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SUPPLEMENTAL BIOLOGICAL ASSESSMENT FOR THE CALICO SOLAR PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for

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AND BUREAU OF LAND MANAGEMENT
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ACEC	Area of Critical Environmental Concern
AFC	Application for Certification
AFY	acre-feet per year
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practices
BNSF	Burlington Northern Santa Fe
CAISO	California Independent System Operator
CDCA	California Desert Conservation Area
CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
DB	Decibel
dBA	A-weighted decibel
DCH	Designated Critical Habitat
DESCP	Drainage, Erosion and Sediment Control Plan
DWMA	Desert Wildlife Management Areas
ESA	Endangered Species Act
FESA	Federal Endangered Species Act
I-40	Interstate 40
km	kilometer
kV	kilovolt
L_{eq}	Equivalent Sound Level
MOU	Memorandum of Understanding
mph	miles per hour
MW	megawatts
MWMA	Mojave Weed Management Area
NAP	Not a Part
NEPA	National Environmental Policy Act
OHV	off-highway vehicle
PCH	Proposed Critical Habitat
POD	Plan of Development
PUP	Pesticide Use Proposal
Project	Calico Solar Project
ROW	Right-of-Way
SCE	Southern California Edison
SES	Stirling Energy Systems
SIS	System Impact Study
sq mi	square mile
URS	URS Corporation
URTD	upper respiratory tract disease
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WEMO	West Mojave Plan
WSA	Cady Mountain Wilderness Study Area

This Supplemental Biological Assessment represents the culmination of changes made to the original Biological Assessment for the Calico Solar Power Generating Facility, San Bernardino County, California. The original Biological Assessment was provided to the United Stated Fish and Wildlife Service (USFWS) as an attachment to a Request to Initiate Formal Consultation Memorandum which the Bureau of Land Management (BLM) sent to the USFWS on April 1, 2010. The original Biological Assessment was docketed to the California Energy Commission's web site on April 12, 2010. In response to the initiation request, the USFWS responded with an Insufficiency Memorandum (dated April 22, 2010) which outlined deficiencies in the original Biological Assessment which made it inadequate to initiate formal consultation. After further discussion with USFWS, the BLM provided the USFWS with a revised Biological Assessment on May 17, 2010. In response to this submittal, the USFWS sent a Sufficiency Letter (dated June 21, 2010) which indicated that the revised Biological Assessment was sufficient to initiate formal consultation. However, the Sufficiency Letter stated that there were clarifications that needed to be addressed in order for the USFWS to complete their Biological Opinion. Upon further discussions with the USFWS, the BLM addressed these clarification needs. This Supplemental Biological Assessment represents the culmination of the changes made in the revised Biological Assessment as well as changes made as a result of addressing the clarification needs of the USFWS. A summary of the changes made since the issuance of the original Biological Assessment are presented in Appendix F of this document.

EXECUTIVE SUMMARY

This Biological Assessment (BA) has been prepared for Tessera Solar's (TSA) Calico Solar Project (Calico Solar Project) in support of a request from the Bureau of Land Management (BLM) for formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the Federal Endangered Species Act (ESA) regarding the issuance of a Right-of-Way (ROW) grant for the Calico Solar Project. The Project is located on 6,215 acres of land managed by the BLM approximately 37 miles east of Barstow in San Bernardino County in southern California (Figure 1). The proposed Project includes the construction, operation, maintenance, and decommissioning of an 850-megawatt (MW) solar power generating facility and its ancillary systems. The facility would be constructed according to two phases: Phase 1 would be 275 MW and covers approximately 2,327 acres; Phase 2 would be 575 MW and covers approximately 3,887 acres in San Bernardino County, CA (Figure 2). The Project also involves the interrelated construction of a connection from the onsite Calico substation to the Pisgah substation. Upgrades to the Pisgah substation and the Pisgah-Lugo transmission lines are separate projects proposed by Southern California Edison (SCE) that will serve a variety of energy and communication needs in the vicinity. For the purposes of this BA, the action area (Figure 3) includes:

- The project site and any necessary components (*i.e.,* access roads).
- A 1,000- foot radius buffer from project boundary to account for impacts to home ranges.
- Not a Part areas (NAP Areas).
- The Desert Tortoise recipient sites.
- The translocation control sites.
- All contiguous Desert Tortoise habitat within 6.2 miles of long-distance translocation sites - based on the average distance Desert Tortoise may range following a translocation.

The following Federally listed species are known to occur, or have the potential to occur in the Action Area:

Species	Listing Status	Critical Habitat within the Action Area	Effects Determination
Desert Tortoise (*Gopherus agassizii*)	Threatened	Yes	May affect, likely to adversely affect tortoise. May affect, not likely to adversely modify critical habitat.

Desert tortoise are widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. They typically have overlapping home ranges averaging between 5-131 acres, which additionally can fluctuate in size on a year-to-year basis based on several factors such as sex, rainfall, availability of resources, and others factors. The 100% 10m transect desert tortoise surveys were conducted in April 2010 to estimate the population of desert tortoise on-site. A total of 48 live adult/subadult desert tortoise and 9 juveniles were

detected on the current Project site during the 100% desert tortoise 10m transect surveys. Designated critical habitat (DCH) is located within the Ord-Rodman Desert Wildlife Management Area (DWMA) Area of Critical Environmental Concern (ACEC), which is south of I-40 and included within the Action Area.

The implementation of the Calico Solar Project is likely to have an adverse affect on the desert tortoise. Potentially adverse affects would occur in the form of behavioral harassment, potential direct or indirect injury or mortality, and reduction of occupied habitat and local habitat capacity due to habitat disturbance and indirect edge effects along the project boundary. Implementation of the Translocation Plan, installation of exclusion fencing, and implementation of other conservation measures are intended to minimize direct mortality of tortoise. Mitigation (a mix of off-site habitat acquisition and off-site habitat enhancement) is proposed to offset impacts to occupied habitat. Based on the amount of suitable habitat that would be impacted and estimated population derived from focused desert tortoise surveys conducted on the Action Area, based on best available data, approximately 93 adult desert tortoise (95 percent confidence range of 47 to 185 individuals) and 6,215 acres of occupied tortoise habitat may be affected by the proposed project. An estimated 39 juvenile tortoises may also be affected. An estimated 83 tortoise may be indirectly affected due to edge effects in habitat directly adjacent to the project site. Additional tortoise would be affected through implementation of the Translocation Plan, based on best available data, potentially 264 (= 2 x (93 + 39) tortoise could be handled, blood sampled and radio transmitters attached so that these individuals can be used as resident or control individuals for comparison to the translocated individuals. Therefore, it is estimated that 764 tortoise (633 directly and 83 indirectly) may be affected by this proposed project.

Juvenile desert tortoises are extremely difficult to detect because of their small size and their cryptic nature. Based on a 4-year study of their population ecology, Turner et al. (1987) determined that juveniles accounted for 31.1 to 51.1 percent of the overall population. Using this range and a maximum 93 adult desert tortoises on the proposed site, we estimate that the 6,215-acre project area may support from 29 to 48 juveniles.

To estimate the number of eggs that could be present on the project site, we used the average number of clutches per reproductive female in a given year, (i.e., 1.6, see Turner et al. 1984), multiplied by the average number of eggs found in a clutch (i.e., 5.8, see Service 1994). By approximating a 1:1 sex ratio, we assumed that 47 out of the 93 adult desert tortoises onsite are reproductive females and that, together, they could produce approximately 436 eggs in a given year. Fewer eggs are likely to be onsite at any given time because the territories of the female desert tortoises likely extend, at least in part, off of the project site and individuals may establish nests in these areas.

The Project site itself does not contain any designated critical habitat (DCH) for the desert tortoise. However, the implementation of the Translocation Plan will require the movement of tortoises into the Ord-Rodman Desert Wildlife Management Area (DWMA) which encompasses DCH. Increasing tortoise densities within the critical habitat along with the potential to introduce diseased animals into DCH has the potential to adversely affect the constituent elements of the critical habitat unit. In total, the long-distance translocation receiver site is composed of 9,833 acres of critical habitat. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of the DCH. While the implementation of the Translocation Plan has the potential to adversely affect critical habitat, the BLM has determined that implementation will not adversely

modify DCH given that the Translocation Plan has protocols which will prevent the translocation of diseased animals and will limit translocation densities to levels which will not exceed the habitat carrying capacity. Furthermore, we have reached this conclusion because most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements.

SECTION 1 PROJECT DESCRIPTION

This Biological Assessment (BA) has been prepared to evaluate the potential effects of the Calico Solar Project (Project) on Federally listed species that are known to or have the potential to occur within the Project area, and on proposed critical habitat (PCH) or DCH within the entire Action Area (defined in Section 1.2) pursuant to Section 7 of the Federal Endangered Species Act (ESA). The proposed Federal action will potentially affect one Federal listed species – desert tortoise (*Gopherus agassizii*). Potential effects on this species and DCH are evaluated in accordance with the requirements set forth under Section 7 of the ESA (16 United States Code [U.S.C.] 1536). DCH occurs within the Action Area.

The effects of the Project within the Action Area on desert tortoise and its DCH include consideration of and implementation of the mitigation measures to avoid and/or reduce the environmental effects from the development, operation, and maintenance of the Project. The conservation measures proposed by the Applicant that will avoid or minimize effects on desert tortoise and modification of DCH are presented in Section 4.

1.1 PROJECT LOCATION

The proposed federal action is the issuance of a Right-of-Way (ROW) grant for the Project. The Project consists of a solar-powered electric generating facility located in a relatively undeveloped area of San Bernardino County, California, approximately 37 miles east of Barstow, California and north of Interstate 40 (I-40) (Figure 1). The Project is located on Bureau of Land Management (BLM) land under management of the BLM Barstow Field Office (Figure 2). The area where the Project would be constructed is primarily open, relatively undeveloped land within the Mojave Desert between approximately 1,810 and 3,050 feet (550 and 930 meters) above mean sea level. The Cady Mountain Wilderness Study Area (WSA) is located north of the Project site. The BLM-designated Pisgah Crater Area of Critical Environmental Concern (ACEC) is located directly adjacent to the southeastern boundary of the Project. The Ord-Roadman DWMA is located adjacent to the southwestern boundary of the proposed Project. Several underground and above-ground utilities traverse the Project area as does Burlington Northern Santa Fe (BNSF) railroad tracks. A transmission corridor runs along the eastern Project area boundary. Undeveloped land extends west of the Project area. The Project includes an access road within BNSF ROW that will be used for construction access prior to completion of a bridge spanning the railroad which should occur by approximately March 2011. Burlington Northern Santa Fe (BNSF) ROW will also be used to access the western-most portion of the site and by trucks delivering water from the BNSF rail siding to the Main Services Complex, should the Project require rail delivery of water prior to completion of a waterline which should occur by approximately June of 2011.

1.2 DEFINITION OF ACTION AREA

The proposed Project is located on approximately 6,215 acres of land managed by the BLM. For the purposes of this BA, the Biological Assessment or "action area" includes the following: the Project area, a 1,000-foot buffer around the project area, the NAP areas, the DT recipient sites, the control sites, and all contiguous DT habitat within 6.2 miles of long-distance translocation (based on the average distance DT may range following a translocation). The combination of these areas is hereby referred to as the "Action Area" (Figure 3). It should be noted that there are portions of the Project site that are within the Action

Area, but are Not a Part (NAP) of the BLM's Plan of Development (POD). These locations are displayed on the attached figures as NAP. The NAP areas are included in the Action Area due to indirect effects similar to that which would occur within the 1000-foot buffer. Translocation receiver sites and control sites and a 6.2 mile buffer around the receiver sites are also considered part of the Action Area due to the handling of tortoise in these areas. The Action Area encompasses nearly 283,000 acres, and includes over 244,000 acres of USGS modeled tortoise habitat.

1.3 PROPOSED ACTION

The Calico Solar Project includes the construction, operation, maintenance, and decommissioning of up to 850 megawatts (MW) of capacity by a solar power generating facility and its ancillary systems in two phases (the first phase would be developed for 275MW and the second for 575MW). The Project will consist of approximately 34,000 SunCatchers. It is estimated that an average of approximately 400 and a high of 750 construction jobs and 180 long-term labor jobs will be required. Construction is tentatively scheduled to occur over an approximate five-year period beginning in 2010 through 2012 for Phase 1 and between 2013 and 2015 for Phase 2. A detailed breakdown of project component phasing is provided in Table 1, assuming SCE completes the full transmission build-out necessary for Phase 2 before 2014.

Approval of the Project ROW Grant Application (Form 299, Applications CACA 49539 and 49537) will result in the issuance of a ROW Grant Permit for use of federal lands administered by the BLM. The Project would require a plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan.

An approved interconnection letter from California Independent System Operator (CAISO) has been issued for the Project. The associated System Impact Study (SIS) is located in Appendix H of the Application for Certification (AFC). The SIS indicates that additional upgrades to the SCE Lugo-Pisgah No. 2 Transmission Line and upgrades at the SCE Pisgah Substation will be required for the full build out of the 850MW Project, although the exact parameters of that project are as of yet undefined. These upgrades are designed to serve a variety of projects in the area. Supplemental studies performed by SCE and CAISO indicate that capacity is available on the existing transmission system to accommodate less than the 850MW Project by incorporating a minor and much less time consuming upgrade to the Pisgah substation. This first part of the upgrade will allow SCE to take 275 MW of the project's generation by the second semester of 2011. Both of these system upgrades are being considered as separate stand alone projects that are not part of the proposed Calico Solar Project (see Appendix A).

An on-site substation (*i.e.,* Calico Solar Substation [approximately 15 acres]) will be constructed to deliver the electrical power generated by the Project to the existing SCE Pisgah Substation. Approximately twelve to fifteen 220 kilovolt (kV) transmission line structures (90 to 110 feet tall), would be required to make the interconnection from the Calico Solar Substation to the SCE Pisgah Substation. All of these structures would be constructed within the Project site, except for a portion of the transmission line that would extend off site for approximately 2,800 feet, and would include a maximum of a 200-foot temporary impact buffer area (12.9 acres). Water will be delivered to the Project site through an underground pipeline from a production well that is located in N.A.P. Area 1. Approximately 990 feet of pipeline will be required within NAP Area 1, with a maximum temporary construction buffer area of 200 feet (4.5 acres). Measures to reduce impacts to desert tortoise would include pre-construction clearance surveys, installing temporary exclusionary fencing prior to construction, and removal of the

temporary exclusion fence after construction. Temporary impacts to up to 12.9 acres of tortoise habitat would be restored to pre-construction conditions upon completion of construction as described in the Restoration Plan for temporary impacts.

The Project will include a centrally located Main Services Complex (37.6 acres) that includes three SunCatcher assembly buildings, administrative offices, operations control room, maintenance facilities, and a water treatment complex including a water treatment structure, raw water storage tank, demineralized water storage tank, basins, and a potable water tank. Adjacent to the Main Services Complex, a 15-acre temporary construction laydown area will be developed and an approximately 6-acre construction laydown area will be provided adjacent to the Satellite Services Complex south of the BNSF railroad

Table 1
Calico Solar Project Construction Schedule

Project Activity	Construction Time Frame	DT Clearance and Exclusionary Fencing Time Frame
Proposed Phase 1 Fenceline Construction	October 2010	October 2010
Proposed Phase 1 Construction	October 2010	October 2010
Transmission Line Construction	October 2010	October 2010
Waterline Construction	October 2010	October 2010
Temporary Construction Road within BNSF ROW Construction	October 2010	October 2010
Proposed Access Road within BNSF ROW Construction	October 2010	October 2010
Proposed Phase 1 Fenceline Construction	October 2010	October 2010
Proposed Main Access Route Construction	November 2010	October 2010
Proposed Main Services Complex Construction	November 2010	October 2010
Proposed Substation Construction	December 2010	October 2010
Proposed Bridge Construction	January 2011	October 2010
Detention Basins Phase 1 Construction	July 2011	Late March – early June 2011
Proposed Access Road to Phase 1 Detention Basins	July 2011	Late March – early June 2011
Phase 2 Project Fenceline Construction (Below Railroad)	October 2010	October 2010

Project Activity	Construction Time Frame	DT Clearance and Exclusionary Fencing Time Frame
Phase 2 Project Construction	June 2013	Late March – early June 2013
Phase 2 Project Fencing Construction (Above Railroad)	June 2013	Late March – early June 2013

The SunCatcher field itself will cover approximately 6,215 acres. The SunCatchers will be installed in two steps. The hollow base will be vibrated into place without the need for extra grading or disturbance. Once the base is installed, the actual SunCatcher unit will be installed onto the base. Rows of SunCatchers will include access roads between them. The combined width of two SunCatchers and associated maintenance road between them is approximately 150 feet. Access roads will only be needed every other row since one road can service SunCatchers on either side of the roads. The access roads will be treated with polymeric stabilizers that contain vinyl acetate and/or acrylic polymers, such as SoilTac, to bind the soil together to minimize dust. The Department of Defense evaluated the environmental fate and effects of this and other commercially available dust stabilizer products used for pavements and soil stabilization (Steevens et al. 2007). This study showed that vinyl acetate and acrylic polymers are stable in soils after curing and are unlikely to be available to terrestrial organisms or be transported in runoff water in their solid form, and appear to be relatively nontoxic to the environment. The most likely receptors of soil stabilizers are less mobile species such as plants and soil invertebrates (e.g., pill bugs and earthworms) that may be contacted during application of the stabilizer. It is unlikely that trophic transfer will be observed for the soil stabilization materials based on chemical composition, chemical properties, and large polymer size. Therefore, chronic impacts to tortoise and other wildlife in the Project area are not expected. However, polymeric stabilizers are a biodegradable material that can cause skin and eye irritation if exposed in liquid form, thus application of polymeric stabilizers to the dirt roads should be made only after all tortoise are cleared from the project site.

Where practicable, the area occupied by the SunCatchers will not be graded. Approximately 40 to 80 feet will be left intact and generally undisturbed between each alternate row of SunCatchers. Shrub vegetation will be trimmed to three inches and allowed to regenerate throughout the solar array fields, as practicable. It is estimated up to 30% of the solar array field area will not be directly disturbed. Minimal mowing and brush trimming may be required to reduce fire hazard and shading of SunCatchers.

Long-term permanent access would be provided by a bridge over the BSNF railroad along a route north of I-40 (Figure 2). Temporary construction access roads and a main access road are depicted on Figures 2 and 4. In addition, there is a proposed access road to the northern detention basins that will run along the outside of the project boundary. Permanent desert tortoise exclusionary fence will surround the road.

Detention basins will be located throughout the Project site, inside of the Project boundary (Figure 2). These will range from small detention basins along the proposed access roads, to larger detention basins at road intersections to the larger detention basins south of the Cady Mountains within the Project site (Figure 2). No tortoise habitat or individuals would be affected by maintenance activities

Water for the Project will be provided by groundwater from an existing well located within the Cadiz basin. The water will be brought onsite by rail using the existing rail line. The expected average water consumption for the Project during construction is approximately 136 acre-feet per year (afy). Under normal operation (inclusive of mirror cleaning, dust control, and potable water usage), approximately 20 afy of water will be required. Use of the Cadiz Basin water source is not expected to impact tortoise. Local wells are currently being tested as a back-up water supply. If these local wells are utilized, water will be delivered to the site through an underground pipeline from a production well that is located in N.A.P. Area 1. Approximately 990 feet of pipeline will be required within NAP Area 1, with a maximum construction buffer of 200 feet. Temporary impacts (4.5 acres) to tortoise and tortoise habitat will be minimized through installation of a temporary exclusion fence while the new pipeline is buried. Once the pipeline is buried, the fence will be removed and the temporary impacts of up to 4.5 acres of tortoise habitat would be revegetated as described in the Restoration Plan associated with this Project. A permanent fence around the production well is not expected, but will be placed if found to be necessary.

1.3.1 Reduced Footprint Alternative 1

At the request of agency representatives and interested parties and to help lessen potential impacts to biological resources, the Applicant modified the northern Project boundary by moving it south approximately 0.55 miles (2900 feet), allowing an approximate 0.65 mile wildlife corridor between the revised northern project boundary and the toe of slope of the Cady Mountains. The Project boundary modification resulted in a reduction of the Project area from approximately 8,230 acres to approximately 7,130 acres. The modified Project boundary avoided direct impacts to occupied habitats for tortoise and other species of concern (e.g., special status plants, burrowing owls, and bighorn sheep). The modifications to the Project boundary would expand the east-west movement corridor by about 2,900 feet and allow for tortoise to move past the steeper topography that may hinder regular movement through this area. Additionally, the boundary modifications increased the distance between the Project and the nearest known golden eagle nest site, from approximately 2.5 miles from the previously proposed boundary to three miles from the modified Project boundary (URS 2010a).

