receptor (located less than 0.1 mile from the site). Because construction of Phase I would begin in the north and move to the south, disturbance from Phase I construction would result in a short-term, adverse effect to the residence. During construction, the Phase I equipment would include a total of 10 transformers (one for every two megawatts of power generation) to be enclosed within each photovoltaic power block. However, the closest transformer to the closest receptor is over 500 feet away. Even with the composite noise of 10 transformers in Phase I, the sound level at the closest receptor would not exceed 55 dB. While this would result in a long-term increase in ambient noise levels, it would not be audible to the nearest receptor.	size and the same amounts and types of disturbance would occur, the same amount of noise would be generated, however, since the project would be moved 50 feet further away from the closest sensitive receptor and have a vegetative screen installed, noise effects would be attenuated slightly.	under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.4 Geology, Topography, & Geologic Hazards	No effects	No effects	The Proposed Action would not increase the geologic instability of the area and would not increase the risk of on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. There would be no effect on a unique geologic feature. Flash flood events could result in on-site damage that could represent a hazard. It is possible that a major flash flood could result in damage down gradient of the site. Compliance with earthquake building codes and maintaining the natural drainage would minimize potential risk associated with the most likely geologic hazards; however, once these events occur, they can strain or stress the existing infrastructure.	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur.	Effects under this alternative would be the similar as those identified under Alternative 3. The difference in the area graded (10 acres) and developed (238 acres) would be reduced, but the type, intensity, and duration of the effects would be similar.
4.4 Soils	No effects	No effects	Both topsoil and vegetation would be removed and vegetation would not be allowed to re-grow over an approximate 12.5 acre area. Therefore, there would a strong potential for wind and water erosion over this 12.5 acres. The Proposed Action would not contribute to substantial soil erosion or loss of topsoil in the area during construction. Due to the lack of protected soils at the site, development of the Proposed Action would not affect soils identified for special	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur.	Effects would be the similar, but less than those identified for Alternative 3. Only 10 acres would be graded as opposed to 12.5 acres; therefore, fewer acres of topsoil would be removed. Since the alternative would decrease the number of structures, specifically concrete pads and post, and the area over which erosion would occur and topsoil removed would be less than Alternative 3, then the effects from this alternative would be similar but less than those for Alternative 3.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			protection.		
4.5 Water Resources	No effects	No effects	The Applicant is conducting flooding models using the Hydrologic Engineering Centers River Analysis System [HEC-RAS] of the USACOE; however, the data were not available at the time of publication of this document. Previous modeling by the Applicant has indicated the major drainage channels could experience high flows during episodic rain events. The available information suggests that flooding is possible in the Proposed Action area, but the intensity and frequency of these events is not known. Therefore, it is not possible at this time to estimate what the potential flood risk is at the site and the possible effects. The flow pattern alteration would not alter the overall flow pattern for the area. Groundwater quality would not be altered by the Proposed Action. The Proposed Action would not degrade the quality of surface waters by increasing erosion, increasing sedimentation, or introducing contaminated waters. The water obtained for both construction and operations would be from a permitted off-site source; therefore, it would not decrease the water supply in the Proposed Action area.	Effects under this alternative would be the same as those identified under Alternative 3 since the project is the same size and the same amounts and types of disturbance would occur and the same amount of water would be used.	Effects would be similar to those identified for Alternative 3. However, because only 238 acres would be developed and solar arrays would be located on approximately 228 acres, this alternative would slightly reduce the area graded to approximately 10 acres and decrease the area where infiltration would not occur.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.6 Biological Resources	No effect	No effect	Direct effects to yucca plants during construction would be short-term. Grading and grubbing activities would cause the direct loss of approximately 12.5 acres of creosote bush-white bursage, white bursage, desert wash, and/or already disturbed vegetative communities. Approximately 420 acres of the 516-acre ROW will be mowed, reducing vegetation to between 6 and 12 inches in height, for development of the solar arrays. The long-term effects to vegetation would depend on the scale, intensity, and duration of the activity. Grading and grubbing activities could create opportunities for non-native invasive weed species to colonize in areas where they had not previously occurred. Construction could directly affect wildlife by loss and fragmentation of cover, breeding, and foraging habitat. These activities and vehicle use could cause direct mortality to wildlife. Human activity would likely cause most wildlife species to avoid the Proposed Action area until the disturbance conditions have concluded. Transmission poles could also pose a direct collision hazard to birds. Human activities could potentially provide food or other	Effects would be similar to those described for Alternative 3. Alternative 4 would involve the same initial effect on native communities; however, the corridor along Santa Fe Fire Road would provide an opportunity for some native vegetation to be salvaged from the construction site and transplanted. Similarly, Alternative 4 would involve the same initial effect on native plant species except Joshua trees could be replanted along the corridor. Invasive species could likely be increased, as with Alternative 3, due to mechanically disturbed soil and habitat. Alternative 4 would have effects similar to those described for Alternative 3. Although Alternative 4 would provide increased habitat for wildlife, water and foraging opportunities could draw wildlife into an	Under Alternative 5, construction and operations and maintenance activities would cause similar direct and indirect effects as described under Alternative 3. However, this alternative would reduce the area of disturbance and, therefore, reduce the amount of vegetation that would be removed compared to Alternative 3. Only 238 acres would be developed with solar arrays. This alternative would reduce the loss of wildlife habitat. Only 238 acres would be developed with solar arrays. This alternative would reduce the potential effects to special status species compared to Alternative 3.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			attractants which could draw unnaturally high numbers of opportunistic predators and scavengers. Loss of burrows due to construction could also cause wildlife to search for or dig new burrows. Infrastructure development could alter wildlife movement in the area and just outside the boundary of the Proposed Action. Fences and transmission poles could also cause increased predation wildlife because raptors could use the infrastructure for perches. Loss of vegetation could indirectly reduce available forage and shelter, degrading and fragmenting existing higher quality habitat. The introduction of an artificial water source into the project area may provide suitable habitat for the Argentine ant, an invasive species in California. Clearing and grading activities would directly remove special status plants from the area. Construction activities, ongoing maintenance, including vegetation clearing, and the frequent use of vehicles on-site could introduce invasive weeds to the site. Le Conte's thrasher, northern harrier, and prairie falcon have been observed on the site and may be adversely affected by the Proposed Action. If owls are present on the site during construction, they may not be able	area of greater traffic and risk for mortality. Alternative 4 would have similar effects on special status species as those described for Alternative 3. Although Alternative 4 could provide increased habitat for wildlife, water and foraging opportunities could draw wildlife into an area of greater traffic and risk for mortality. This would be particularly relevant for desert tortoise, nesting and foraging birds, and foraging raptors.	