1.3.2 Reduced Footprint Alternative 2

Based on input from the U.S. Fish and Wildlife Service's Desert Tortoise Recovery Office (DTRO) and the BLM, the northern boundary of the Project site has been further modified to include a 4,000-foot desert tortoise linkage between the Project (exclusive of all detention basins) and the base of the Cady Mountains. This is also the preferred alternative and identified throughout this document as Alternative 2. To accommodate this modification, the detention basins were re-configured to extend east to west along the northern Project boundary and the boundary between Phases 1 and 2, which allows the detention basins to be included within the Project fenceline and outside of the 4,000-foot wildlife linkage. The detention basin design also maintains the natural drainage patterns of the site. Additional modifications were made to the overall project, resulting in a decrease in project acreage to 6,215 acres (a 2,015-acre reduction). Several support facilities were adjusted, and the remainder of the Phase two solar field footprint was decreased to avoid the majority of the biological and flood prone areas of the site and minimize the distance needed for desert tortoise translocation. This new footprint will allow the Applicant to meet the requirements of the PPA, avoid environmentally sensitive areas, reduce the loss of desert tortoise, avoid or reduce impacts to special status plants, and pull away from the toe of the Cady

Mountains. It should be noted that the spacing between and the number of the SunCatchers is not being changed.

1.3.3 Best Management Practices (BMPs)

Project construction will occur in two phases. Phase I and Phase II, as denoted on Figure 2, represent geographic location. The Applicant is currently working with the agencies and public to determine the temporal phasing that will minimize environmental impacts. It is anticipated that the first phase of the Project would be developed for 275 MW and be built above the BNSF railroad, while staying as close to the railroad as practicable. A detailed breakdown of project component phasing is provided in Table 1.

Maintenance shall be restricted to within the tortoise exclusion fence. If unanticipated circumstances require altering such boundaries, the potential expanded work areas shall be surveyed for listed species prior to use of the area. All appropriate mitigation measures for protecting listed species and their associated habitats shall be implemented within the expanded work areas. No expanded work areas shall be authorized without the express written concurrence of the BLM and USFWS.

1.3.4 Avoidance, Minimization, Mitigation, and Monitoring

The following section summarizes mandatory avoidance and minimization measures being proposed by the Applicant to avoid and/or compensate for the potential impacts of the proposed Project. These mitigation measures may be modified and/or supplemented based on discussions with the various permitting agencies (*i.e.,* during the consultation process with United States Fish and Wildlife Service [USFWS] and California Department of Fish and Game [CDFG], or during the National Environmental Policy Act [NEPA] process with BLM).

1.3.5 Construction Monitoring and Vegetation Clearing

Calico Solar will provide mitigation construction monitoring by USFWS and BLM approved qualified biologists. The biologists will be given authority to monitor the functions listed below.

- Awareness training for desert tortoise, Mojave fringed-toed lizard, and other special status resources will be provided to all construction crews and operations staff.
- A biologist will monitor the construction activities daily during the initial site disturbance (including installation of temporary and permanent desert tortoise exclusion fencing). After all tortoises have been removed from the active construction area, an authorized biologist shall be on-call and available at all times. Should a tortoise be located within the perimeter exclusion fence, the authorized biologist will be contacted to move the tortoise to outside the exclusion fence and to notify BLM within 1 business day. Exclusionary fencing will be checked monthly and after any substantial rain event to ensure that they are effective barriers for tortoise. A monitoring biologist will be notified should construction crews or operations staff detect a tortoise within the exclusion fence and the biologist would go to the site to move the tortoise outside the fence.

- Implement the Weed Management Plan that is consistent with the Mojave Weed Management Area (MWMA) Memorandum of Understanding (MOU), which includes prevention, control, and eradication of weeds and invasive plant species, and educating the public about weed control in the region (DMG 2002a). The MOU identifies a priority list of invasive species to control in the Mojave. Use of herbicides will be avoided, but if necessary, only those herbicides approved by the USFWS and BLM that have shown empirically proven low toxicity to test animals in the Pesticide Use Proposal (PUP) process will be used. This would include post-emergent herbicide formulations such as Accord SP with the active ingredient glyphosate, and pre-emergent herbicide formulations such as Korvar I DF with the active ingredients bromacil and/or diuron (R. Chavez, BLM, pers. comm. 2010).

1.3.6 Focused Mitigation for Desert Tortoise

The following conservation measures will be performed by the Applicant.

A Desert Tortoise Translocation Plan (Appendix D to this document) shall be developed by Calico Solar, and must be approved by BLM and the wildlife agencies, and be completed and approved by USFWS prior to issuance of a Biological Opinion. This plan will include the following details at a minimum: translocation protocol; health assessments for all tortoise handled; disease testing of individuals that will be translocated greater than 500 meters; translocation habitat assessment and suitability; assessment of desert tortoise population and health in the area receiving translocated tortoise. Pre-construction surveys will be conducted to locate and test all desert tortoises that will be translocated greater than 500 meters from the area where they are collected to the translocation location outside of the Project site. Testing will entail bloodwork to determine whether any desert tortoises suffer from upper respiratory tract disease (URTD) and will include radio tagging each desert tortoise found to aid in subsequent relocation after blood test results are available. Desert tortoises from Phase One will be held in temporary holding pens in the Pisgah Crater ACEC, which has been identified and approved as the short-distance translocation area (Figure 3). Those desert tortoises found to be healthy will be released into this translocation area. Tortoise found within 500 meters of the boundary of the detention basin area of Phase 1 will be moved into the desert tortoise linkage area. Approximately 12 tortoise are located within 500 meters of the boundary of the Phase 1 detention basin areas and can be moved without requiring blood testing; however, the number of tortoise that would be placed in the linkage will be limited to avoid raising the tortoise density of the linkage above 10% of its current density (4.5 tortoise per kilometer). Any additional individuals that are detected in the detention basins will be placed in temporary holding pens within the short-distance translocation area (Figure 3) and once they are found to be healthy will be released.

Two desert tortoises were detected in an area that was recently identified as an environmentally sensitive area on the west side of NAP Area 2 and has been excluded from the Project footprint. To avoid and minimize loss of tortoise in this recently excluded area, the Applicant proposes to relocate the tortoise found in this area by following the methods identified in the approved Desert Tortoise Translocation Plan. These tortoises would be relocated greater than 500 meters from this location, which would require blood testing prior to moving them to the long-distance translocation site. The Applicant proposes to install temporary fencing around the Project line (on the west side of NAP Area 2) that surrounds this environmentally sensitive area while waiting for blood test results (Figure 4) to avoid moving the tortoise more than one time. The fencing would be removed once the tortoises are relocated to the long-distance translocation areas in Spring 2010. An unknown (but

small) number of tortoises reside in the NAP Area 2, and these tortoises will be blood tested and translocated to the long-distance translocation site if the individuals are found disease free. Since these tortoises are on private lands in NAP 2, these tortoise will be identified and translocated to the extent that land owner approval can be obtained.

A temporary exclusionary fence will be constructed around the construction area in occupied desert tortoise habitat, pre-construction clearance surveys to remove tortoise from the construction area will be conducted, and roving biological monitors that will monitor the various construction crews in the active construction areas will be assigned. Biological monitoring would also be present during access road improvements in occupied desert tortoise habitat. The temporary exclusionary fencing will be in place for over one year; therefore, in compliance with USFWS guidelines, a 4-strand wire exclusion fence that is made of galvanized material or an ERTEC polymer matrix (USFWS 2005, ERTEC 2010; Appendix E) will be placed during construction and removed after construction has been completed. This type of fencing is usually used for permanent fencing, thus providing the level of protection needed for the extended length of Project construction, which is expected to be approximately 4 years. Figure 4 shows the phasing of exclusion fencing.

A permanent security fence will surround the Project site. To continue to allow access to the public lands north of the Project site, the perimeter road surrounding the Project site will be left open to the public. A permanent tortoise exclusionary fence will be constructed on the outside of this perimeter road to minimize the potential for tortoise mortality from traffic (Figure 4). Where there are intersections with other roads, the fence will remain on the outside of the perimeter road (creating a 'T' of fencing on the outside of each road) thereby allowing uninterrupted use of the road. These intersections are shown in detail on Figure 4. The exclusionary fence will be consistent with USFWS design criteria as described above.

Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing exclusion areas, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent and temporary fencing shall be inspected monthly and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the Project. All fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise. If fencing is not repaired within 48 hours, the BLM Wildlife Biologist shall be notified within 5 business days to determine if additional remedial action is required, such as the need for conducting additional clearance surveys within the Project footprint.

In addition to the exclusionary fencing, cattle guards will be placed where the perimeter access road meets the permanent security fencing near the southeast and northeast boundaries of Section 9, and in two locations where additional breaks are needed in the permanent security fence for access to the NAP 1 Area (Figure 4).

Consistent with BLM and CDFG requirements, mitigation for loss of desert tortoise habitat will be achieved by a combination of habitat acquisition and habitat enhancement. The lands to be acquired and the specific habitat enhancement actions have not presently been determined. These specifics shall be developed through discussions among BLM, CDFG, and USFWS. Acquired lands will be purchased either by the applicant or the applicant can deposit funds with the National Fish and Wildlife Foundation (NFWF) in conformance with a Memorandum of Agreement (MOA) being developed by the wildlife agencies. If these lands are acquired through the NFWF MOA, a compensation fee will be assessed based on current fair market appraised value for the specific geographic area in which the acquisition occurs. The acquired lands shall occur in desert tortoise habitat with equivalent function and value. The replacement habitat is intended to benefit the population of tortoises adversely affected by the project, and shall be located within the same Desert Tortoise Recovery Unit (as identified in the 2009 draft Recovery Plan) with comparable or better habitat value. The BLM, USFWS, and CDFG shall coordinate to reach mutual agreement on the selection and ownership/management of acquired lands.

If acquisition funds are provided to NFWF, the compensation (1) funds will be provided prior to Project construction, (2) lands will be acquired prior to completion of Project construction, and (3) lands will be conserved in perpetuity by a legal mechanism agreed to by the three agencies. If the conservation lands are acquired directly by the applicant, then steps #2 and #3 will apply.

Regardless of the acquisition method (by applicant or NFWF), the Applicant will establish a management fund for the agency that owns and manages the acquired lands. The management fund will consist of an interest-bearing account, with the amount of non-wasting capital commensurate to generate sufficient interest to fund all monitoring, management, and protection of the acquired lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and other actions designed to protect or improve the habitat values of the acquired lands. A Property Analysis Record (*http://cnlm.org/cms/index.php?option=com_content&task=view&id=21&Itemid=155*), or comparable method, will be conducted by the Applicant and Agencies, to determine the management needs and costs described above, which then will be used to calculate the amount of capital needed for the management fund. This management fund will be held and managed by NFWF. A portion of the lost desert tortoise habitat may be offset by habitat enhancement activities. The proportion of the habitat loss to be offset by habitat enhancement activities shall be determined through discussions among the BLM, CDFG, USFWS and the Applicant. Funds for implementing these management actions, as determined by the wildlife agencies, shall be deposited in the same NFWF fund described above.

Speed limits within the Project site will be restricted to less than 25 miles per hour (mph) during construction and on non-public access roads in areas surrounding the Project Site during operation of the Project. All construction and operations personnel will be limited to this speed limit unless the speed limit is posted on public paved roads.

Lighting will be focused in toward the project site and downward to avoid lighting habitats beyond the project perimeter fencing.

A Raven Monitoring, Management, and Control Plan must be approved by BLM, CDFG and USFWS prior to the initiation of any earth disturbing events. Monitoring for the presence of ravens and other potential human subsidized predators of special status wildlife and implement a management plan if predator densities substantially increase in the vicinity of the facility. A pre-construction survey of the

project site will be conducted to document the baseline level of raven occupation in the project vicinity. Best Management Practices (BMPs) will be instituted to minimize the subsidization of ravens. BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

Calico Solar Weed Management Plan, which must be approved by the wildlife agencies (CDFG, USFWS and BLM), will be implemented prior to the initiation of ground disturbing activities. Mitigation measures in the Weed Management Plan include: worker awareness training; limiting ground disturbance to designated areas only; maintenance of vehicle wash and inspection stations and close monitoring of materials brought onto the site to minimize the potential for weed introduction; re-establishment of native vegetation in disturbed areas to prevent weeds from colonizing newly disturbed areas; and, regularly scheduled monitoring to quickly detect new infestations of weeds, coupled with rapid implementation of control measures to prevent further infiltration. Herbicides that may be used include post-emergent herbicide formulations such as Accord SP with the active ingredient glyphosate, and pre-emergent herbicide formulations such as Korvar I DF with the active ingredients bromacil and/or diuron. These herbicides have shown empirically proven low toxicity to test animals, and are approved by BLM and USFWS.

1.4 CONSULTATION HISTORY

Early informal consultation between the BLM and USFWS started on this proposed project in early 2007. The early discussions concerned the development of protocols for biological surveys. Between 2007 and the present, many e-mail and phone conversations have ensued. Below are listed the major milestones associated with this consultation process.

August 18, 2008:

The BLM Barstow Field Office sent the USFWS Ventura Field Office an e-mail relating to the protocols used during the data collection for the development of the Biological Technical Report.

August 19, 2008:

The USFWS Ventura Field Office sent a response e-mail to the BLM Barstow Field Office regarding the protocol discussion e-mail.

August 27, 2009:

BLM District Office sent letter to USFWS Ventura Field Office requesting a species list for the proposed Project.

September 21, 2009:

BLM District Office received species list for the proposed Project from the USFWS Ventura Field Office.

October 8, 2009:

First meeting between BLM, CDFG, USFWS and Project proponent regarding potential mitigation measures for the proposed Project.

December 10, 2009:

Second meeting between BLM, CDFG, USFWS and Project applicant regarding potential mitigation measures for the proposed Project.

January 28, 2010:

Meeting between BLM, CDFG, USFWS and Project applicant regarding development of the draft Desert Tortoise Translocation Plan.

March 29, 2010:

Meeting between BLM, CDFG, and USFWS to discuss translocation receptor sites.

April 1, 2010:

Meeting between BLM, USFWS, and Project Applicant to discuss translocation receptor sites.

April 20, 2010:

BLM received an early alert phone call that an Insufficiency Letter was forthcoming from the USFWS.

April 26, 2010:

BLM received an Insufficiency Letter from USFWS, dated April 22, 2010, indicating that the consultation package was incomplete and that the formal consultation had not been initiated pending revisions of the original Biological Assessment.

April 27, 2010:

BLM met with USFWS to discuss the insufficiencies outlined in the April 22, 2010 letter.

April 30, 2010:

USFWS provided written comments on the original BA to BLM and the Applicant.

May 5, 2010:

USFWS met with BLM and Applicant to discuss BA revisions.

May 10, 2010:

BLM and USFWS received revised BA from the Applicant.

May 12, 2010:

BLM provided comments to USFWS and applicant on the revised BA.

May 17, 2010:

BLM provided a revised BA to the USFWS.

June 21, 2010:

The USFWS sent the BLM a Sufficiency Letter stating that the revised BA was sufficient to initiate consultation. The Sufficiency Letter requested clarification regarding the Alternative #2 Reduced Footprint Proposed Action.

July 2, 2010: BLM provided USFWS with an Appendix to the revised BA which addressed the USFWS information needs.

SECTION 2 DESCRIPTION OF LISTED SPECIES

Only one federally listed wildlife species was detected in the Project site or immediate vicinity during field surveys: desert tortoise. Section 2.1 lists details of the implemented desert tortoise protocol survey methods and associated results. A listing of other special management status species known from the Project vicinity can be found in the Solar One Biotechnical Report (URS 2009b).

No federally listed plant species were found, or are expected to occur within the Project site. A complete list of all plant species detected during the 2007 and 2008 surveys, and a listing of other special management status species known from the Project vicinity can be found in the Solar One Biotechnical Report (URS 2009b).

Designated critical habitat for the desert tortoise occurs in the Action Area directly adjacent to the southwestern edge of the Project site south of I-40 within the Ord-Rodman DWMA. A total of 9,833 acres of DCH has been targeted for use as long-distance translocation receptor sites.

2.1 DESERT TORTOISE

2.1.1 Literature/Database Search and Species Consultation

A search of the California Natural Diversity Database (CNDDB 2008) within a 10-mile radius of the Project boundary revealed several previously documented desert tortoises occurring approximately 4.5 miles south of the Project boundary (Figure 5). A literature search was also conducted that yielded relevant information pertaining to desert tortoise within the Action Area. Experts, authors, and consultation with appropriate agencies (including USFWS, CDFG, and BLM) are cited below.

2.1.2 Species Account

Regulatory Status: Federal: USFWS: Threatened; State: CDFG: Threatened

Desert tortoise is widely distributed in the deserts of California, southern Nevada, extreme southwestern Utah, western and southern Arizona, and throughout most of Sonora, Mexico. Desert tortoise populations are declining because of various factors including the spread of a fatal respiratory disease, increases in raven populations that prey on juvenile tortoises, and habitat loss and degradation because of various extensive and intensive land uses. Only the Mojave population of desert tortoise is Federal- and State-listed as threatened. Typical tortoise habitat consists of firm but not hard ground - usually soft sandy loams and loamy sands - to allow for burrow construction (Karl 1983). Desert tortoise primarily occurs in four subpopulations in the West Mojave Desert (Ord-Rodman, Superior-Cronese, Fremont-Kramer, and Joshua Tree DWMAs). Outside of these DWMAs, tortoises tend to occur in at much lower densities. This species is mostly found in creosote bush scrub, with lower densities occurring in Joshua tree woodland and saltbush scrub. The topography where this species is typically found includes flats, low valleys, bajadas, and low hills between 2,000 and 3,300 feet and occasionally above 4,100 feet.

The diet of desert tortoise consists mainly of annual plants and grasses, but also perennial plants such as cacti and native forbs when available, certain non-native plant species are also eaten (West Mojave

Planning Team 1999). Desert tortoise are most active when plants are available for forage or when pooled water is available for drinking, usually from March through early June and again between September and early November (Marlow 1979). They typically have overlapping home ranges averaging between 5-131 acres, which additionally can fluctuate in size on a year-to-year basis based on several factors such as sex, rainfall, availability of resources, and others factors (Berry 1986, Duda 1999, CDFG 2000). Individuals commonly traverse 1,500-2,400 feet/day within their home range, and males have been recorded traveling up to 0.62 miles within their home range. Mojave desert tortoises are also known to disperse more extended distances (1.9 miles in 16 days and 4.5 miles in 15 months; Berry 1986).

2.1.3 Protocol Survey Methods

URS conducted a 2010 10m transect survey of the 6,215-acre Calico Solar Project site. The survey implemented the 2010 USFWS survey protocol (USFWS 2010) and represents a 100% coverage survey. The survey was completed between March 29 and April 15. The Project site map (Figure 6) was overlaid with 183 survey cells that typically encompassed 50 acres (mean cell size 45 acres, range: 13 – 64 acres). Typical rates of coverage were 5 to 6 acres per person-hour and 1.25 transect km per person-hour. Each cell was surveyed by four or five experienced biologists using the 10m transect protocol. All detected tortoise were visually measured and assessed for signs of disease, and field forms were completed (see URS 2010). Tortoise locations were recorded with consumer-grade GPS units. All potential tortoise burrows detected were recorded with GPS units and classified according to USFWS burrow categories (Class 1 through 5).

2.1.4 Protocol Survey Results

The survey required a total of 335 field days to complete and a total of 3,334 km of 10m transects were walked. Table 2 summarizes the results of the survey. A total of 57 individual tortoise were detected, including 48 adults, and 9 juveniles (Figures 6 and 7). The distribution of tortoise onsite is similar to that assessed in the project biological technical report (URS 2009). As suggested by the 2007-2008 plot surveys, tortoise tend to be more common on the northern half of the site north of the railroad, less common on the southern half of the site north of the railroad, and rare south of the railroad (Figures 7 and 8).

Phase One areas support 18 individuals; 6 tortoise in the 1,876-acre Phase One area immediately north of the railroad and 12 tortoise within the northern detention basin area (451 acres; Figure 7). The 1,747-acre Phase Two area between the two Phase One areas supports 39 individuals. No tortoises were detected within the current 2,139-acre Phase Two area between Interstate 40 and the railroad (Figure 7); however, 2 tortoise were detected in the recently excluded Environmentally Sensitive Area. Two of the tortoise detected in Phase 2 showed sign of disease or ill health. A total of 347 burrows categorized as Class 1 through 5 were recorded on the site during the surveys. Table 3 and Figure 8 show the distribution of burrows by Phase area.

Using the USFWS formula to estimate tortoise population based on 10 m transect survey data, approximately 93 desert tortoise (95 percent confidence range of 47 to 185 individuals) may occupy the 6,215-acre Calico Project site (See Appendix B). It is expected that an additional 31.1-51.1% of the

individuals detected during 5m clearance surveys will be juveniles (Turner et al. 1987); therefore, an estimated 29-48 (= 93 x 0.311 and 93 x 0.511) juveniles may need to be relocated.