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			to move quickly enough to avoid mortality due to collisions with vehicles and equipment. Vehicle use on the site during operation and maintenance could also increase collisions and mortality of the burrowing owl. Desert tortoise are present on-site and could be adversely affected by the Proposed Action. Effects would be both short- and long-term. The Proposed Action could result in direct or indirect effects on birds protected by the Migratory Bird Treaty Act, including northern harrier, prairie falcon, golden eagle, red-tailed hawk, and any other migratory bird species.		
4.7 Cultural Resources	No effects	No effects	No cultural resources eligible for inclusion in the NRHP are known to occur in the Proposed Action area.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects to cultural resources resulting from this alternative would be similar to those identified under Alternative 3.
4.8 Paleontological Resources	No effects	No effects	The Proposed Action has a low potential to affect significant nonrenewable fossil resources.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects to paleontological resources resulting from this alternative would be similar to those identified under Alternative 3.
4.9 Land Use and Realty	No effects	No effects	The Proposed Action would, have no adverse effect on the BLM's ability to site future utilities within the corridor and would not conflict with either the Energy Production and Utility Corridor Element or the MUC M designation of the CDCA Plan.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects under this alternative would be the same as those identified under Alternative 3.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.10 Special Management Areas	No effects	No effects	No effect to Special Management Areas (SMAs) as a result of the Proposed Action. State Route 247 is a County-designated Scenic Route. Drivers along State Route 247 would have short-term views of the Proposed Action site during construction, operations and maintenance, and reclamation. Impacts to sensitive viewers is evaluated in more detail in Section 4.6.	Effects under this alternative would be the same as those identified under Alternative 3.	Effects under this alternative would be the same as those associated with the Proposed Action (Alternative 3).
4.11 Recreation	No effects	No effects	Construction of the Proposed Action would affect off-site recreational uses through short term disruption of access from fugitive dust from clearing and grading and long term alteration of the views as seen from recreation areas; however, visual effects are discussed in greater detail in Section 4.12. The temporary closure of portions of Santa Fe Fire Road during grading and hardening would result in short-term effects on access but long-term beneficial effects on the quality of the road.	Effects under this alternative would be the same as those identified under Alternative 3.	The effects to recreation would be the same under this alternative from construction, operations and maintenance, and decommissioning as those identified in Alternative 3.
4.12 Visual Resources	No effects	No effects	During the construction period, construction activities and materials, equipment, trucks, and parked vehicles all could be visible on the proposed project site and thus temporarily change the existing visual environment. Construction activities would be conducted in a manner that would minimize (visible) dust emissions. Therefore, visual changes associated with construction period activities at the proposed project site	Under this alternative, recreationists traveling the Santa Fe Fire Road en route to Blackhawk Canyon would see shielded views of the proposed project which would reduce the visual effect of the Proposed Action. All other viewpoints would have the same	Visual effects during construction of Phase I and II would be similar to effects under Alternative 3. However, since the construction periods for these phases are shorter under this alternative, effects would be for a shorter time period. Since a smaller amount of area is being developed and the amount of energy being produced is less, the facility itself would be smaller and be less of a

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
			would be short-term. The proposed project would result in increased levels of visual contrast by introducing new permanent above-ground structures into the landscape. However, these changes would not directly conflict with the management objectives associated with the interim VRM class established for the proposed project site. In summary, visual changes associated with operations and maintenance would be long-term.	views as Alternative 3 and the effects on visual resources would be the same during Phases I and II.	contrast to the surrounding area. Visual changes associated with operations and maintenance would be long-term, however, they would be less than that experienced under Alternative 3.
4.14 Transportation	No effects	No effects	Construction of both phases of the project would result in short-term increases in traffic volume of a maximum of 90 trips per day (45 morning and 45 evening trips) due to the construction labor force (assuming they all drive separately) and an additional unquantified short-term increase in traffic volume. Up to a maximum of 90 additional trips per day would not change the LOS of SR 247, nor would it affect the LOS of I 15, SR 18, or Bear Valley Road. During Phase II the labor force would mirror the labor force discussed for Phase I.	Effects under this alternative would be the same as those identified under Alternative 3.	Implementation of this alternative would result in similar effects to traffic volume as Alternative 3. The number of trips from workers and construction equipment as well as the delivery of supplies at the peak of construction would be the same as under Alternative 3; however, the effect would be for a shorter period since the construction phases under this alternative are shorter than the construction phases under Alternative 3. The effects to Foothill Road, Santa Fe Fire Road, and Zircon Road would be the same. There would be short-term traffic disruptions due to oversize loads. However, since this alternative is smaller than Alternative 3, this disruption would be for a shorter period of time.