Table 2
2010 Desert Tortoise Observations on Calico Solar Project Site

Tortoise by Age and Location	Acres Surveyed	Adult on surface	Adult In Burrow	Sub-Adult	Juvenile	Total Detected	Tortoise Per 1000 Acres
Phase 1 - North of Railroad	2,000	4	0	0	4	8	4.0
Phase 1 - Northern Detention Basins	320	3	1	0	0	4	12.5
Phase 2 - North of Railroad between Phase One	3,780	69	10	1	10	90	23.8
Phase 2- South of Railroad	2,130	1	0	0	1	2	0.94
Total on Calico Solar Site	8,230	77	11	1	15	104	12.64

Table 3
Distribution of Tortoise Burrows Classes 1 through 5* at Calico Solar Site

	Class 1	Class 2	Class 3	Class 4	Class 5	Total
Phase 1 - North of Railroad	9	13	25	6	7	60
Phase 1 - Northern Detention Basins	14	3	6	0	0	23
Phase 2 - North of Railroad between Phase One	137	122	117	9	3	388
Phase 2- South of Railroad	3	6	26	5	0	40
Total	**163**	**144**	**174**	**20**	**10**	**511**

*Tortoise Burrow Classification
1. Currently active, with tortoise or recent tortoise sign
2. Good condition, definitely tortoise, no evidence of recent use
3. Deteriorated condition definitely tortoise, no evident of recent use
4. Deteriorated condition and possibly tortoise, no evident of recent use
5. Good condition and possibly tortoise, no evident of recent use

2.1.5 Critical Habitat

DCH for desert tortoise has five Primary Constituent Elements:

1) sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow;

2) sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species;

3) suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites;

4) sufficient vegetation for shelter from temperature extremes and predators; and

5) habitat protected from disturbance and human-caused mortality.

The Project site is not located within any DCH for listed species (Figure 3); however, the Project Action Area includes areas of DCH for desert tortoise (i.e., Ord-Rodman DWMA/ACEC) (Figure 3). Project activities are not anticipated to impact desert tortoise DCH, but implementation of the Translocation Plan may adversely affect DCH. Areas of DCH are needed to be used as long-distance recipient sites (up to 9,833 acres), therefore there is a potential for moving diseased individuals into DCH and in increasing population densities of tortoise within DCH.

The translocation of tortoises from the Project Site to the Ord-Rodman Desert Wildlife Management Area may adversely affect DCH through the introduction of additional animals into occupied critical habitat, through the potential introduction of diseased animals into the DCH, and through increasing the population density in DCH. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of the DCH.

SECTION 3 ENVIRONMENTAL BASELINE

3.1 BIOLOGICAL SETTING

The Project is located within the Mojave Desert in an area approximately 37 miles east of Barstow, California. The Mojave Desert is the transitional area between the hotter Sonoran Desert to the south and the cooler and higher elevation Great Basin Desert to the north. The Mojave Desert is within the rain shadow of the Transverse and Sierra Nevada mountain ranges, and is defined by a specific combination of latitude, elevation, geology, and indicator plant species.

The Mojave Desert is the driest desert in the continental United States with average precipitation ranging from 2.2 to 2.5 inches per year falling primarily between October and March, and temperatures ranging from 40 to 110 degrees Fahrenheit. Perennial rivers and streams are rare, with the Mojave River being the most prominent drainage feature in the greater region, although it is distant from the Project site. Elevations in the Mojave Desert range from below sea level at Death Valley, to an elevation of 7,929 feet. Plant communities in the region vary with topography, geology, elevation, and precipitation. These communities include pinyon-pine forests and frost-tolerant species above 5,500 feet, where local average precipitation may be as much as 10 inches per year (some of which falls as snow); Joshua tree woodland in the range of 4,000 to 6,000 feet; mixed desert shrub communities in the middle elevation regions and along the mountain range fronts; and creosote bush and other drought-tolerant species in the lower elevation regions where rainfall averages less than 2.5 inches per year (USGS 2004).

Vegetation across the Project site is dominated by Mojave creosote bush scrub through the rolling terrain, with less common and site-specific conditions allowing for saltbush scrub in the southwestern portion of the Project site (Figure 9). Developments in this area include the BNSF railroad, the Kinder-Morgan pipeline that bisects the southern portion of the Project site, a maintained north-south dirt access road for the existing transmission line on the eastern border of the assessment area connecting to the existing Pisgah substation south of the site, and several east-west dirt roads that cross the site. The past land uses within the assessment area include a history of cattle grazing and limited mining. Currently, there is evidence of disturbance from off-highway vehicle (OHV) activities.

3.2 VEGETATION COMMUNITIES PRESENT

Vegetation in the Project site is composed primarily of Mojave Desert creosote bush scrub with a smaller area of desert saltbush scrub as defined by the Holland (1986) classification of plant communities (Figure 9). Disturbed areas are associated with dirt roads and trails, areas adjacent to railroads and the interstate highway, along underground pipeline routes, and cleared areas from past land uses (*e.g.*, mining).

The Project site supports two distinct vegetation communities. These vegetation communities were digitized and are displayed on aerial photographic maps. Each habitat description follows the Holland vegetation classification (Holland 1986). Table 4 shows the estimated acreages of existing vegetation communities for areas within the Project site.

The remainder of the Action Area is composed of generally the same habitats, dominated by Mojave Desert creosote bush scrub, with many areas of disturbance, and dirt and paved roads. A habitat assessment was conducted on the translocation recipient sites and the control sites in spring 2010, to ensure that tortoise are relocated to habitat that is of equal or better quality than the habitat from which they are moved.

Portions of the DWMA were surveyed in the spring, and the remaining areas that were identified as long-distance translocation receiver sites will be surveyed in the fall of 2010. The habitat in the southern long-distance translocation area in the DWMA is comprised of Mojave Desert creosote bush scrub, with a diverse assemblage of vegetation and little to no disturbance. Large erosional features with braided washes with areas of large boulders and cobbles dominate the landscape with a gravelly substrate and few areas of pure sand. This area is excellent DT habitat and is also about 30 minutes down the transmission line road south of I-40 so it is relatively isolated. The area on the western side of the DWMA that was surveyed in the spring contains several deep washes, with variable terrain and sandy loam soils with gravel, rocks and cobble. The vegetation is diverse, but is lower in cover than the Project site. DT density was lower here than in the southern DWMA survey area, and several desert tortoise carcasses were observed.

Table 4
Vegetation Communities Occurring within the Calico Solar Biological Assessment Area

Community Name	Holland Code	Project Boundary Acreage	1000-foot Buffer Acreage
Developed	12000	27.84	239.9
Desert Saltbush Scrub	36110	241.7	278.7
Disturbed Mojave Creosote Bush Scrub	34000	70.64	68.5
Mojave Creosote Bush Scrub	34000	5,874.5	2,543.7
Total		6,215.0	3,130.8

3.2.1 Developed

Developed lands (Holland Code 12000) include roads, built structures, and associated infrastructure. Within the Action Area, these included dirt roads, transmission lines, underground gas pipelines, railroads, and any other built environments. Developed areas (which include paved roads, highway, railroad, and the transmission line) occurred in approximately 27.84 acres of the Project footprint, and 239.9 acres of the 1,000-foot buffer of the Project.

3.2.2 Desert Saltbush Scrub

Desert saltbush scrub (Holland Code 36110) is a low, sparse mixture of micophyllous shrubs and occasional succulent species. Stands of shrubs are usually spaced widely and are strongly dominated by desert saltbush (*Atriplex polycarpa*). Other species include white burrobush (*Hymenoclea salsola*), and inkweed (*Suaeda moquinii*). This habitat usually forms on fine-textured, poorly draining soils with high alkalinity and salinity, usually surrounding playas on elevated ground. Desert saltbush scrub is only found

in the southwestern corner of the Project footprint (241.7 acres) in association with small patches of Mojave creosote bush scrub. In addition, approximately 278.7 acres of desert saltbush scrub occurs in the 1,000-foot buffer of the Project.

3.2.3 Mojave Creosote Bush Scrub

Mojave creosote bush scrub (Holland Code 34000) is a community dominated by creosote bush (*Larrea tridentata*) and white bur-sage (*Ambrosia dumosa*). Shrubs are typically widely spaced with bare ground between them. A diverse annual herb layer may flower in late March and April with sufficient winter rains. Other common plant species in this habitat include desert senna (*Senna armata*), Nevada ephedra (*Ephedra nevadensis*), white burrobush, encelia (*Encelia* spp.), ratany (*Krameria* spp.), and various cactus species (*e.g., Opuntia* spp.). This plant community is usually found on well-drained secondary soils with very low water-holding capacity on slopes, fans, and valleys. This vegetation type makes up the majority of the acreage within the Project footprint boundaries (5,874.5 acres undisturbed and 70.6 acres disturbed). Approximately 2,543.7 acres of undisturbed and 68.5 acres of disturbed Mojave creosote bush scrub occur within the 1,000-foot buffer, and is shown on Figure 9 as a hatched overlay on top of the Mojave creosote scrub habitat.

3.2.4 Catclaw acacia thorn scrub

Within the mapped creosote bush scrub, dry desert washes in the northern portion of the proposed project site (i.e., foothills of the Cady Mountains and the upper bajada) often support catclaw acacia (*Acacia greggii*). Scattered blue palo verde (*Parkinsonia florida*) and smoke tree (*Psorothamnus spinosus*) are also found in these washes. These stands match the Catclaw acacia thorn scrub (*Acacia greggii shrubland alliance*) described by Thomas et al. (2004) and Sawyer et al. (2009). Catclaw acacia thorn scrub is synonymous, in part, with "Mojave wash scrub" and "Mojave desert wash scrub" as described by Holland (1986); Catclaw acacia is a large, deep-rooted shrub or small tree, characteristic of desert washes, occurring in habitats similar to other desert microphyllous wash woodland species. It resprouts rapidly following disturbance by floods, and seed dispersal and germination are apparently initiated by flooding. Catclaw acacia thorn scrub has no special conservation status ranking (CDFG 2003; 2007).

3.2.5 Lower elevation wash and sandfield vegetation

Areas mapped as creosote bush scrub in the southern part of the project area, generally from about 0.25 mile north of the BNSF railroad tracks and southward to the southern project area boundary, include patches of two additional vegetation associations not previously mapped. These areas are characterized by sandy soils, in deep sandy washes, open sandfields, and active windblown sandfields. Sediments from the Cady Mountains, upslope, are transported by fluvial and aeolian processes toward the southern part of the project site, particularly the southeastern part of the site, where fine windblown sands spread across the lower bajada and small hills in a small dune system, associated with active channels and partially stabilized sandfields. Vegetation types of these dunes, sandfields, and washes include smoke tree woodland, big galleta shrub-steppe, desert saltbush scrub, and unvegetated habitat. These vegetation types are described in the following paragraphs.

3.2.6 Smoke tree woodland (*Psorothamnus spinosus* woodland alliance)

Smoke tree woodland is characteristic of desert washes and arroyos. Smoke tree is a shrub or small tree. It may be the dominant or co-dominant species, often occurring with other desert wash species (see catclaw acacia thorn scrub, above). Mixed stands, where smoke trees occur with smaller creosote bush or white bursage present, are classified as smoke tree woodland, even where smaller shrubs constitute as much as twice the overall cover (Thomas et al. 2004; Sawyer et al. 2009). On the project site, smoke trees occur in washes of the upper bajadas, but they are not dominant there. In lower washes smoke tree is the visually dominant plant, even where it occurs with other shrubs. Smoke tree is relatively short lived (to approximately 50 years), and is strongly tied to active washes. Its stands regenerate following floods, which abrade dormant seeds, permitting them to germinate (Sawyer et al. 2009). Smoke tree woodland has been included within "Mojave wash scrub" and "Mojave Desert Wash Scrub" (Holland 1986). Smoke tree woodland has no special conservation status ranking (CDFG 2003; 2007).

3.2.7 Big galleta shrub-steppe (*Pleuraphis rigida* herbaceous alliance)

On the proposed project site, big galleta (*Pleuraphis rigid* = *Hilaria rigida*) occurs in low sandy areas and around the margins of dunes in the southeastern portion of the site. In dune areas, it is often interspersed with small stands of the desert sand verbena (*Abronia villosa*) or desert panic grass (*Panicum urvilleanum*). Throughout the Mojave Desert, it commonly occurs in patches within creosote bush shrublands and has often been included within that vegetation description (Thomas *et al.,* 2004).

3.3 WILDLIFE CORRIDORS

A wildlife corridor is defined as a linear landscape feature that allows animal movement between two patches of habitat or between occupied habitat and geographically discrete resources (*e.g.,* water). To function effectively, a corridor must accomplish two basic functions. First, it must effectively link two or more large patches of habitat. The corridor must conduct animals through the landscape to areas of suitable habitat without excessive risk of directing them to unsuitable areas where risk of mortality may be very high. Second, the corridor must be suitable to the focal target species so that they will use the corridor frequently enough to achieve the desired demographic and genetic exchange between populations. Presence of wildlife corridors allow an exchange of individuals between populations, lowering inbreeding within populations, increasing effective population size, and facilitating re-establishment of populations that have been decimated or eliminated because of random events.

Focal species are those species that naturally occur in low densities and that may be unwilling or unable to cross extensive areas of development or otherwise unfavorable habitat. Animals have a natural aversion to situations or physical settings they perceive to be dangerous and will often shy away from situations in which they are exposed without cover or escape routes. The presence of disturbance outside of the animal's normal experience is also a situation that is often avoided by animals. In the Mojave Desert, potential focal species for wildlife movement assessment could include desert tortoise, mountain lion (*Felis concolor*), coyote, bighorn sheep (*Ovis canadensis nelsoni*), bobcat, and kit fox.

Generally, the Project site and surrounding vicinity is unrestricted and conducive to live-in habitat and movement of wildlife throughout the area, with variable habitat composition and desert tortoise densities

throughout the area. Movement in the east-west direction is currently unconstrained. The primary constraints to wildlife movement are in the north-south direction. The existing BNSF railroad and I-40 run east-west across the lower one-third of the bajada that contains the Project site. I-40 adjacent to the Project site is fenced; however, tortoise exclusion fencing is not used, allowing animals to potentially move across the freeway. The BNSF railroad is not fenced, although the railroad is elevated several feet above surrounding grade, creating constraints to wildlife movement, especially for smaller terrestrial species such as reptiles and small mammals. Although animals can choose to cross over these features at any point, the only safe locations for general wildlife movement across both of these features are through existing culverts and railroad trestles (Figure 10). The majority of these features are large enough for large mammals to pass through, with the exception of a series of small pipes that run under I-40 at the far southwestern corner of the Project site. Regardless of the few culverts and bridges, north-south wildlife movement is greatly restricted by these existing linear landscape features.

The recently proposed and accepted Reduced Footprint Alternative 2 would expand the wildlife linkage by about 4,000 feet south, and reduce the project area by 2,015 acres (Figure 12). The expanded undeveloped area between the Project and the Cady Mountains also creates a functional tortoise linkage with live-in and move-through habitat instead of only move-through habitat that would have been provided with the original Project footprint. The modified Project boundary also avoids direct impacts to other species of concern (e.g., special status plants, burrowing owl, and bighorn sheep). Additionally, the boundary modification increases the distance between the Project and the nearest known potential golden eagle nest site, from approximately 2.5 miles from the previously proposed boundary to over three miles from the modified Project boundary.

3.3.1 Special Management Areas

Figure 13 illustrates the additional management areas within the vicinity of the Action Area. North of the Project Area, the BLM has proposed an area for designation as wilderness (Cady Mountains Wilderness Study Area). The Project is also located within the planning area of the West Mojave Coordinated Management Plan (West Mojave Plan or WEMO, BLM 2006). WEMO designates a total of four DWMAs, each of which focuses on the protection and conservation of desert tortoise, Mohave ground squirrel (*Spermophilus mohavensis*), and other State- or Federal- listed special status species that share their habitats. The Action Area includes portions of the Ord-Rodman DWMA because this area will be used as a long-distance receiver site for tortoises found on the Project site. The Pisgah ACEC is immediately to the southeast of the Project site (Figure 12) and portions of the Pisgah ACEC will be used as a short-distance recipient site. There is a total of 80,563 acres of DCH within the Action Area, up to 9,833 acres of which will be used as a receptor site during implementation of the Desert Tortoise Translocation Plan (Figure 3).

SECTION 4 EFFECTS OF THE ACTION

4.1 IMPACTS ON DESERT TORTOISE

Impacts resulting from the implementation of the Project include:

- Number of tortoise affected;
- Loss of occupied desert tortoise habitat;
- Constriction of movement corridors;
- Adverse edge effects of the Calico Solar Project on desert tortoise occupying NAP Area 1 and within the 1000-foot buffer;
- Potential for partial loss of habitat within desert tortoise territories along the Project boundary;
- Potential for dust during construction to negatively affect adjacent intact vegetation, and therefore affect desert tortoise habitat quality;
- Potential noise and lighting effects on tortoise behavior near the Project boundary;
- Disturbance from vibration during construction that could affect tortoise in burrows near the Project boundary;
- Introduction of weeds that may increase on the Project site and within the buffer area during construction and operation, and therefore affect desert tortoise habitat quality; and
- Potential increases in ravens and other predators of desert tortoise occupying adjacent lands as a result of perches provided by the SunCatcher structures, transmission towers, and perimeter fencing.

4.1.1 Number of Tortoise Directly Affected

A federal take of a species listed pursuant to the Federal Endangered Species Act (FESA) is defined as "Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct" (50 CFR 17.3). A total of 48 adults, plus 9 juveniles were detected in the revised Project boundary during 10m transect surveys of the project site in 2010. Desert tortoise exclusion fencing will be installed prior to construction and desert tortoise will be excluded (translocated) via clearance surveys before the construction phase of the Project. Desert tortoise will be affected due to handling, blood sampling, transmitter attachment, transportation, and there is a possibility for tortoises to be killed or injured as a result of the translocation process. Tortoise monitored as recipient site resident or control area individuals for comparison to monitored translocated individuals will also be affected by attachment of radio transmitters, handling, and blood testing. Affects could also result from increasing local population densities in the recipient areas.

Using the USFWS formula for population estimate from transect survey data for the original Project boundary, a total of 176 adult individuals may occupy the project site (95% C.I. Range: 92 to 337). For the Reduced Footprint Alternative 1, modifying the Project boundary to exclude 1,100 acres of habitat avoids approximately 25 percent of the adult desert tortoise found on the project site. Of the 104 total

tortoise found during 2010 surveys, 26 desert tortoise (*Gopherus agassizii*) would now be avoided. In addition, 86 desert tortoise burrows would also be avoided by the project boundary change. Of the 425 total burrow locations on site, this Project modification will result in approximately a 20 percent reduction of direct impacts. Using the USFWS formula to estimate tortoise population based on 10-meter transect survey data, it is estimated that direct impacts to approximately 49 individuals may be avoided due to the Project boundary modifications.

With the Reduced Footprint Alternative 2, modifying the Project boundary to exclude 2,015 acres of habitat avoids approximately 39 percent of the adult desert tortoise found on the project site. Of the 104 total tortoise found during 2010 surveys on the original Project footprint, 47 desert tortoise would now be avoided (Table 5). In addition, 164 desert tortoise burrows will also be avoided by the project boundary change. With a total of 511 burrow locations on the original Project site, this Project modification will result in approximately a 47 percent reduction of direct impacts to 347 burrow locations within the new boundary (Table 6). Using the USFWS formula to estimate tortoise population based on 10-meter transect survey data, it is estimated that direct impacts to approximately 93 individual adult tortoise may be avoided due to the Project boundary modifications.

The Project boundary modifications reduce the estimate of desert tortoises requiring translocation for the Project from 176 to 93 adult individuals and from 32-53 to 29-48 juveniles. These excluded desert tortoise may be indirectly affected due to being adjacent to the Project perimeter, though direct impacts to habitat will be reduced by 2,015 acres.

The modifications to the Project boundary would expand the east-west movement corridor by about 4,000 feet and create a functional habitat linkage that is adequate as live-in habitat as well as move-through habitat. Approximately 12 tortoise found in the Phase 1 detention basin area during the clearance surveys could be placed into this new linkage without requiring blood testing as long as they are not moved further than 500 meters from the location which they were found. The number of individuals that will be placed into this new linkage will be limited to avoid raising the tortoise density above 10% of its current density (4.5 tortoise per square kilometer). The carrying capacity of the linkage will also not be exceeded.

Some areas of DCH (inside the Ord-Rodman DWMA) will be used as long-distance recipient sites (up to 9,833 acres), creating a potential of moving diseased individuals into DCH; however, all long distance translocations will only involve individuals that have been tested for disease to minimize this potential adverse effect. Animals showing clinical signs of disease or testing positive in blood tests will not be moved. In addition, to minimize the potential effects of increased populations in the recipient sites, the number of individuals relocated into a given area will be limited in order to avoid raising the local tortoise density above 30% of the current density and the local habitat carrying capacity will not be exceeded. Most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements of DCH. A small amount of DCH adjacent to roads may be temporarily disturbed; we expect the size of this disturbance to be minimal and its effects on the function of DCH to not be measurable. All vehicular access will occur on authorized open routes of travel, where the primary constituent elements of DCH are absent. Only foot traffic will occur away from designated open routes of travel; we anticipate that the effects of foot traffic on the primary constituent elements of DCH would not be measurable.