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.14 Human Health and Safety/Hazardous Materials	No effects	No effects	It is unlikely that a hazard to the public or environment would occur as a result of soil disturbance at the site during construction of the Proposed Action. Disturbance of groundwater is also not expected to occur during site construction because foundations would not be drilled to these depths. Leaks would likely be contained within the walls of the substation and the transformers would have biodegradable oil. The solar facility may increase the potential for additional incidents related to fire and fire safety.	The effects and related mitigation measures would be the same for this alternative as those for Alternative 3.	Because the footprint is smaller and the construction period shorter for this alternative, the likelihood of potential small spills would be reduced proportionately; however, the types of effects and related mitigation measures would be the same for this alternative as those for Alternative 3.
4.15 Social and Economic Conditions	No effects	No effects	Assuming that $20 million of construction phase direct spending (related to wages and purchases of materials and equipment) occurs in San Bernardino County, the initial $20 million in direct local content expenditures would generate a grand total of $36.1 million in total output to the region. Indirect effects include the effects occurring along the supporting supply chain as goods and services are purchased from vendors and subcontractors supporting the installation. Induced effects represent the cumulative effects from household spending, reflecting labor earnings from direct and indirect related economic activity. On average, 25 construction and supervisory personnel would be required on-site for approximately eight months to build Phase I, with 45 personnel being required at peak times. During Phase II, this manpower loading would be repeated.	Effects during Phases I and II under this alternative would be similar to Alternative 3.	Effects during Phases I and II under this alternative would be similar to Alternative 3

Table 4.18-1 Comparison Summary of Effects of Alternatives

Resource Area	Alternative 1 (No Action)	Alternative 2 (No Action w/ Plan Amendment)	Alternative 3 (CES Proposed Action)	Alternative 4 (Modified Site Layout)	Alternative 5 Smaller Project Alternative
4.16 Environmental Justice	No effects	No effects	The Proposed Action is not expected to have a disproportionately high and adverse human health or environmental effect on minority and low-income populations in the Lucerne Valley.	Effects under this alternative would be similar to Alternative 3.	Effects under this alternative would be similar to Alternative 3
4.17 Energy and Minerals	No effects	No effects	No effect on mineral or energy resources would occur. The Proposed Action would require energy and mineral resources for construction, operations and maintenance, and decommissioning. However, given the expected 30-year lifespan of this renewable energy project, this would not be an adverse effect.	Effects under this alternative would be similar to Alternative 3	Effects under this alternative would be similar to Alternative 3.

5.0 Consultation and Coordination

5.1 Public Participation Summary

5.1.1 Public Scoping Period

The public was provided a 30-day scoping period at the beginning of the EIS process to identify potential issues and concerns associated with the proposed project. The Notice of Intent (NOI) for the Lucerne Valley Solar Project EIS was published in the *Federal Register* on Thursday, July 23, 2009 (Vol. 74, No. 140, page 36,504). A copy of this NOI is included in Appendix A of the BLM's *Final Environmental Impact Statement and Amendment to the California Desert Conservation Area Plan Lucerne Valley Solar Project San Bernardino County, California Public Scoping Summary Report, October 9, 2009* (BLM 2009). On July 14, 2009 BLM issued a press release to announce the beginning of the public scoping process and provide information about the time and location of the scoping meetings.

5.1.2 Scoping Meetings

The BLM held two public scoping meetings near the proposed project location, as follows:

- Lucerne Valley, California, on July 29, 2009, and
- San Bernardino, California, on July 30, 2009.

On July 24, 2009, a press release announced a change in the public meeting location for the July 29 public scoping meeting, from Lucerne Valley Community Center, 33187 Highway 247, to the Lucerne Valley Elementary School, 10788 Barstow Road, Lucerne Valley. The original press release announcing the meetings and the press release announcing a change in the public meeting location were attached to the Scoping Summary Report as appendices (BLM 2009). Outreach meetings were conducted by CES and the BLM with local residents, businesses, and San Bernardino County First District Supervisor Brad Mitzelfelt to discuss the project.

An open house was held for half an hour prior to each meeting so that participants could review displays, maps, and literature, as well as to meet members of the EIS team, BLM staff, and CES personnel. This also allowed the participants to discuss issues directly and to ask questions. To encourage public comment, repositories were provided for the public to deposit written comments. Each scoping meeting began with a presentation by the BLM describing its role as lead agency to administer the NEPA process. Then CES provided an overview of the technical aspects of the project, including a detailed presentation of the project. Lastly, the environmental consulting firm preparing the EIS described its role as third-party consultant, described opportunities for public involvement, and provided an overview of the environmental issues already identified to be addressed.