4.1.2 Loss of Occupied Habitat

The current Project description includes the installation of permanent desert tortoise exclusion fencing along the entire Project boundary. Approximately 6,215 acres of occupied desert tortoise habitat would be excluded as a result of Project fencing.

Table 5
2010 Desert Tortoise Observations on Calico Solar Project Site
Reduced Footprint Alternative 2

Tortoise by Age and Location	Acres Surveyed	Adult on surface	Adult In Burrow	Sub-Adult	Juvenile	Total Detected	Tortoise Detected Per 1000 Acres
Excluded Area along northern boundary	1,746	25	3	1	5	34	19.4
Phase 1 - North of Railroad	1,876	2	0	0	4	6	3.2
Phase 1 - Northern Detention Basins	451	9	1	0	2	12	26.6
Phase 2 - North of Railroad between Phase One	1,747	32	0	0	3	39	22.3
Phase 2- South of Railroad	2,139	0	0	0	0	0	0
Total on Calico Solar Site - Reduced Footprint	6,215	43	4	0	9	57	9.17

Table 6
2010 Desert Tortoise Burrow Observations on Calico Solar Project Site
Reduced Footprint Alternative 2

	Class 1	Class 2	Class 3	Class 4	Class 5	Total
Phase 1 - North of Railroad	9	17	24	6	6	62
Phase 1 - Northern Detention Basins	16	13	12	1	0	42
Phase 2 - North of Railroad between Phase One	74	57	75	4	2	212
Phase 2- South of Railroad	0	4	23	4	0	31
Total	91	91	134	15	8	347

*Tortoise Burrow Classification
1. Currently active, with tortoise or recent tortoise sign
2. Good condition, definitely tortoise, no evidence of recent use
3. Deteriorated condition definitely tortoise, no evident of recent use
4. Deteriorated condition and possibly tortoise, no evident of recent use

5. Good condition and possibly tortoise, no evident of recent use

Construction equipment will not operate beyond the fenced Project boundary, other than on roads designated open by BLM. Roads that are not designated as open by BLM that may exist are not to be used by project personnel. A map of BLM designated open routes is found in Figure 14. Therefore, temporary disturbance of NAP Area 1 or other areas beyond the Project boundary by equipment operation will not occur.

4.1.3 Constriction of Movement Corridors

Movement through the Project site north of the railroad is expected to be mostly in the east-west directions, and mostly along the lands in the northern half of the Project site and beyond up to the mountains, where tortoise densities are greater. East-west movement of tortoises in NAP Area 1 will be restricted, as the Project extends along the east, west, and south sides of NAP Area 1; however, east-west movement is still possible north of the Project site. Movement corridors are not necessarily areas where animals spend most of their time (preferred habitat), but are merely areas that they periodically used to move between areas of preferred habitat. The area north of the Project site is not being proposed as desert tortoise to function as live-in habitat, but rather as an area available as a movement corridor. The Project will not prevent east-west movement because lands north of the Project site will remain open to desert tortoise and these areas also tend to have the greatest concentrations of desert tortoise (Figure 11). The mountainous terrain to the north of the Project may not be suitable habitat for desert tortoise occupation; however, it does allow tortoise to move in and east-west direction. The United States Geological Survey (USGS) modeled desert tortoise habitat was used to predict potential movement corridors (Figure 11).

The limited number of desert tortoise observations between the BNSF railroad and I-40 after one year of focused desert tortoise surveys (plus incidental surveys in two years), suggests that the area between the BNSF railroad and I-40 is not easily accessible to desert tortoise. Potential desert tortoise habitat exists in the area between the BNSF railroad and I-40, and desert tortoise have limited access to this area through existing culverts and trestles (Figure 10). The limited number of desert tortoise individuals and active burrows detected in this area compared to the area north of the railroad tracks leads to the expectation that desert tortoise do not currently prefer this area. The habitat quality is considered to be lower than habitat north of the railroad. Desert tortoise are not expected to effectively colonize or persist within the area between the BNSF railroad and I-40 because these linear features likely act as an access filter, deterring frequent individual desert tortoise movement into this area. Based on this information, it is likely that the movement of desert tortoise from north to south between the mountains and the lands south of I-40 is likely constrained by the BNSF railroad and I-40.

The reduced footprint alternative 2 would expand the east-west linkage corridor by about 4,000 feet and allow for tortoise and other wildlife to move past the steeper topography that may hinder regular movement through this area (Figure 12). The expanded linkage is also large enough to support desert tortoise and is designed to function as live-in habitat. A total of 25 adult tortoises and 5 juveniles were detected in this 1591-acre excluded area during 2010 surveys. About 93 adult/subadult individuals may use this area based on the USFWS formula. An additional 29-48 juveniles may be present in this area,

based on a 4-year study of tortoise population ecology (Turner et al. 1987) which determined that juveniles account for 31.1 to 51.1 percent of the overall population.

4.1.4 Edge Effects

A total of 45 adult tortoises may be affected indirectly by the proposed project. Assuming a local density of 16 individuals per sq mi based on the population estimate for areas north of the railroad, about 40 desert tortoise may occur within NAP Area 1 and will likely be affected by the adjacent construction and operation of the Project with partial loss of home ranges. The NAP Area 1 is a contiguous parcel of land bounded by the Project site on the east, west and south sides. It is approximately one mile wide from east to west and two miles long from north to south (approximately 960 acres in size). Most of the desert tortoises in NAP Area 1 were detected in the northern half of this area. Project construction will occur up to the boundary on three sides of NAP Area 1, and approximately 990 feet into the south end of the NAP Area 1 parcel for installation of the underground water pipeline. All impacts as a result of the pipeline will be temporary; once the pipeline is buried and construction is completed in that area, the pipeline impact area will be revegetated according to the Restoration Plan.

About 45 adult individuals may have portions of their home ranges within this buffer area. Juveniles would be an additional 31.1-51.1 percent of this adult estimate (14-23 juveniles). Specifically, the entire buffer area contains 1,495 acres of land, a portion of which is already impacted by existing development, such as the BNSF railroad and I-40 to the south, the Kinder-Morgan gas pipeline that crosses the southern portion of the site and to the east of the site, and the existing transmission line along the eastern boundary. Impacts in the buffer areas as a result of the Project may affect approximately 1,495 acres of suitable habitat. Impacts may also potentially extend into suitable habitat beyond the 1,000-foot buffer area. Edge effects are difficult to quantify, but generally entail reduced habitat quality due to weeds and adjacent disturbance, increased predation, and ongoing harassment due to chronic human activity (construction and ongoing project operations) adjacent to tortoise occupied habitat that tends to result in reduced occupation by tortoise (Boarman and Sazaki 2006, but see Lovich and Daniels 2000).

The overall distribution of desert tortoise is toward the north-central portion of the Project site and that distribution is expected to continue northward on the plains of the bajada up to the foothills of the northern bounding mountains. After Project implementation, the movement of desert tortoise from NAP Area 1 would be northward due to Project constraints in the east, west, and southern sides. The proposed Project already includes placement of exclusionary fencing along the Project boundary during construction and for the life of the Project, such that effects on desert tortoise in NAP Area 1 moving into the Project area would be minimized. The expanded habitat associated with the reduced footprint alternative would provide a functional linkage and movement corridor and a greater opportunity for tortoise to move into and out of NAP Area 1, and it would provide approximately 1,591 acres of live-in habitat for desert tortoise.

4.1.5 Partial Loss of Desert Tortoise Territories

The linear extent of the Project footprint which is also the length of permanent perimeter and tortoise exclusion fencing, is approximately 45 miles (Figure 4). Because the site is completely fenced with desert tortoise exclusion fencing, there is likely to be a partial loss of occupied territories along the Project

boundary, notably the estimated 24 desert tortoise that may occupy NAP Area 1. Estimated desert tortoise density north of the railroad is 16.0 adult desert tortoise per square mile assuming a population of 93 adults, with most desert tortoise observations occurring north of the BNSF railroad. It is unknown how many desert tortoises exist outside of the surveyed area; however, partial territory loss is anticipated to affect additional individuals outside the action area. Based on a buffer area of about 1,495 acres, and using the density indicated above for the areas north of the railroad, perhaps 45 additional tortoise may inhabit the buffer area. The 960-acre NAP Area 1 may support about 24 tortoise using the same density estimate. Assuming 31.1%-51.1% of the population are juveniles, an additional 22-36 juveniles may be affected in the 1000-foot buffer area and NAP Area 1.

The partial loss of occupied habitat would reduce the amount of potential forage habitat for resident tortoise. Affected individuals would need to expand their home range away from the project boundary if suitable habitat is available to do so. Initially, local population densities would be elevated until the extent of new home range boundaries are established by the partially displaced individuals.

A similar number of tortoise would likely be affected due to partial loss of their home range for the reduced footprint alternative.

4.1.6 Dust

The Project plan also does not include the wholesale grading of the entire site; however, SunCatcher maintenance roads will be installed between every other row of SunCatchers. Construction activities and operational vehicle traffic on the roads within the Project could generate dust that would affect vegetation adjacent to the Project site in the short-term, although long-term adverse effects on vegetation are not expected to occur. In the short-term, dust may settle on leaves of plants affecting their ability to photosynthesize and uptake nutrient and water; however, any dust that settles is likely to be washed away during rainstorms. These roads will not be paved, but will be treated with polymeric stabilizers to control dust impacts. Dusted vegetation may be less suitable for tortoise as forage.

Polymeric stabilizers are a biodegradable material that can cause skin and eye irritation if exposed in liquid form. Application of polymeric stabilizers to the dirt roads should be made only after all tortoises are cleared from the project site.

4.1.7 Noise and Lighting

The existing noise conditions at the Project site vary with the distance from I-40 and the adjacent railroad. Current ambient noise levels near the Project site vary from the mid 40s to nearly 80 dBA L_{eq}. The main sources of noise currently found onsite are from vehicular traffic on I-40 and railroad activity. The highest level of current ambient noise is expected to center along these two sources, fading to the low range with increased distance from these sources. Construction activities will generate noise that will vary from 48 to 76 dBA L_{eq} that would extend into the 1000-foot buffer area for construction activities directly adjacent to the Project boundary. Project operation will generate noise of 63 to 74 dBA L_{eq}. The source of noise during Project operation will primarily be the SunCatchers themselves. The SunCatchers are spread evenly throughout the majority of the site aside from large portions in the northern end where the detention/infiltration basins will be located. The amount of noise generated by the Project is not a significant change from existing conditions nearest the freeway and railroad, but does represent an

increase of approximately 20 dBA L_{eq} farthest away from the two sources near northern boundary of the Project. Tortoise near the foothills of the Cady Mountains, north of the Project site, would experience an increase in sound levels, which may affect their behavior and use of the area to the north of the site, although studies indicate noise effects may be less than adverse (Bowles *et al.* 1999). No biologically significant effect was documented by Bowles et al. 1999.

The potential effects on tortoise from noise are considered less than significant because of the temporary nature (construction) of the highest intermittent noise events, and moderate to low increased levels of constant noise above ambient conditions during operation, some of which are within the noise levels currently found on-site due to the presence of the highway and railroad. The modeled 60 dBA Leq contour during project operations will be located 500 to 1800 feet from the project boundary and is dependent on the location relative to the railroad and highway. Studies have consistently failed to find significant non-auditory health effects in laboratory animals (rats, mice, chickens, pigeons, small birds, amphibians, and some reptiles) and humans for noise levels less than 70 dB (Bowles & Thompson 1996). Tortoise do not appear to utilize hearing as a significant means of avoiding predation due to their low locomotive abilities. Lovich & Daniels (2000) document sustained tortoise use of an established wind farm where ambient noise levels in the turbine field may exceed 90-118 dB (Rabin et al. 2006). Lovich & Daniels (2000) conclude "*The results challenge the paradigm that desert tortoises are negatively affected by all forms of anthropogenic disturbance and suggest that with proper planning, some forms of development in the desert are compatible with conservation of sensitive species.*"

Effects of lighting are expected to be minimal along the project perimeter. Lighting will be minimized to the extent practicable and limited to meeting safety/security requirements. Lighting will be focused in toward the Project site and downward to avoid lighting habitats beyond the Project perimeter fencing. If light levels were to substantially increase along the project perimeter, some of the smaller tortoise inhabiting the 1000-foot buffer area may be subjected to increased predation by nocturnal predators. The lighting associated with washing the SunCatchers will be mostly retained onsite due to the 100-200 foot setback from the perimeter fence and the relative location of the access roads in the array fields to the perimeter fence.

4.1.8 Vibration

Equipment that will cause surface disturbance and otherwise operate during construction will be limited to what would be needed to develop dirt roads that are generally at existing landform grades, equipment to install the SunCatcher pedestals and the actual SunCatchers, equipment to install cables, and equipment to construct the few buildings that are part of the Project plan. This equipment will cause limited vibration in the ground near them; however, the potential effects of such short-term (just a few minutes at a time) ground vibration are unlikely to be noticeable farther than a few tens of feet beyond the source of the vibration. The impact buffer for vibration is assumed to be less than 100 feet. The typical setback distance between the perimeter fence and nearest SunCatcher pedestal is 100 to 200 feet. Since activity during operations will be substantially less than during Project construction, no adverse effects from ground vibration on desert tortoise are expected to occur during Project operations. Also, because the Project site will be enclosed with exclusion fencing, little or no effects of ground vibration would affect existing offsite burrows beyond the Project boundary, especially into NAP Area 1 and the 1000-foot

buffer area. Operational SunCatchers do not produce a measurable vibration that would be expected to affect tortoise in burrows in adjacent offsite habitat greater than 100 feet from the nearest SunCatcher.

4.1.9 Introduction of Weeds

Introduction of weeds will be controlled via the wildlife agency approved weed management plan and will prevent the spread/colonization of weed onsite and off-site. The existing study area, including the Project area and surrounding lands is not currently infested with weed species, although several non-native plant species occur throughout the general area. Areas that are adjacent to the Project boundary, such as NAP Area 1, already support these non-native plant species. There is some potential that non-native plant species densities may increase within the Project boundary in areas of surface land disturbance and shading, namely Sahara mustard. In addition to planned ground disturbance, each SunCatcher unit will be periodically washed with approximately 14 gallons of water. Although the majority of the water is expected to evaporate, the introduction of a minimal amount of water under the SunCatchers may occur. This could potentially contribute to the establishment and spread of non-native species onsite and within the 1000-foot buffer area. Increased weed cover within occupied tortoise habitat may reduce the forage quality of the habitat and thereby reduce the long-term tortoise carrying capacity of occupied and potential habitat affected by weeds. All Project-related vehicles traveling in the recipient sites and control areas (Action Area) must follow the requirements of the Calico Weed Management Plan to minimize the potential for the introduction of substantial numbers of non-native species in the Action Area. All vehicles are required to go through vehicle wash stations before leaving the Project site, especially when heading to the recipient and control sites.

The weed management plan allows for the use of herbicides in the management of weeds. Use of herbicides will be avoided, but if necessary, only those herbicides approved by the USFWS and BLM that have been empirically proven low toxicity to test animals in the PUP process will be used. This would include post-emergent herbicide formulations such as Accord SP with the active ingredient glyphosate, and pre-emergent herbicide formulations such as Korvar I DF with the active ingredients bromacil and/or diuron (R. Chavez, BLM, pers. comm. 2010).

A weed management plan will be implemented to address potential issues stemming from planned ground disturbance and SunCatcher wash water. The goal of this plan would be to minimize potential effects from weeds within the Project boundary and adjacent lands, as well as to avoid adverse effects on desert tortoise forage habitat off-site. Given the preparation of a weed management plan to address effects of potential weed issues, it is unlikely that these issues would result in substantial increases in non-native species such that adjacent lands beyond the Project boundaries would be at substantial risk from weeds. With implementation of a weed management plan adverse effects on tortoise habitat from weeds within the Project boundary or in adjacent lands are expected to be minimized.

4.1.10 Attraction of Human Subsidized Predators

Substantial development within the desert often attracts ravens and coyotes at higher densities than in areas of undeveloped desert landscapes (Boarman *et al.,* 2006). Ravens may be attracted to the SunCatchers and perimeter fencing and transmission lines as perches, as well as to other facilities for the Project. Boarman *et al.* (2006) demonstrate that ravens are primarily attracted to areas with human

influence that provide supplemental nesting, food or water resources. There will not be increased sources of food or water for ravens at the SunCatchers. There is some potential for increased sources of food or water at the few buildings onsite where people will concentrate and water will be increased at the evaporation ponds; however, a wildlife agency approved raven management plan must be developed prior to the initiation of construction activities which will reduce potential raven related impacts to desert tortoise. The evaporation pond would be fenced and covered with a fine mesh material that is small enough to prevent wildlife and small birds from accessing the water in the pond, but will still allow evaporation of the water within the ponds.

Education regarding control of food/trash sources and minimization of water resources are the main focus of the plan. Ravens may also be attracted to potential detention basins (Figure 3); however, these features will only have water in them after rainstorms and are not intended to be inundated for long periods of time. Ravens may also be attracted to a waste water treatment pond that may or may not be included in the final Project design plans. If included, covering the pond to prevent raven use will be implemented. Operation and maintenance of the facility could allow for predator densities to increase because of the increased presence of limited resources (*e.g.*, freshwater, nest sites, food resources) that is currently absent from the site. These potential attractants would be eliminated by:

- Eliminating sources of water that is attractive to ravens, such as designing evaporation ponds/detention basins that only hold water for a maximum of a few days. The evaporation pond facility will be designed to exclude wildlife from the pond water.
- Designing structures to eliminate locations where ravens can build nests or installing measures to prevent nesting in structures.
- Limiting the creation of trash and keeping the site trash free.
- Using hazing to deter raven occupation of the site (with approval from the wildlife agencies only).
- Routine monitoring of the site for ravens to identify occupation and formulate adaptive strategies to deter further occupation; and education of workers to follow these measures.

The effect of attracting human subsidized predators could extend to the adjacent lands within the 1000-foot buffer area and beyond. This impact is potentially significant. A raven control plan has been created by the client and is under review by the wildlife agencies (CDFG, USFWS and BLM). The plan must be approved prior to the initiation of earth disturbing events. The plan describes methods for adaptive management to control potential adverse effects from ravens in the vicinity of the Proposed Project by implementing the above measures and on a regional basis by contributing funding to a regional raven management plan being implemented by the USFWS.

4.2 CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area. Based on consultation with the Planning Department of San Bernardino County and the Bureau of Indian Affairs, no known tribal, state, local government, or private projects are reasonably certain to occur in the future within the defined action area of the Calico Solar

Project (Figure 3). Non-federal activities that occur on federal land, specifically the maintenance of power transmission lines, are subject to federal ESA requirements and, therefore, would not contribute to cumulative effects. The Calico Solar Project is not expected to result in significant cumulative effects on desert tortoise.

SECTION 5 DETERMINATION OF EFFECT

The implementation of the Calico Solar Project may affect and is likely to adversely effect the desert tortoise. Effects would occur in the form of behavioral harassment, potential injury or mortality, and loss and degradation of occupied habitat. Implementation of the Translocation Plan and exclusion fencing is intended to minimize direct mortality of tortoise. Based on the amount of suitable habitat that would be directly impacted and population estimates based on desert tortoise 10m transect surveys conducted in the Project site, approximately 93 adult/subadult desert tortoise (95 percent confidence range of 47 to 185 individuals), 29-48 juveniles, and 6,215 acres of tortoise habitat may be directly affected by the proposed project. All tortoises captured during preconstruction clearance surveys and construction monitoring will be translocated offsite to minimize direct mortality of individuals. Approximately 24 adult/subadult tortoise and 14-23 juveniles that may have partial home ranges reduced by the Project within the 1,495-acre, 1000-foot buffer area would also be affected through loss of foraging and sheltering habitat and associated edge effects. About 24 adult/subadult tortoise and 8-13 juveniles may occur in the 960-acre NAP Area 1 and would be indirectly affected similar to tortoise in the 1000-foot buffer area. In order to implement the Translocation Plan, a similar number of tortoise would be directly affected by the proposed project (366 to 699 individuals) and may be handled for the purpose of monitoring recipient site populations and control area individuals for comparison with translocated individuals. We assume approximately 31.1-51.1% of the population may be juveniles.

Table 7

Summary of Potential Effects

Project Component	Estimated Adult/Subadult Tortoise	Estimated Juvenile Tortoise	Total
Project Site (Individuals to be translocated; 6,215 acres)	93 (max:185)	29-48	122 (max: 233)
1000-foot Buffer Area (1,495 acres) indirectly affected	45 (based on an assumed density of 16 per sq mi)	14-23	59-68
NAP Area 1 (960 acres) indirectly affected	24 (based on an assumed density of 16 per sq mi)	8-13	32-38
Recipient Site Resident Individuals	93 (max: 185)	29-48	122 (max: 233)
Control Area Individuals	93 (max: 185)	29-48	122 (max: 233)
Total Directly Affected	**279-555**	**87-144**	**366-699**
Total Directly and Indirectly Affected	**348 (max: 624)**	**109 (max:180)**	**457 (max:804)**

The reduced footprint alternative would reduce the amount of habitat directly affected by about 1,495 acres. This excluded area had 25 adult/subadult tortoise detected during the 2010 10m transect surveys and may support 45 adult individuals based on the number of tortoise found in the immediate vicinity of the Phase 1 area north of the railroad (16 adult/subadult tortoise per sq mile). Juvenile tortoise occupation is assumed to be 31.1-51.1% of the adult population estimate: 14-23 juvenile tortoise for a total estimate of 59-68 individuals occupying the 1,495 acre buffer area that would be indirectly affected by the Project. Approximately 32-38 tortoise that are estimated to occur within NAP Area 1 would also be indirectly affected..

The translocation of tortoises from the Project Site to the Ord-Rodman Desert Wildlife Management Area may adversely affect DCH through the introduction of additional animals into occupied DCH, through the potential introduction of diseased animals into DCH, and through increasing the population density in the critical habitat unit. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of DCH. These potential adverse affects will be minimized through the implementation of the Desert Tortoise Translocation Plan. The Translocation Plan includes a disease testing program which will preclude, to the best of our ability, the translocation of disease-positive animals into DCH. Also, the Translocation Plan provides for maximum density limits which are designed to prevent the density from exceeding carrying capacity of the DCH. Most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements. A small amount of DCH adjacent to roads may be temporarily disturbed; we expect the size of this disturbance to be minimal and its effects on the function of critical habitat to not be measurable. All vehicular access will occur on authorized open routes of travel, where the primary constituent elements of DCH are absent. Only foot traffic will occur away from designated open routes of travel; we anticipate that the effects of foot traffic on the primary constituent elements of DCH would not be measurable. Therefore, we conclude that the implementation of the Plan will not adversely affect DCH.

SECTION 6 REFERENCES

Berry, K.H. 1986. Desert tortoise (*Gopherus agassizzii*) research in California, 1976-1985. Herpetologica 42 (1):62-67.

Boarman, W.I., M.A. Patten, R.J. Camp, and S.J. Collis. 2006. Ecology of a population of subsidized predators: Common ravens in the central Mojave Desert, California. Journal of Arid Environments, Volume 67: 248-261.

Boarman, W.I. and M. Sazaki. 2006 A highway's road-effect zone for desert tortoises (*Gopherus agassizii*). Journal of Arid Environments 65:94-101.

Bowles, A.E. and S. J. Thompson. 1996. A review of nonauditory physiological effects of noise on animals. J. Acoust. Soc. Am. 100:2708.

Bowles, A. E., S. Eckert, L. Starke, E. Berg, L. Wolski, J. Matesic, Jr. 1999. Effects of flight and sonic booms on hearing, behavior, heart rate, and oxygen consumption of desert tortoises (*Gopherus agassizii*). Sea World Research Institute, San Diego, CA.

Bureau of Land Management (BLM). 2006. West Mojave Plan and EIS. http://www.dmg.gov/documents/WMP_Volumes/Vol-1-Chapter1_Bookmarks.pdf

California Department of Fish and Game (CDFG). March 2000. Life History Accounts and Range Maps, Desert Tortoise. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx

CDFG 2003 – California Department of Fish & Game. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. Unpublished report, CDFG Wildlife and Habitat Data Analysis Branch, Sacramento.

CDFG 2007 – California Department of Fish & Game. "List of California Vegetation Alliances." Biogeographic Data Branch – Vegetation Classification and Mapping Program. October 22, 2007.

Desert Managers Group (DMG). 2002a. Memorandum of Understanding, Mojave Weed Management Area.

Duda, J.J.; A.J. Krzysik, and J.E. Freilich,. 1999. Effects of drought on desert tortoise movement and activity. Journal of Wildlife Management. 63(4): 1181-1192.

Hickman, J. C., ed. 1993 – The Jepson Manual: Higher Plants of California. Berkeley: University of California Press. 1400 pp.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Sacramento: The Resources Agency, California Department of Fish and Game.

Jepson, W. L. 1943 – A Flora of California. Associated Student Store, University of California, Berkeley, CA.

Karl, A. E. 1983. The Distribution, Relative Densities, and Habitat Associations of the Desert Tortoise, *Gopherus agassizii*, in Nevada. M.S. Thesis, California State Univ., Northridge. 111 pp.

Keeler-Wolf, T. 2007 – Mojave Desert scrub vegetation. Pages 609-656 in M. G. Barbour, T. Keeler-Wolf, and A. A. Schoenherr, eds. Terrestrial Vegetation of California, 2nd ed. University of California Press, Berkeley.

Lovich, J.E. and R. Daniels. 2000. Environmental characteristics of desert tortoise (*Gopherus agassizii*) burrow locations in an altered industrial landscape. Chelonian Conservation and Biology 3:714-721.

Marlow R.W. 1979. Energy relations in the desert tortoise *Gopherus agassizii*. Ph.D. dissertation, University of California, Berkeley.

Nussear, K.E., T.C. Esque, J.E. Heaton, M.E. Cablk, K.K. Drake, C. Valentin, J.L. Yee, and P.A. Medica. 2008. Are Wildlife Detector Dogs Or People Better At Finding Desert Tortoises (*Gopherus agassizii*)? Herpetological Conservation and Biology 3(1): 69-115.

Rabin, L.A., R.G. Coss, and D.H. Owings. The effects of wind turbines on antipredator behavior in California ground squirrels (*Spermophilus beecheyi*). Biological Conservation 131:410-420.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evans 2009 – Manual of California Vegetation, 2nd ed. California Native Plant Society, Sacramento. 1300 pp.

Shreve, F. and I. L. Wiggins 1964 – Vegetation and Flora of the Sonoran Desert. Stanford University Press, Stanford, California.

Steevens, J., Burton Suedel, Alfreda Gibson, Alan Kennedy, William Blackburn, and David Splichal. 2007. Environmental Evaluation of Dust Stabilizer Products, Final Report. Environmental Laboratory U.S. Army Engineer Research and Development Center. 69 pp.

Thomas, K., T. Keeler-Wolf, and J. Thorne 2002 – Central Mojave Field Data. A digital database (Access). Flagstaff, AZ: U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Colorado Plateau Field Station.

Thorne, R. F. 1982 – The desert and other transmontane plant communities of southern California. Aliso 10:219-257.

Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Prepared for the Southern California Edison Company, Rosemead, California.

Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. Copeia 1984(4):811-820.

U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). 1992. Field Survey Protocol for any Non-Federal Action that may occur within the Range of Desert Tortoise.

U.S. Fish and Wildlife Service (USFWS). 2006. Biological opinion for the West Mojave Plan. January. 198 pp.

U.S. Fish and Wildlife Service (USFWS). 2008. Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). U.S. Fish and Wildlife Service, California and Nevada Region, Sacramento, California. 209 pp.

U.S. Geological Survey (USGS) 2004. Website: pubs.usgs.gov. Accessed February, 2006.

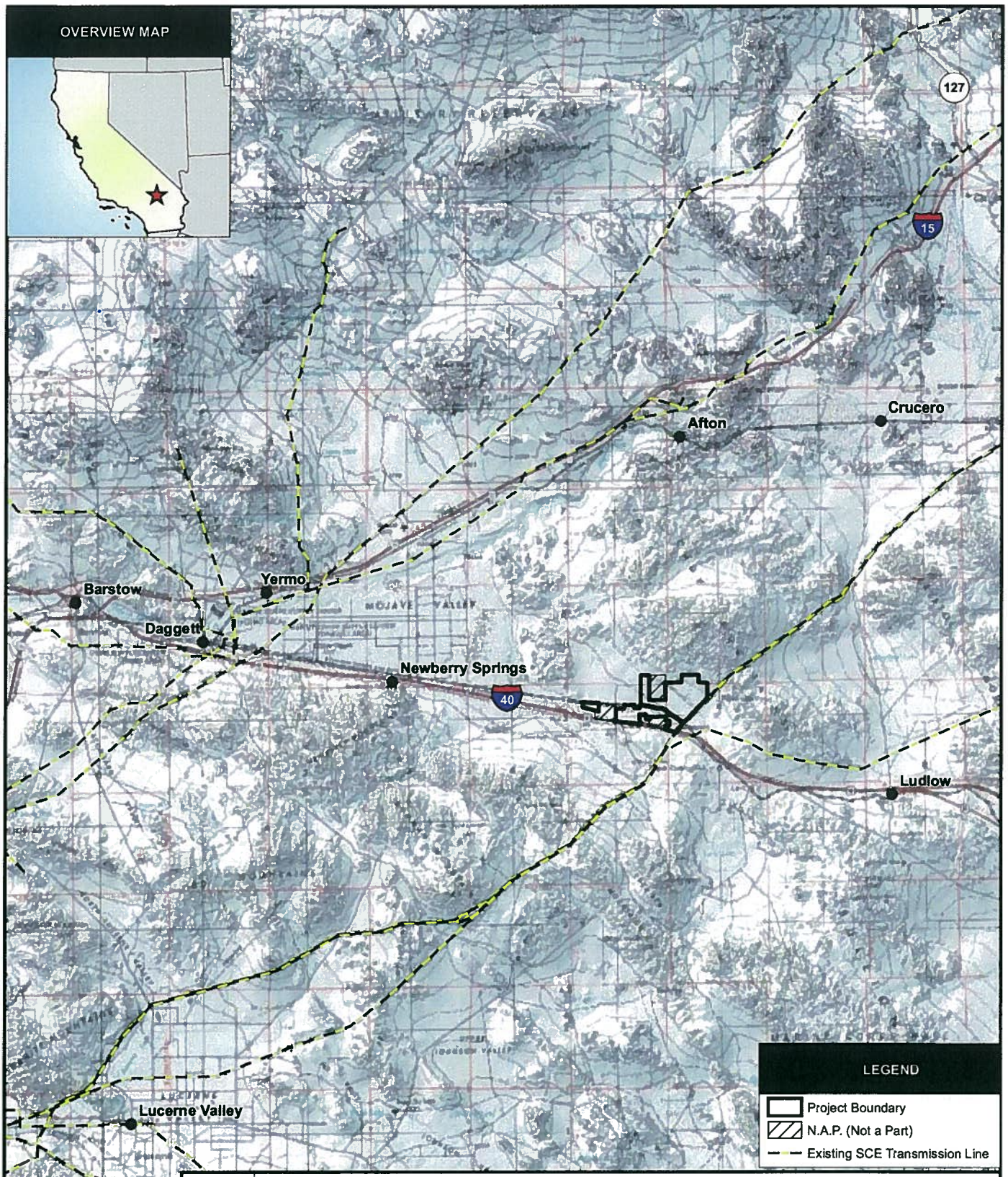
URS 2009a. Solar One Response to CEC and BLM Data Request 81. Drainage, Erosion, and Sediment Control Plan.

URS 2009b. Solar One Biological Technical Report. Prepared for SES and submitted to BLM and CEC.

URS 2010. Summary of Protocol Desert Tortoise 10m Transect Surveys of the Calico Solar Project Site.

West Mojave Planning Team. 1999. Current management situation of special status species in the West Mojave Planning Area. March 1999. 254 pp.

1132



SOURCES:
Mortenson (project features June 2010);
POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); ESRI (roads, overview);
USGS (7.5' quads various dates).

GENERAL VICINITY MAP
CALICO SOLAR PROJECT

URS

4 0 4 8 Miles

SCALE: 1" = 8 Miles(1:506,880)
SCALE CORRECT WHEN PRINTED AT 8.5X11

CREATED BY: CM	DATE: 06-16-10	FIG. NO:
PM: AL	PROJ. NO: 27658189.70002	1

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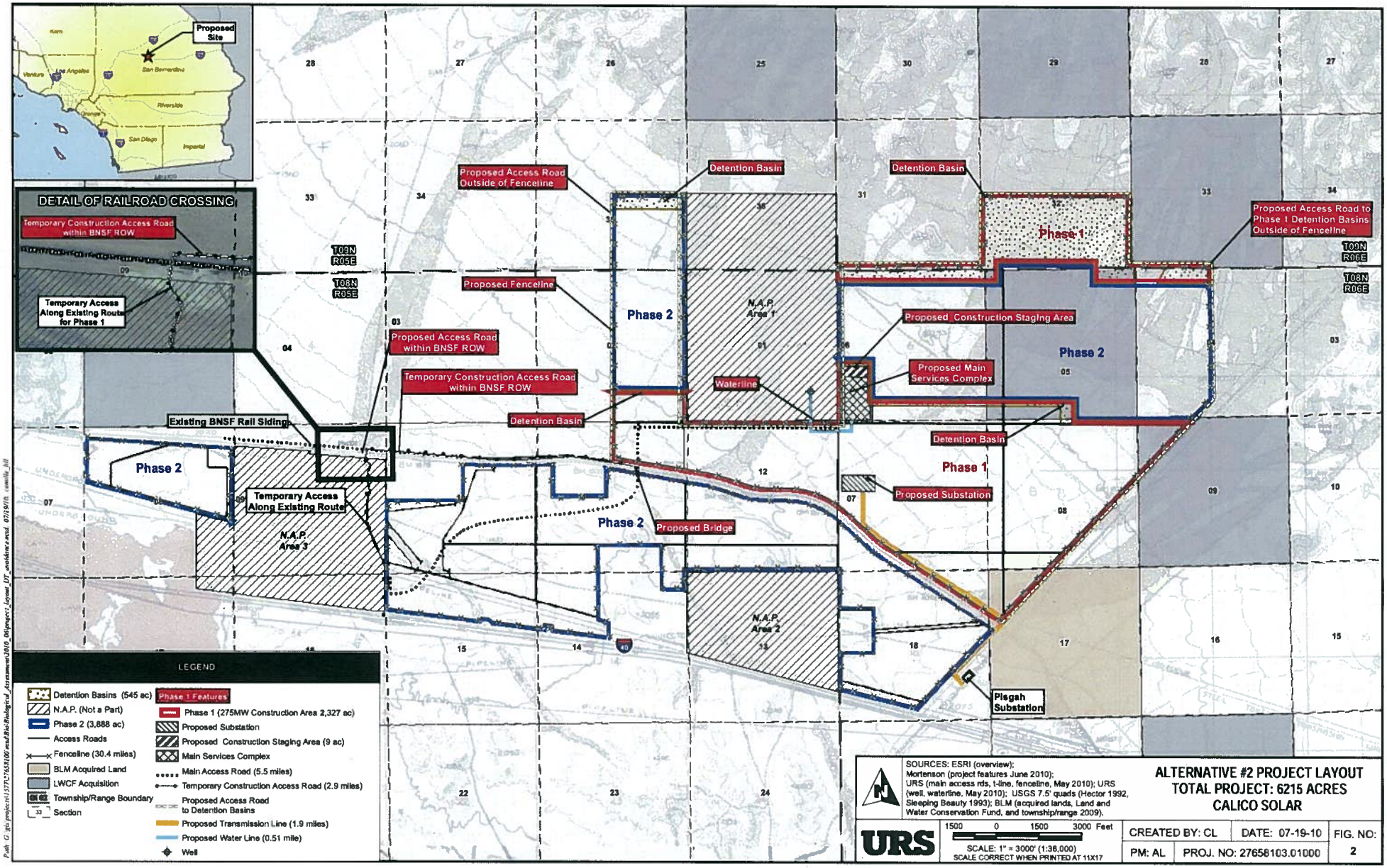
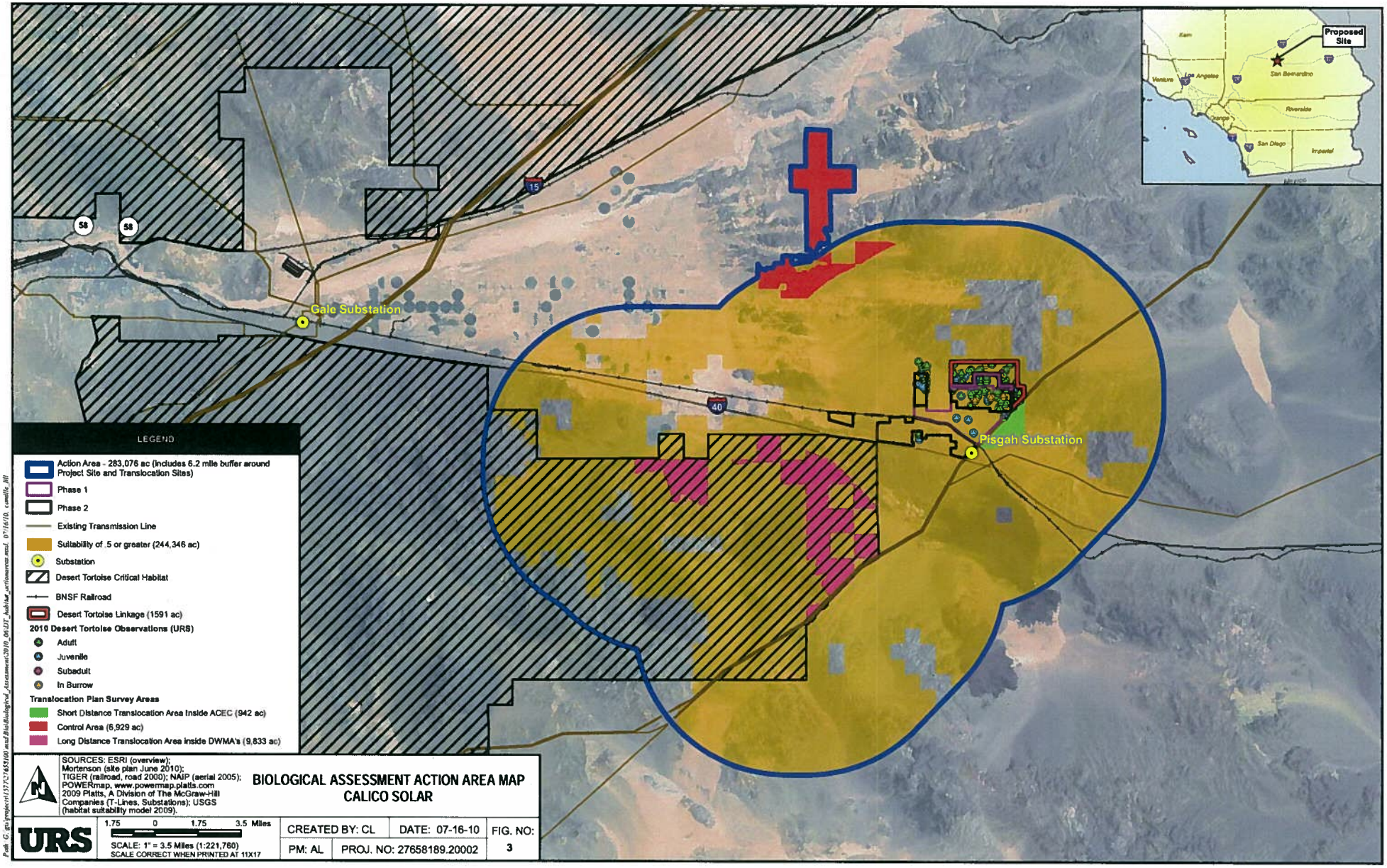
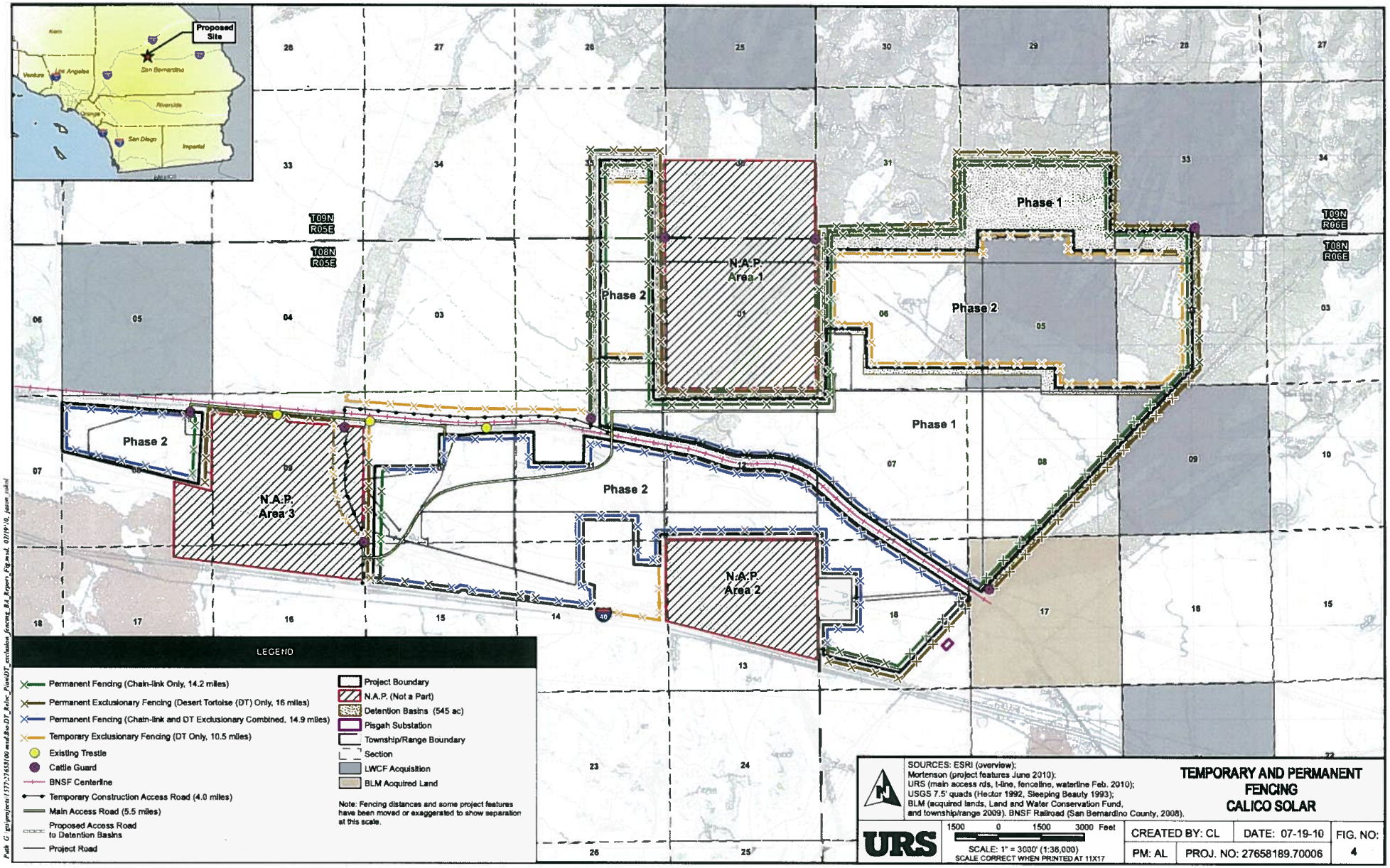