Each meeting concluded with a public comment period, where the BLM invited the public to provide verbal comments on the project. A court reporter recorded the two public scoping meetings and prepared transcripts of presentations and public comments and a list of persons commenting. Copies of the meeting transcripts were included as Appendices C and D of the Scoping Summary Report (BLM 2009). In addition to having the opportunity to provide verbal comments at the scoping meeting, participants were given the opportunity at the meetings to provide written comments or to take a comment form to fill out and mail in at a later date. All

meeting materials also contained a project-specific e-mail address to facilitate collection of electronic comments.

Attendees at the scoping meetings were provided with handouts describing the proposed project as well as the NEPA process. Comment forms were also provided to all attendees to facilitate submission of written scoping comments. The public was given the option to provide comments during the meeting, using regular mail or e-mail. Attendees of the meetings were encouraged to take additional comment forms with them.

The BLM also used the NEPA commenting process to satisfy the public involvement process for Section 106 of the NHPA (16 USC, Section 470f), as provided for in 36 CFR, Part 800.2(d)(3).

5.1.3 Scoping Response

Seventy-eight people attended the Lucerne Valley scoping meeting, and 13 people provided verbal comments. Seven people attended the San Bernardino scoping meeting, and two people provided verbal comments. In addition to verbal comments received during these scoping meetings, the BLM received a total of 40 comment letters or e-mails, including five from government agencies, two from nongovernmental organizations, one from CES, and 32 from private citizens by the August 22, 2009, deadline; these comments were contained in Appendix G of the Scoping Summary Report (BLM 2009).

5.1.4 EIS Mailing List

An EIS mailing list of interested persons was initially assembled from agencies, organizations, and other persons who expressed interest in being added to the mailing list during and after scoping. The mailing list for the proposed project was revised to add those persons who provided comments in response to scoping, who requested to be on the mailing list, or who signed a scoping meeting attendance list. Respondents who provided more than one comment letter were listed only once in the mailing list.

5.1.5 Distribution of the Draft EIS

The Draft EIS review period was initiated by publication of the Notice of Availability (NOA) for the Draft EIS in the Federal Register. The Draft EIS was distributed as follows:

- A NOA was published in the *Federal Register* specifying dates for the comment period;
- A news release containing the date, time, and location of public comment meetings was provided by the BLM at the beginning of the comment period on the Draft EIS. The news release was submitted to the same news organizations as for the initial public scoping announcement; and
- The Draft EIS was distributed to interested parties identified in the updated EIS mailing list, as described above, and also made available via the Internet.

5.1.6 Final EIS Preparation and Distribution

Letters and oral comments received on the Draft EIS will be reviewed and evaluated. Responses will be prepared for substantive comments, and modifications or corrections will be made to the EIS as determined necessary in response to these comments. Copies of these comments, along with responses to them, will be included in the Final EIS. A 30-day Final EIS

availability period will be initiated by publication of the NOA for the Final EIS in the *Federal Register*. The Final EIS will be sent to those who request copies and will be made available via the Internet. A news release will be issued to the same newspapers used for previous project announcements.

5.1.7 Record of Decision

Subsequent to the 30-day availability period for the Final EIS, the BLM will prepare a ROD. The BLM ROD will be distributed to individuals and organizations as requested and posted on the Internet. A news release will be made to the same newspapers used for previous project announcements.

5.2 Consultation with Others

5.2.1 Federal, State, and Local Agencies

The following state, federal, and local agencies were consulted during preparation of the EIS:

- Department of Defense
- Department of Energy
- USFWS
- California State Historic Preservation Office
- CDFG
- County of San Bernardino.

The following state, federal, and local agencies provided comments during the scoping period:

- Lucerne Valley Economic Development Association
- Town of Apple Valley
- U.S. EPA

5.2.2 Non-Governmental Organizations

The following non-governmental organizations also provided comments during the public scoping period:

- California Desert Coalition
- California Wilderness Coalition
- Defenders of Wildlife
- Desert Protective Council
- Mojave Desert Land Trust
- Natural Resources Defense Council
- Partnership for Johnson Valley

- Sierra Club
- Sierra Club Desert Committee Energy Committee
- The Audubon Society
- The Nature Conservancy
- The Wilderness Society
- The Wildlands Conservancy

5.2.3 Native American Tribes

The following Native American tribes were given notice of preparation of the EIS:

- Morongo Band of Mission Indians;
- San Fernando Band of Mission Indians;
- San Manuel Band of Mission Indians; and
- Serrano Nation of Indians.