Proposed Site
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
DETAIL OF RAILROAD CROSSING
Temporary Construction Access Road within BNSF ROW
Temporary Access Along Existing Route for Phase 1
T09N R05E
T08N R05E
T09N R06E
T08N R06E
Proposed Access Road Outside of Fenceline
Detention Basin
Proposed Fenceline
Phase 2
N.A.P. Area 1
Proposed Access Road within BNSF ROW
Temporary Construction Access Road within BNSF ROW
Waterline
Proposed Construction Staging Area
Proposed Main Services Complex
Phase 1
Proposed Access Road to Phase 1 Detention Basins Outside of Fenceline
Existing BNSF Rail Siding
Temporary Access Along Existing Route
N.A.P. Area 3
Proposed Bridge
Proposed Substation
N.A.P. Area 2
Pisgah Substation
LEGEND
Detention Basins (545 ac)
N.A.P. (Not a Part)
Phase 2 (3,888 ac)
Access Roads
Fenceline (30.4 miles)
BLM Acquired Land
LWCF Acquisition
Township/Range Boundary
Section
Phase 1 Features
Phase 1 (275MW Construction Area 2,327 ac)
Proposed Substation
Proposed Construction Staging Area (9 ac)
Main Services Complex
Main Access Road (5.5 miles)
Temporary Construction Access Road (2.9 miles)
Proposed Access Road to Detention Basins
Proposed Transmission Line (1.9 miles)
Proposed Water Line (0.51 mile)
Well
SOURCES: ESRI (overview); Mortenson (project features June 2010); URS (main access rds, t-line, fenceline, May 2010); URS (well, waterline, May 2010); USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993); BLM (acquired lands, Land and Water Conservation Fund, and township/range 2009).
URS
1500 0 1500 3000 Feet
SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17
ALTERNATIVE #2 PROJECT LAYOUT
TOTAL PROJECT: 6215 ACRES
CALICO SOLAR
CREATED BY: CL
DATE: 07-19-10
FIG. NO: 2
PM: AL
PROJ. NO: 27658103.01000


Gale Substation
Pisgah Substation
58
58
15
40
Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
San Diego
Imperial
LEGEND
Action Area - 283,076 ac (includes 6.2 mile buffer around Project Site and Translocation Sites)
Phase 1
Phase 2
Existing Transmission Line
Suitability of .5 or greater (244,346 ac)
Substation
Desert Tortoise Critical Habitat
BNSF Railroad
Desert Tortoise Linkage (1591 ac)
2010 Desert Tortoise Observations (URS)
Adult
Juvenile
Subadult
In Burrow
Translocation Plan Survey Areas
Short Distance Translocation Area Inside ACEC (942 ac)
Control Area (6,929 ac)
Long Distance Translocation Area inside DWMA's (9,833 ac)
SOURCES: ESRI (overview); Mortenson (site plan June 2010); TIGER (railroad, road 2000); NAIP (aerial 2005); POWERmap, www.powermap.platts.com 2009 Platts, A Division of The McGraw-Hill Companies (T-Lines, Substations); USGS (habitat suitability model 2009).
BIOLOGICAL ASSESSMENT ACTION AREA MAP
CALICO SOLAR
URS
1.75 0 1.75 3.5 Miles
SCALE: 1" = 3.5 Miles (1:221,760)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: CL
DATE: 07-16-10
FIG. NO: 3
PM: AL
PROJ. NO: 27658189.20002


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Mexico
T09N R05E
T08N R05E
T09N R06E
T08N R06E
Phase 1
Phase 2
N.A.P. Area 1
N.A.P. Area 2
N.A.P. Area 3
LEGEND
Permanent Fencing (Chain-link Only, 14.2 miles)
Permanent Exclusionary Fencing (Desert Tortoise (DT) Only, 16 miles)
Permanent Fencing (Chain-link and DT Exclusionary Combined, 14.9 miles)
Temporary Exclusionary Fencing (DT Only, 10.5 miles)
Existing Trestle
Cattle Guard
BNSF Centerline
Temporary Construction Access Road (4.0 miles)
Main Access Road (5.5 miles)
Proposed Access Road to Detention Basins
Project Road
Project Boundary
N.A.P. (Not a Part)
Detention Basins (545 ac)
Pisgah Substation
Township/Range Boundary
Section
LWCF Acquisition
BLM Acquired Land
Note: Fencing distances and some project features have been moved or exaggerated to show separation at this scale.
SOURCES: ESRI (overview);
Mortenson (project features June 2010);
URS (main access rds, t-line, fenceline, waterline Feb. 2010);
USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993);
BLM (acquired lands, Land and Water Conservation Fund, and township/range 2009). BNSF Railroad (San Bernardino County, 2008).
URS
1500 0 1500 3000 Feet
SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17
TEMPORARY AND PERMANENT FENCING
CALICO SOLAR
CREATED BY: CL
DATE: 07-19-10
FIG. NO: 4
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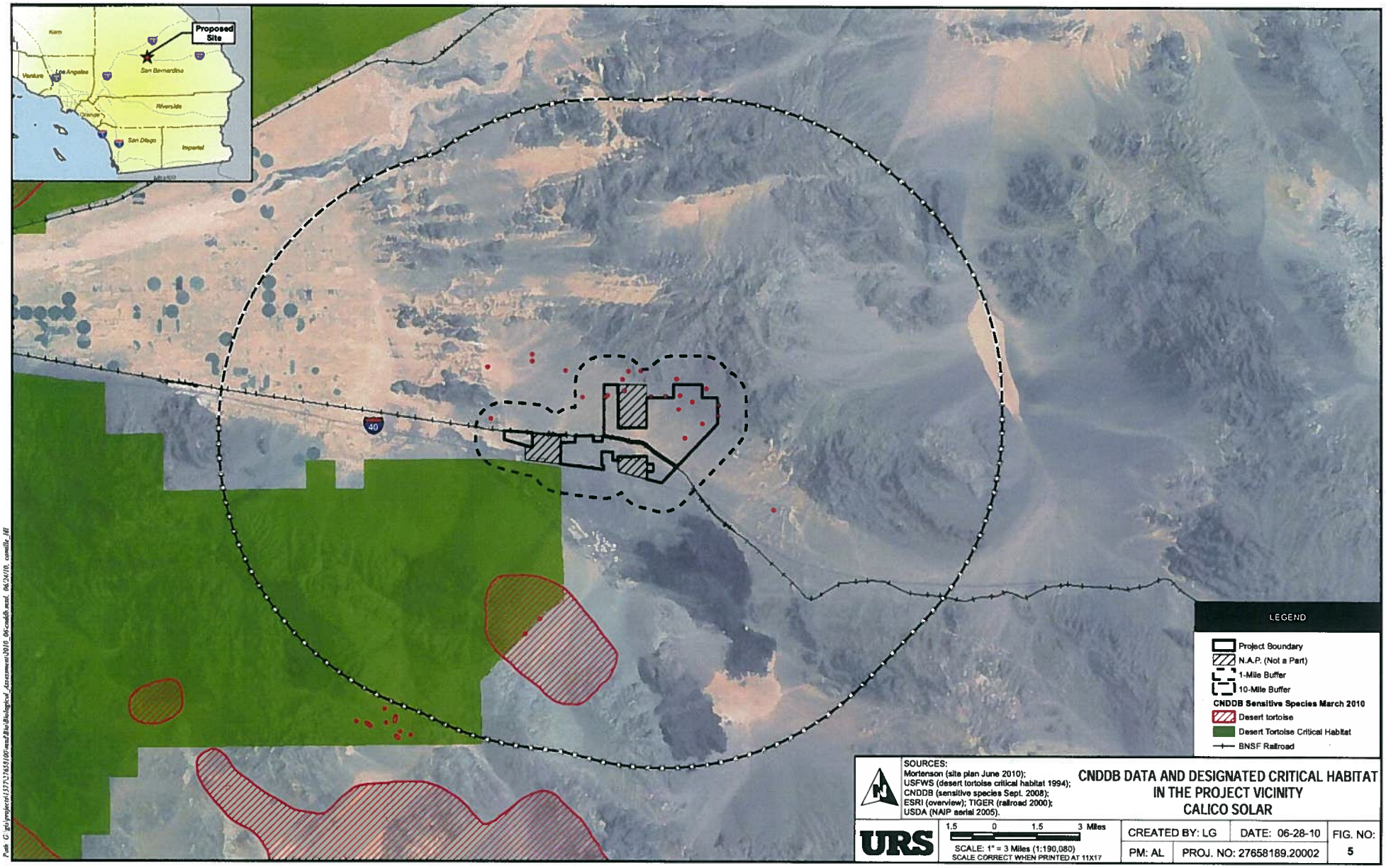
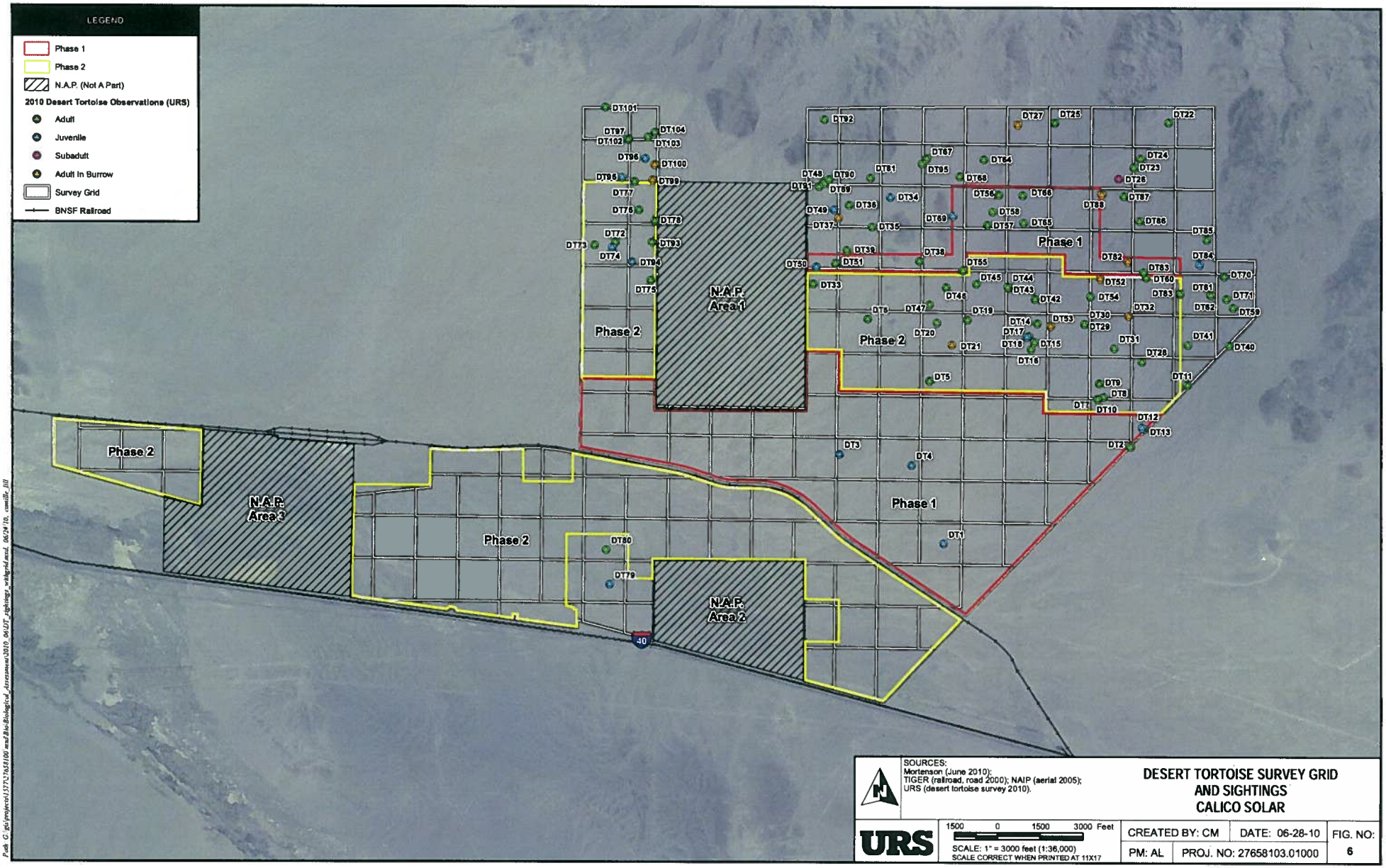

Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
40
LEGEND
Project Boundary
N.A.P. (Not a Part)
1-Mile Buffer
10-Mile Buffer
CNDDB Sensitive Species March 2010
Desert tortoise
Desert Tortoise Critical Habitat
BNSF Railroad
SOURCES:
Mortenson (site plan June 2010);
USFWS (desert tortoise critical habitat 1994);
CNDDB (sensitive species Sept. 2008);
ESRI (overview); TIGER (railroad 2000);
USDA (NAIP aerial 2005).
1.5 0 1.5 3 Miles
SCALE: 1" = 3 Miles (1:190,080)
SCALE CORRECT WHEN PRINTED AT 11X17
URS
CNDDB DATA AND DESIGNATED CRITICAL HABITAT
IN THE PROJECT VICINITY
CALICO SOLAR
CREATED BY: LG
DATE: 06-28-10
FIG. NO:
5
PM: AL
PROJ. NO: 27658189.20002



SOURCES:
Mortenson (June 2010);
TIGER (railroad, road 2000); NAIP (aerial 2005);
URS (desert tortoise survey 2010).

DESERT TORTOISE SURVEY GRID AND SIGHTINGS CALICO SOLAR

URS

1500 0 1500 3000 Feet

SCALE: 1" = 3000 feet (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 06-28-10	FIG. NO:
PM: AL	PROJ. NO: 27658103.01000	6