6.0 List of Contributors

The following individuals participated in the preparation of this EIS:

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7.0 Acronyms

AB	Assembly Bill
AC	alternating current
ACECs	Areas of Critical Environmental Concern
AHPA	Archaeological and Historic Preservation Act of 1974
AIRFA	American Indian Religious Freedom Act of 1978
amsl	above mean sea level
ARPA	Archaeological Resources Protection Act of 1979
ATVs	all-terrain vehicles
BLM	Bureau of Land Management
BM	biological monitor
BMPs	Best Management Practices
BP	Before Present
BWh	dry-hot desert
°C	degrees Celsius
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal/OSHA	California Occupational Safety and Health Agency
CalEPA	California Environmental Protection Agency
CALFIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CAT	California Climate Action Team
CBC	California Building Code
CCAA	California Clean Air Act
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Chevron Energy Solution
CESA	Cumulative Effects Study Area
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalence
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
dB	decibel
dBA	A-Weighted Sound Level
DC	direct current
DCP	dust control plan
DEIS	Draft EIS
DOE	Department of Energy
DTSC	California Department of Toxic Substances Control
DWMAs	Desert Wildlife Management Areas

DWR	California Department of Water Resources
ECSZ	Eastern California Shear Zone
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act
ESA	Federal Endangered Species Act
°F	degrees Fahrenheit
FEIS	Final EIS
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act
FTA	Federal Transit Administration
GHG	greenhouse gas
GWP	global warming potential
HEC-RAS	Hydrologic Engineering Centers River Analysis System
HFCs	hydrofluorocarbons
HWCL	California Hazardous Waste Control Law
Hz	hertz
IM	Instruction Memorandum
IMPLAN	Impact Analysis for Planning, Inc., model
IPCC	Intergovernmental Panel on Climate Change
KOPs	key observation points
kV	kilovolt
L_{dn}	Day-Night Level
L_{eq}	sound level equivalent
L_{max}	maximum sound exposure level
LOS	level of service
LVCP	Lucerne Valley Community Plan
LVEDA	Lucerne Valley Economic Development Association
LVUSD	Lucerne Valley Unified School District
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MDPA	Mojave Desert Planning Area
MMT	million metric tons
$MMTCO_2e$	million metric tons of carbon dioxide equivalents
MUC	multiple-use class
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAAs	Non-attainment Areas
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NAHC	Native American Heritage Commission
NAICS	North American Industry Classification System
NEC	National Electrical Code
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NLCS	National Landscape Conservation System
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System

NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWSRS	National Wild and Scenic Rivers System
O_3	ozone
OES	California Office of Emergency Services
OHVs	off-highway vehicles
OSHA	Occupational Safety and Health Administration
Pb	lead
PFCs	perfluorocarbons
PGA	peak ground acceleration
PILT	payments in lieu of taxes
PM_{10}	particulate matter of 10 microns in diameter or less
$PM_{2.5}$	particulate matter 2.5 microns in diameter
POD	Plan of Development
PV	photovoltaic
RACM	Reasonably Available Control Measures
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROW	right-of-way
RPLI	Regional Paleontologic Locality Inventory
RWQCB	Regional Water Quality Control Board
SBCSD	San Bernardino County Sheriff's Department
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SLF	Sacred Lands File
SLRU	Sensitivity Level Rating Units
SMAs	Special Management Areas
SO_2	sulfur dioxide
SQRU	Scenic Quality Rating Units
STATSGO	State Soil Geographic database
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VdB	vibration velocity level in decibels
VOCs	volatile organic compounds
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEMO	West Mojave
WRCC	Western Regional Climate Center
ZCTA	Zip Code tabulation area

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1.0 Purpose of and Need for the Proposed Action

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