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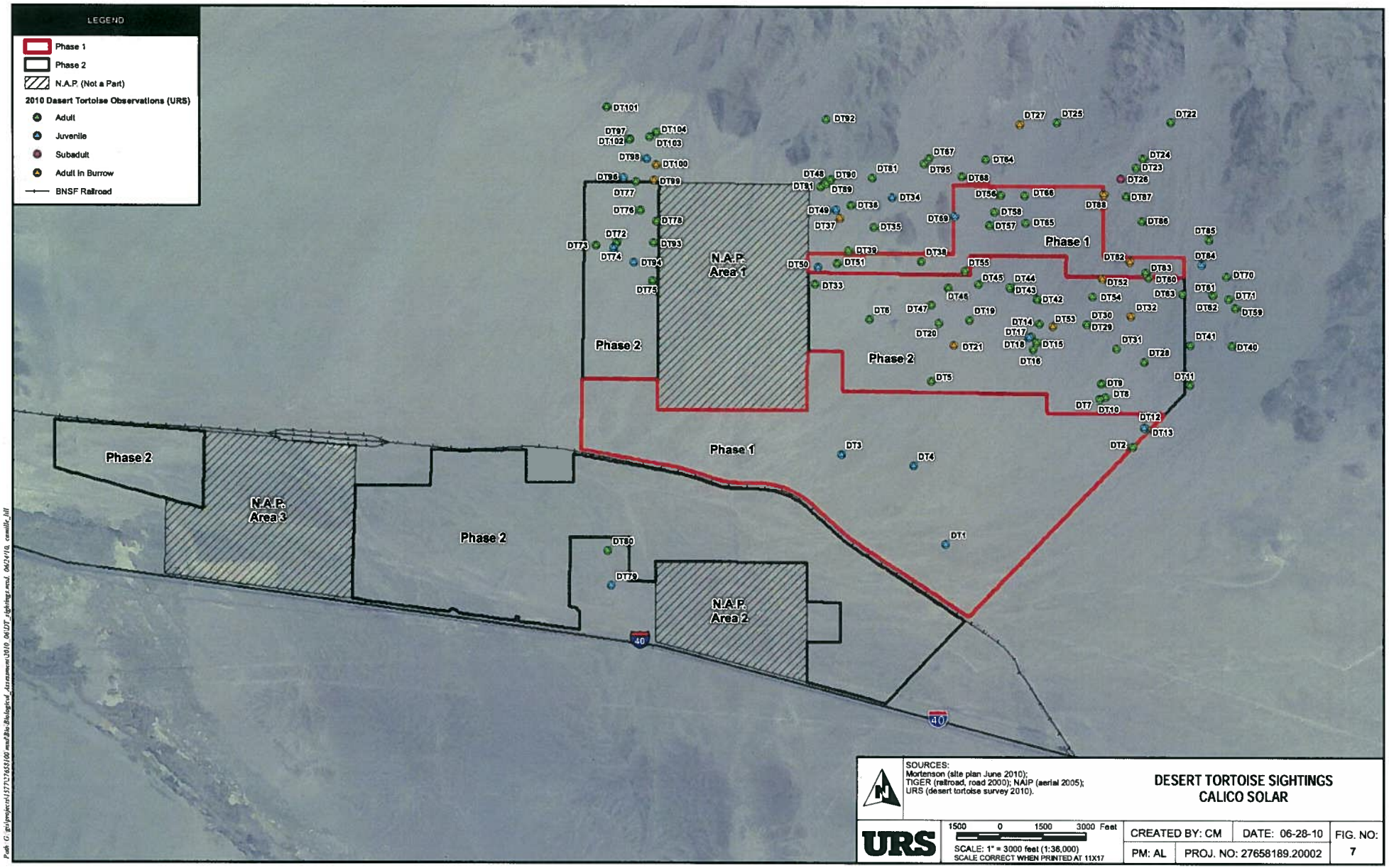
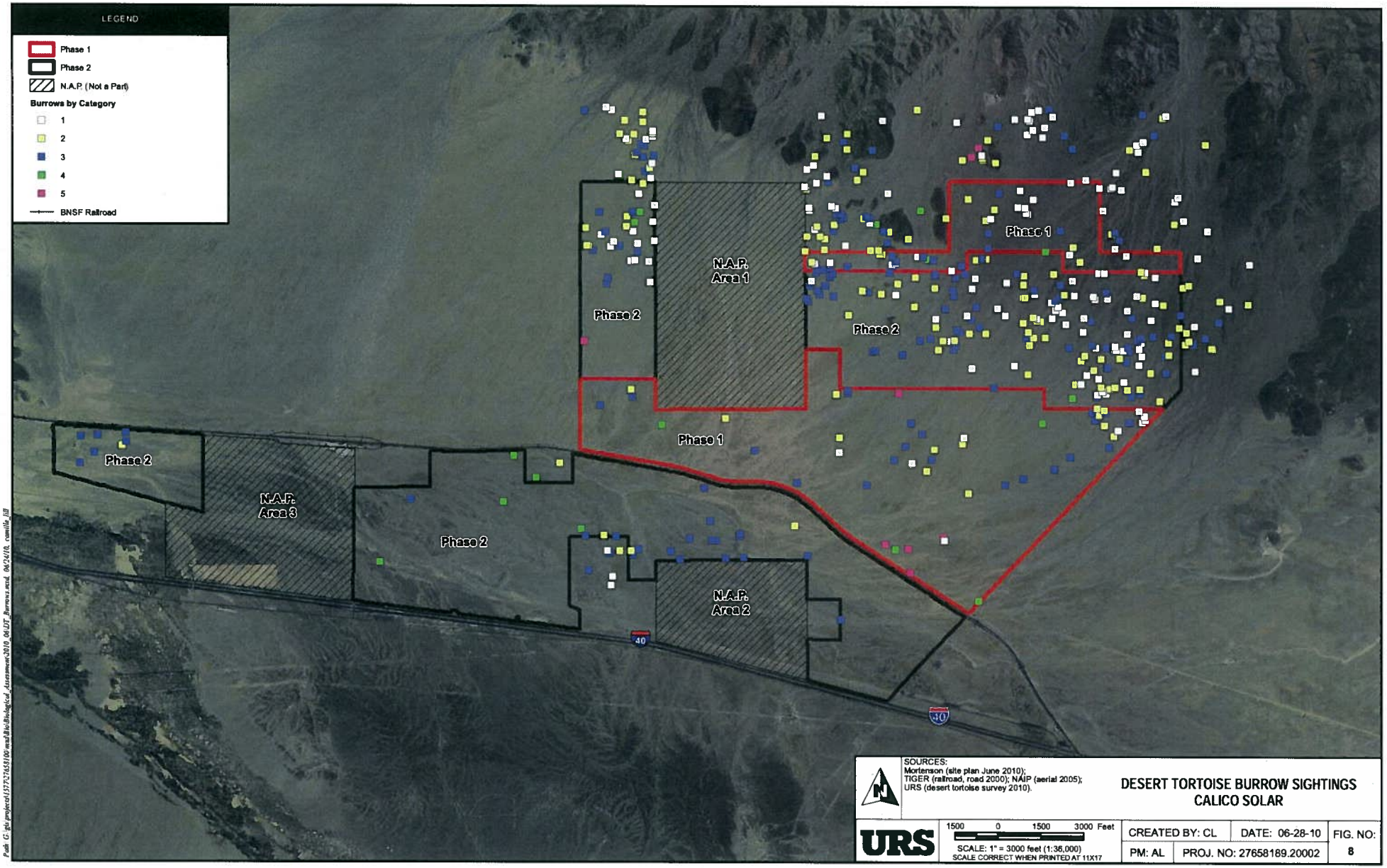
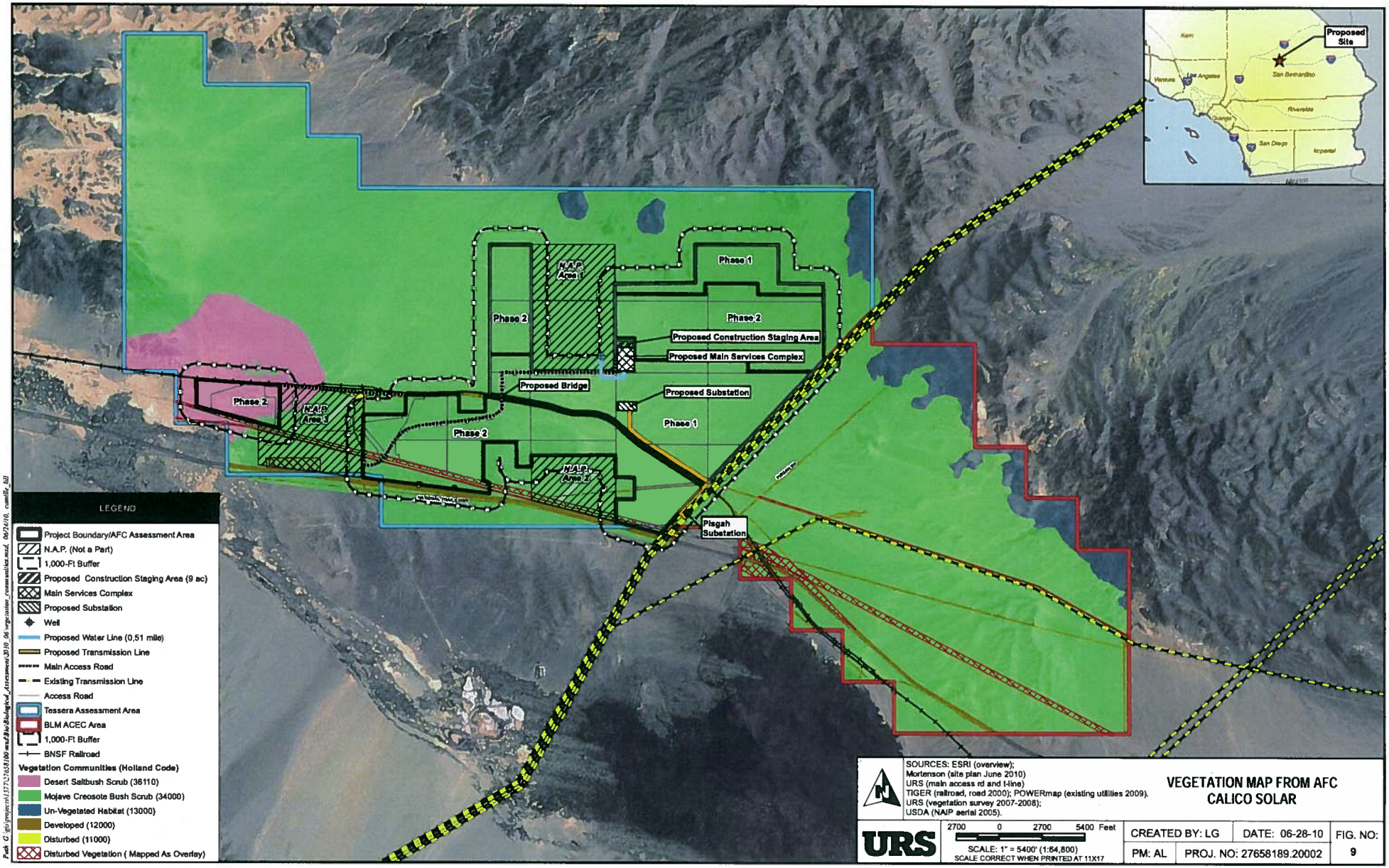
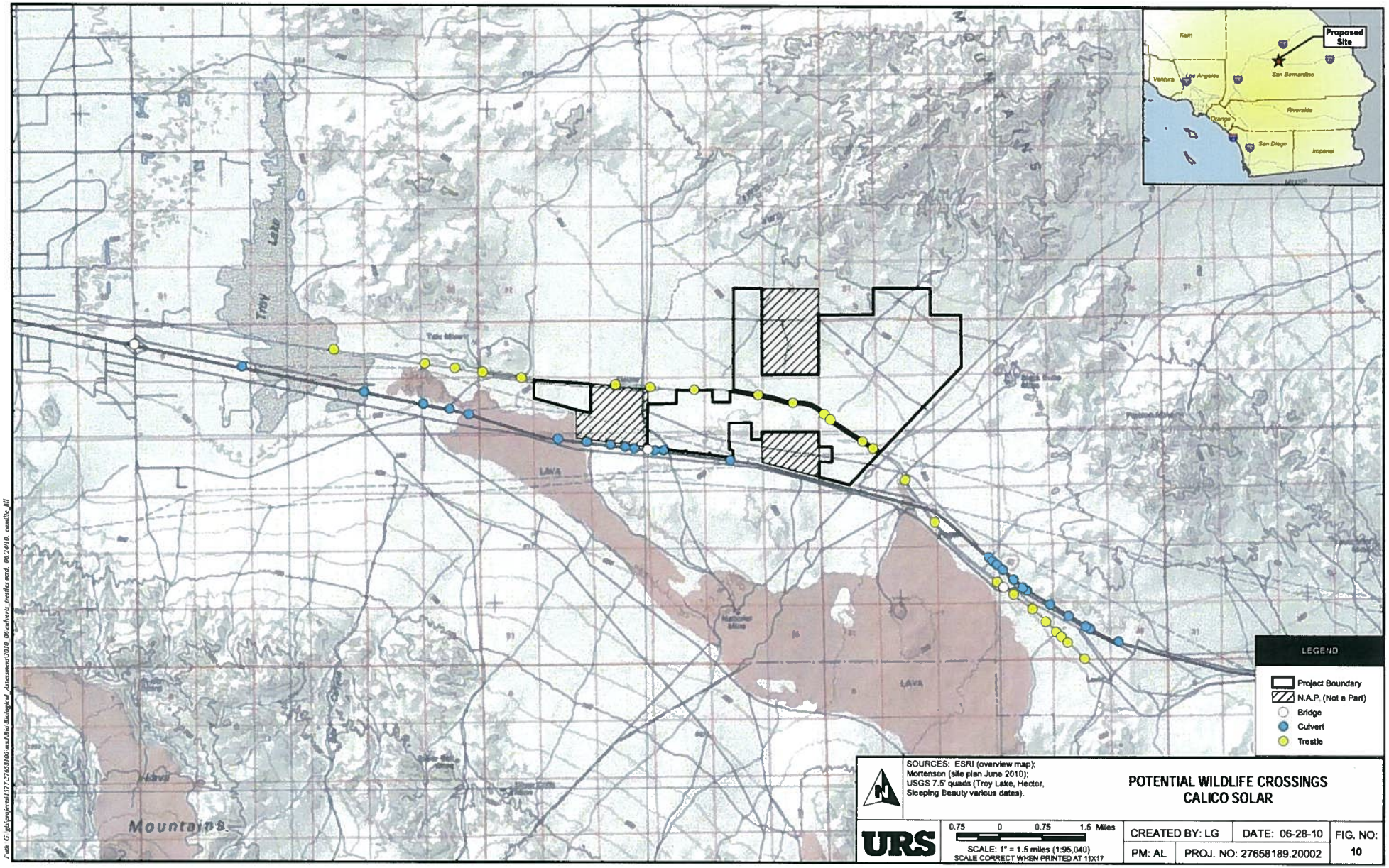


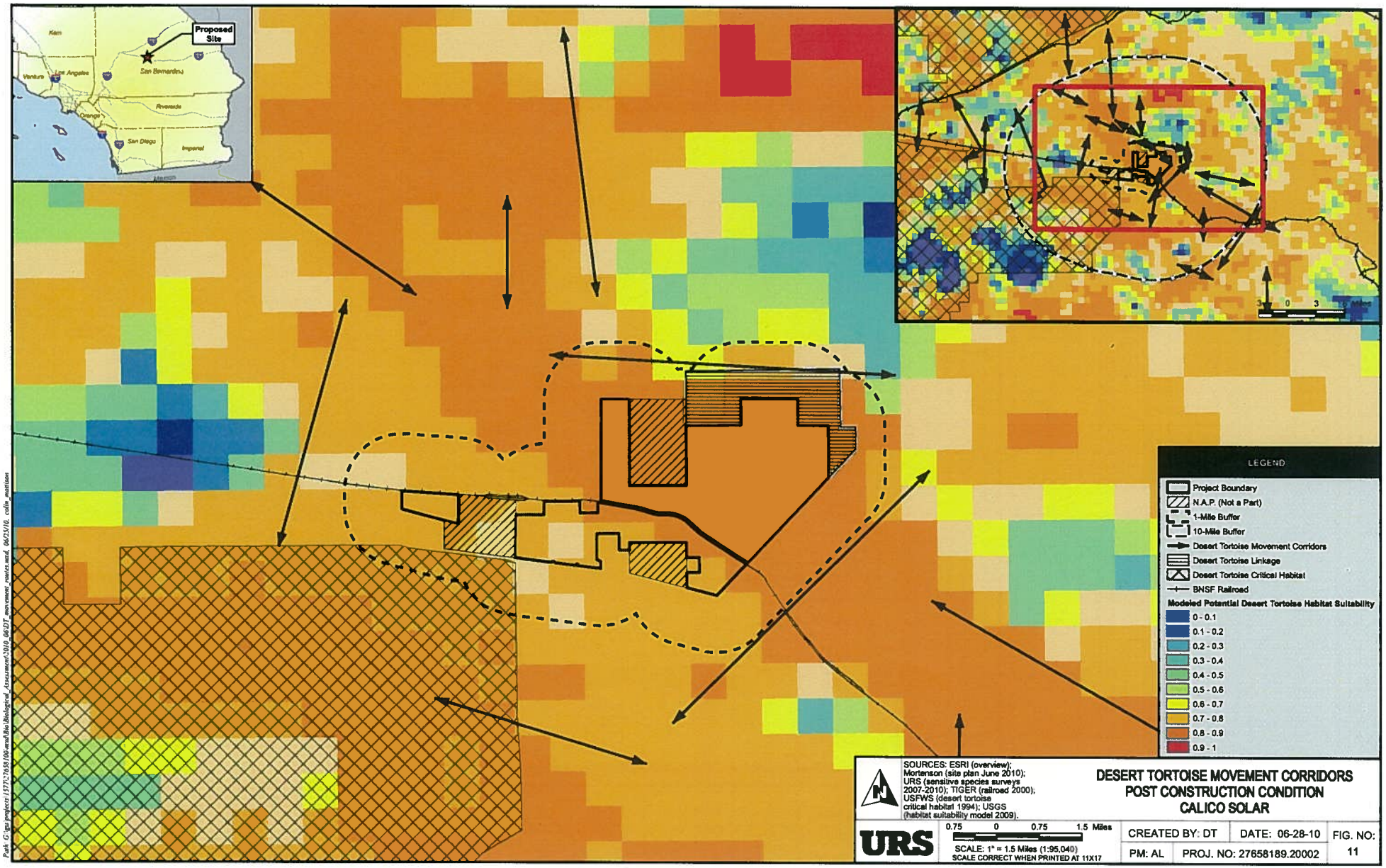
DESERT TORTOISE SIGHTINGS
CALICO SOLAR


LEGEND
Phase 1
Phase 2
N.A.P. (Not a Part)
Burrows by Category
1
2
3
4
5
BNSF Railroad
Phase 1
Phase 2
N.A.P. Area 1
Phase 2
Phase 1
Phase 2
N.A.P. Area 3
Phase 2
N.A.P. Area 2
40
40
SOURCES:
Mortenson (site plan June 2010);
TIGER (railroad, road 2000); NAIP (aerial 2005);
URS (desert tortoise survey 2010).
DESERT TORTOISE BURROW SIGHTINGS
CALICO SOLAR
URS
1500 0 1500 3000 Feet
SCALE: 1" = 3000 feet (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: CL
DATE: 06-28-10
FIG. NO:
PM: AL
PROJ. NO: 27658189.20002
8



VEGETATION MAP FROM AFC
CALICO SOLAR


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Mexico
Troy Lake
Troy
Tom Mountain
LAVA
Mountains
LEGEND
Project Boundary
N.A.P. (Not a Part)
Bridge
Culvert
Trestle
SOURCES: ESRI (overview map);
Mortenson (site plan June 2010);
USGS 7.5' quads (Troy Lake, Hector,
Sleeping Beauty various dates).
POTENTIAL WILDLIFE CROSSINGS
CALICO SOLAR
URS
0.75 0 0.75 1.5 Miles
SCALE: 1" = 1.5 miles (1:95,040)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: LG
DATE: 06-28-10
FIG. NO:
10
PM: AL
PROJ. NO: 27658189.20002



SOURCES: ESRI (overview); Mortenson (site plan June 2010); URS (sensitive species surveys 2007-2010); TIGER (railroad 2000); USFWS (desert tortoise critical habitat 1994); USGS (habitat suitability model 2009).

DESERT TORTOISE MOVEMENT CORRIDORS
POST CONSTRUCTION CONDITION
CALICO SOLAR

URS

0.75 0 0.75 1.5 Miles
SCALE: 1" = 1.5 Miles (1:95,040)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: DT	DATE: 06-28-10	FIG. NO:
PM: AL	PROJ. NO: 27658189.20002	11

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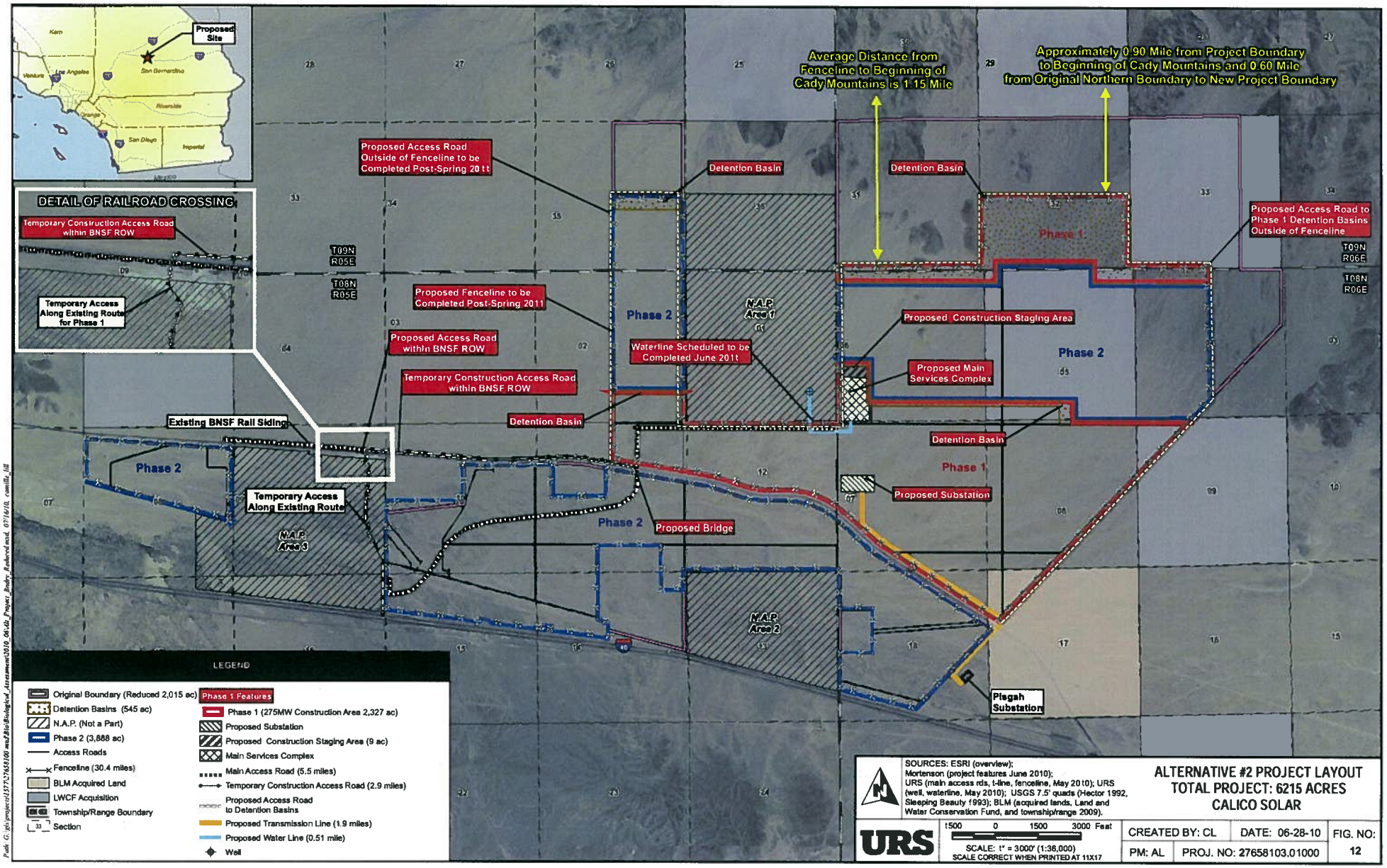
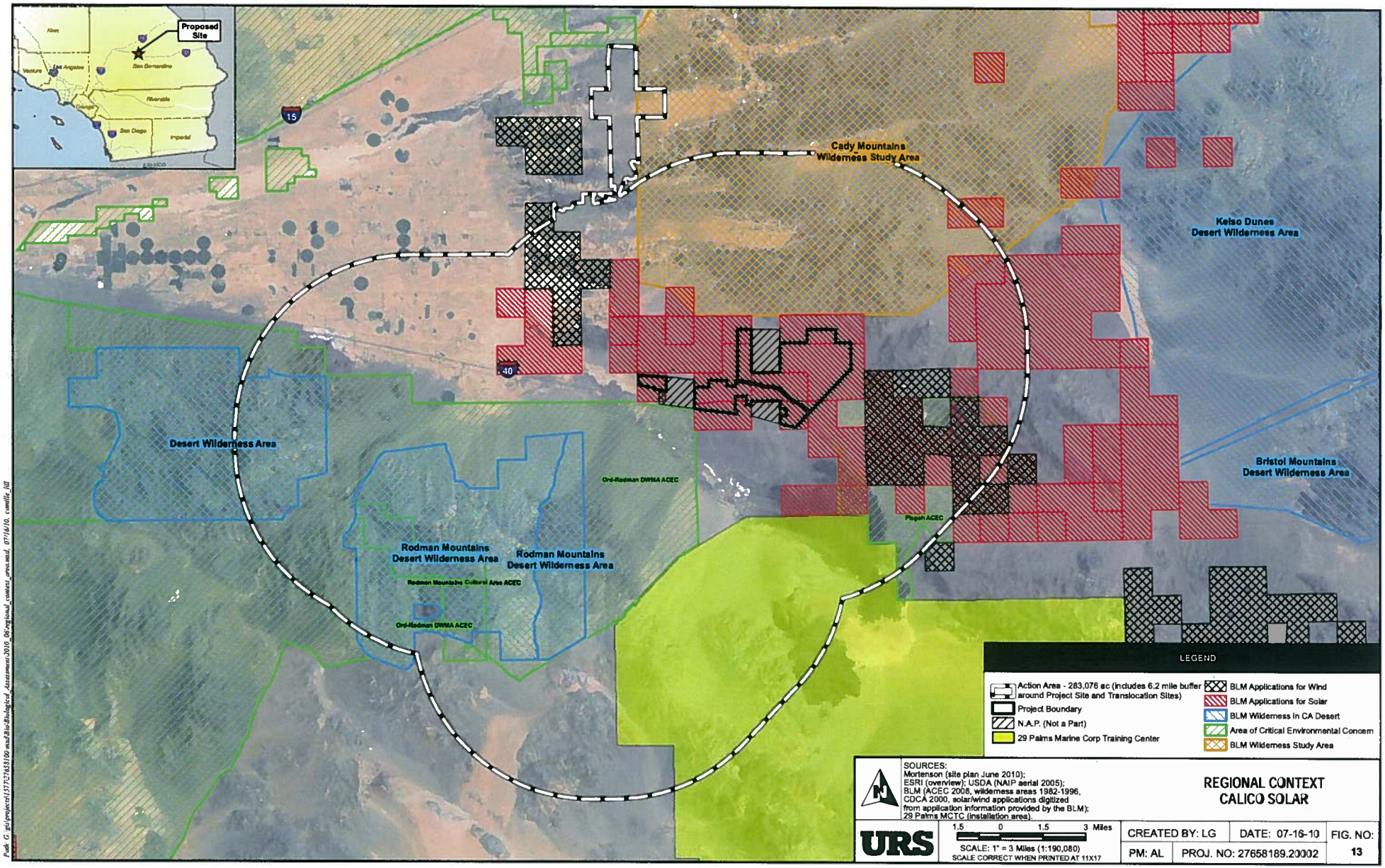

Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Mexico
DETAIL OF RAILROAD CROSSING
Temporary Construction Access Road within BNSF ROW
Temporary Access Along Existing Route for Phase 1
Proposed Access Road Outside of Fenceline to be Completed Post-Spring 2011
Proposed Fenceline to be Completed Post-Spring 2011
Proposed Access Road within BNSF ROW
Temporary Construction Access Road within BNSF ROW
Existing BNSF Rail Siding
Temporary Access Along Existing Route
N.A.P. Area 3
N.A.P. Area 1
N.A.P. Area 2
Phase 2
Phase 1
Detention Basin
Waterline Scheduled to be Completed June 2011
Proposed Bridge
Proposed Substation
Proposed Construction Staging Area
Proposed Main Services Complex
Average Distance from Fenceline to Beginning of Cady Mountains is 1.15 Mile
Approximately 0.90 Mile from Project Boundary to Beginning of Cady Mountains and 0.60 Mile from Original Northern Boundary to New Project Boundary
Proposed Access Road to Phase 1 Detention Basins Outside of Fenceline
T09N R05E
T08N R05E
T09N R06E
T08N R06E
Pisgah Substation
LEGEND
Original Boundary (Reduced 2,015 ac)
Detention Basins (545 ac)
N.A.P. (Not a Part)
Phase 2 (3,888 ac)
Access Roads
Fenceline (30.4 miles)
BLM Acquired Land
LWCF Acquisition
Township/Range Boundary
Section
Phase 1 Features
Phase 1 (275MW Construction Area 2,327 ac)
Proposed Substation
Proposed Construction Staging Area (9 ac)
Main Services Complex
Main Access Road (5.5 miles)
Temporary Construction Access Road (2.9 miles)
Proposed Access Road to Detention Basins
Proposed Transmission Line (1.9 miles)
Proposed Water Line (0.51 mile)
Well
SOURCES: ESRI (overview); Mortenson (project features June 2010); URS (main access rds, t-line, fenceline, May 2010); URS (well, waterline, May 2010); USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993); BLM (acquired lands, Land and Water Conservation Fund, and township/range 2009).
URS
1500 0 1500 3000 Feet
SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17
ALTERNATIVE #2 PROJECT LAYOUT
TOTAL PROJECT: 6215 ACRES
CALICO SOLAR
CREATED BY: CL
DATE: 06-28-10
FIG. NO: 12
PM: AL
PROJ. NO: 27658103.01000


Proposed Site
Kern
Ventura
Los Angeles
San Bernardino
Riverside
Orange
San Diego
Imperial
Mexico
15
40
Cady Mountains Wilderness Study Area
Kelso Dunes Desert Wilderness Area
Bristol Mountains Desert Wilderness Area
Desert Wilderness Area
Ord-Rodman DWMA ACEC
Piegan ACEC
Rodman Mountains Desert Wilderness Area
Rodman Mountains Desert Wilderness Area
Rodman Mountains Cultural Area ACEC
Ord-Rodman DWMA ACEC
LEGEND
Action Area - 283,076 ac (includes 6.2 mile buffer around Project Site and Translocation Sites)
Project Boundary
N.A.P. (Not a Part)
29 Palms Marine Corp Training Center
BLM Applications for Wind
BLM Applications for Solar
BLM Wilderness in CA Desert
Area of Critical Environmental Concern
BLM Wilderness Study Area
SOURCES:
Mortenson (site plan June 2010);
ESRI (overview); USDA (NAIP aerial 2005);
BLM (ACEC 2008, wilderness areas 1982-1996,
CDCA 2000, solar/wind applications digitized
from application information provided by the BLM);
29 Palms MCTC (installation area).
REGIONAL CONTEXT
CALICO SOLAR
URS
1.5 0 1.5 3 Miles
SCALE: 1" = 3 Miles (1:190,080)
SCALE CORRECT WHEN PRINTED AT 11X17
CREATED BY: LG
DATE: 07-16-10
FIG. NO:
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PROJ. NO: 27658189.20002
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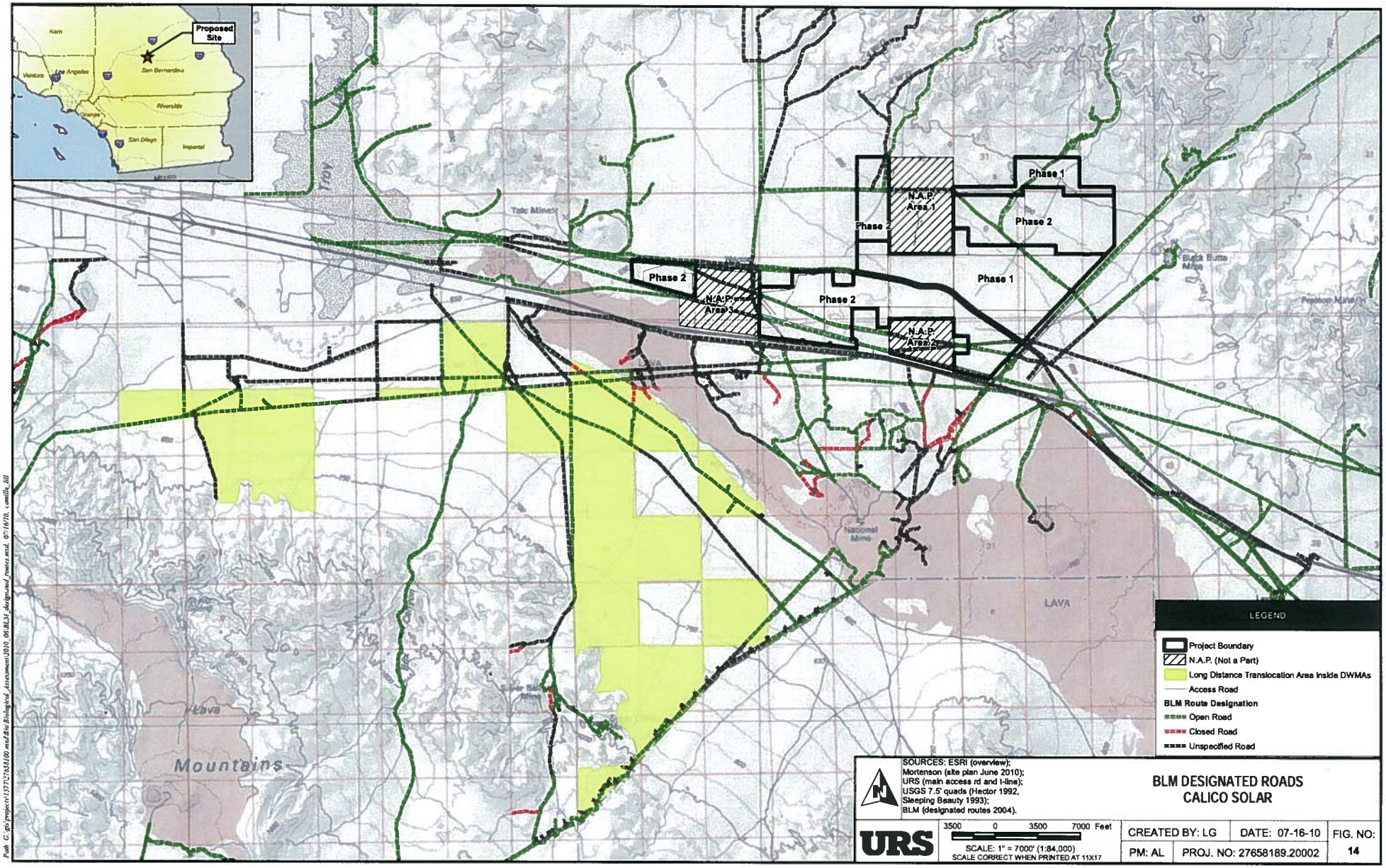

SOURCES: ESRI (overview); Mortenson (site plan June 2010); URS (main access rd and t-line); USGS 7.5' quads (Hector 1992, Sleeping Beauty 1993); BLM (designated routes 2004).

BLM DESIGNATED ROADS
CALICO SOLAR

URS

3500 0 3500 7000 Feet

SCALE: 1" = 7000' (1:84,000)
SCALE CORRECT WHEN PRINTED AT 11X17

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Southern California Edison Project Description for Calico Solar
275 MW Early Interconnection Facilities
Submitted by SCE on December 16, 2009

Background

The following project description is provided in relation to the early interconnection request made by Tessera Solar (TSNA) to Southern California Edison (SCE). As discussed below, TSNA requested SCE to review how much latent system capacity is available for use on SCE's existing system prior to completion of the system facilities proposed for interconnection of the 850MW for the Calico Solar Project.

Calico Solar Generation Interconnection Study Overview:

Tessera Solar applied to the California Independent System Operator (CAISO) for the interconnection of their 850MW Solar One Project to the CAISO Grid at the existing SCE Pisgah Substation 220kV Bus under the terms of SCE's Transmission Owner (TO) Tariff.

SCE prepared a System Impact Study (SIS) dated March 7, 2006, to analyze the impact of the 850MW Project to the SCE Transmission System.

In addition, SCE prepared a Technical Study (TAS I) to evaluate transient stability associated with the interconnection of the 850MW Calico Solar Project.

Subsequent to these two studies, a number of queued ahead generation projects withdrew from the CAISO Interconnection Queue resulting in a need to perform a reassessment of the impacts originally identified in the SIS and the TAS I.

SCE prepared a new Technical Assessment II (TAS II) dated June 13, 2008, to analyze the impact of the 850MW Project to the SCE Transmission System reflecting the withdrawal of previously-queued projects.

The Interconnection Facilities Study dated November 6, 2008, addressed the scope of work and the cost estimate for the construction of all the Interconnection Facilities and System Upgrades required for the interconnection of the 850MW Project.

During the preparation of the several reports discussed above, TSNA requested SCE to investigate the possibility of interconnection a portion of its 850MW generation to the existing Pisgah Substation and the related 220kV system before the completion of the 500kV upgrades.

In compliance with this request, SCE prepared an LGIP Optional Interconnection Study Report ("Optional Study") to analyze the maximum amount of generation that could be interconnected to the existing Pisgah 220kV Bus and related 220kV Transmission Lines and transmitted the results to CAISO in January 2008.

On January 9, 2008, the CAISO issued the Optional Study Report indicating that that Calico Solar Project could be allowed to interconnect up to 275MW generation to the existing Pisgah 220kV Bus and related 220kV Transmission System contingent on the installation of a new Special Protection Scheme to drop the Calico Solar Project's generation under certain contingencies.

The intent of the early interconnection of up to 275MW is that it would be a temporary interconnection until the 500kV upgrades identified in the Interconnection Facilities Study are in service, and the full requested generation output of 850MW could be connected to the upgraded transmission system. When completed, the 500 kV upgrades will allow the export of approximately 1,400 MW of additional generating capacity between the Lugo and Pisgah Substations. This will accommodate not only all of the power produced by Calico Solar but other proposed generating facilities.

A second Optional Study Agreement ("Interconnection Optional Study"), dated October 12, 2009, detailed the scope of work and cost estimate for the early interconnection of 275MW of the Calico Solar generation to the existing Pisgah Substation 220kV Bus and related 220kV Transmission Lines.

Please note, final engineering has not been performed for the 275MW early interconnection, and is pending the execution of a Large Generator Interconnection Agreement ("LGIA") for the proposed Calico Solar Project. Negotiations for the LGIA are nearing completion.

Therefore, SCE anticipates the 275 MW early interconnection project descriptions, which is based at this time on conceptual engineering, to be as follows:

Pisgah Substation Expansion

Engineering Plan, Description and Location: SCE is planning to do the following work at Pisgah Substation:

- Expand SCE's existing Pisgah 220kV Substation (northwest area of the substation to create a new area of approximately 270 feet by 100 feet) within SCE's existing 220kV right-of-way (ROW)
- Install a new double-breaker 220kV line position to terminate the new Calico Solar 220kV Gen Tie Line
- Install motorized disconnect switches on each of the existing SCE Lugo No.1 and No.2 220 kV line positions at the substation
- Install special protection scheme (SPS) relays inside the existing mechanical electrical equipment rooms (MEER)
- Install new remote terminal unit (RTU) inside the existing MEER
- Install miscellaneous Telecommunications equipment inside the existing MEER.

Construction Activities: The expansion of Pisgah Substation would require extending the graded substation pad to the west. It is estimated that the grading activities would disturb an area

approximately 300 feet by 125 feet (0.9 acre) to provide the proposed 270-foot by 100-foot internal expansion. Because the surface elevation of the new expansion area would be higher than the surface elevation of the surrounding desert floor, it is anticipated that approximately 10,000 cubic yards of new soil would be required to achieve the desired level.

After the area has been graded, new chain-link fencing would be installed and the portion of the old fencing would be removed.

Following the completion of the site improvements, below grade construction would begin with the expansion of the substation ground grid into the new area, followed by the excavation for conduits and for equipment and structure foundations. Above grade construction would include the erection of steel structures, the installation of the new 220 kV circuit breaker and ancillary electrical equipment, the installation of overhead connecting cables and of new control and monitoring devices within the control building.

Once the installation of the substation equipment has been completed, a four-inch thick layer of crushed rock would be placed on the surface of the expansion area. There would be no asphalt concrete paving as part of this project element.

Upon completion of these activities, extensive testing would be required to insure safe and reliable operation prior to the energization of the new position.

SCE 220kV Gen-Tie Configuration

Engineering Plan, Description and Location: SCE will build approximately 1-2 new 220kV structures within the existing 200kV ROW and/or within the expanded Pisgah Substation fence line to support the gen-tie line coming from the Calico Solar Project to facilitate the 220kV service drop from the last Calico Solar Project's gen-tie structure into the Pisgah Substation. At this time, the actual structure types, configurations and locations have not yet been determined or engineered and will be subject to further engineering and coordination with TSNA.

Construction Activities: The establishment of a marshalling yard will not be necessary for the construction of the transmission structures and the stringing of the conductor to complete the gen-tie circuit from Calico Solar into Pisgah Substation. Although, a temporary equipment and material staging area would be established for short-term utilization within the existing SCE ROW near the new transmission structure locations and/or at Pisgah Substation.

Equipment and materials to be stored at the temporary equipment and material staging area may include:

- Construction trailer
- Construction equipment
- Conductor / wire reels
- Transmission structure components
- Overhead ground wire/Optical ground wire cable

- Hardware
- Insulators
- Consumables, such as fuel and joint compound
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal

The size of the temporary equipment and material staging area would be dependent upon a detailed site inspection and would take into account, where practical, suggestions by the SCE Crew Foreman or the SCE Contractor selected to do the work; an area of approximately 0.5 to 1.5 acres may be required. Land disturbed at the temporary equipment and material staging area, if any, would be restored to preconstruction conditions following the completion of construction.

This portion of the project involves construction within an existing SCE ROW. It is assumed that existing public roads as well as existing transmission line roads would be used during construction. Transmission line roads are classified into two groups: access roads and spur roads; access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites. However, it is also assumed that rehabilitation work may be necessary in some locations for existing transmission line roads to accommodate construction activities. This work may include the re-grading and repair of existing access and spur roads. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side).

The construction of this project may require new spur roads to access the new transmission line structure locations. Similar to rehabilitation of existing roads, all new spur road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side) but may be wider depending on final engineering requirements and field conditions. Access and spur road gradients would be leveled so that any sustained grade does not exceed 12 percent. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. Spur roads would usually have turnaround areas near the structure locations.

The new structure locations would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for footing and structure construction. Site preparation for the temporary laydown area required for the assembly of the structure would first be cleared of vegetation and graded as required to provide a reasonably level and vegetation-free surface for footing and structure construction. The area needed for the laydown and the assembly of the structure is approximately 200 feet by 200 feet (0.92 acre). Erection of the structure will require an erection crane to be set up adjacent to and 60 feet from the centerline of the structure. The crane pad would be located within the laydown area used for structure assembly. If the existing terrain is not suitable to support crane activities, a temporary 50 feet by 50 feet (0.06 acre) crane pad will be constructed.

The structure would require drilled, poured-in-place, concrete footings that would form the structure foundation. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at the site and would be determined during final engineering.

The foundation process starts with the drilling of the hole for the structure. The hole would be drilled using truck or track-mounted excavators with various diameter augers to match the diameter requirements of the structure. The excavated material will be distributed at the structure site or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of the foundation footing for each structure, steel reinforced rebar cage(s) would be set, survey positioning of the anchor bolts and/or stub angles would be verified, and concrete would then be placed. The steel reinforced rebar cage(s) would be assembled off site and delivered to the structure location by flatbed truck. A typical transmission structure would require approximately 15 to 80 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed, soil conditions, and topography at each site. The transmission structure footings will project approximately 1-3 feet above the ground level.

Foundations in soft or loose soil and that extend below the groundwater level may be stabilized with drilling mud slurry. Mud slurry will be placed in the hole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation is then pumped to the bottom of the hole, displacing the mud slurry. The mud slurry brought to the surface is typically collected in a pit adjacent to the foundation, and then pumped out of the pit to be reused or discarded at an off-site disposal facility in accordance with all applicable laws.

Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically takes approximately 28 days to cure to an engineered strength. This strength is verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to begin the erection of the structure.

During construction, existing concrete supply facilities would be used where feasible. If concrete supply facilities do not exist in certain areas, a temporary concrete batch plant would be set up. If necessary, approximately 2 acres of property would be sub-partitioned from a marshalling area for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

The assembly would consist of hauling the structure components from the staging yard to their designated laydown site using semi-trucks with 40-foot trailers. Crews would then assemble portions of each structure on the ground at the structure location, while on the ground, the top section may be pre-configured with the necessary insulators and wire-stringing hardware before being set in place. An 80-ton all-terrain or rough terrain crane would be used to position the base section on top of

previously prepared foundation. When the base section is secured, the remaining portions of the structure would then be placed upon the base section and bolted together.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footing. The graded area would be compacted and would be capable of supporting heavy vehicular traffic.

Wire-stringing includes all activities associated with the installation of conductors. This activity includes the installation of primary conductor and OPGW or ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) are typically attached during the steel erection process.

A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in Institute of Electrical and Electronics Engineers Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension structures. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by SCE:

- Step 1: Sock Line, Threading: Typically, a lightweight sock line is passed from structure to structure, which would be threaded through the wire rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull.

- Step 2: Pulling: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running

board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- Step 3: Splicing, Sagging, and Dead-ending: After the conductor is pulled in, the conductor would be sagged to proper tension and dead-ended to structures.

- Step 4: Clipping-in, Spacers: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The preferred minimum area needed for tensioning equipment set-up sites requires approximately an area of 150 feet by 500 feet (1.72 acres); the preferred minimum area needed for pulling equipment set-up sites requires approximately an area of 150 feet by 300 feet (1.03 acres); however, crews can work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end.

For stringing equipment that cannot be positioned at either side of a dead-end transmission structure, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup.

The puller and tensioner set-up locations associated with the transmission structures would be temporary and the land would be restored to its previous condition following completion of conductor stringing activities. The final number and locations of the puller and tensioner sites will be determined during final engineering for the Proposed Project and the construction methods chosen by SCE or its Contractor.

An overhead ground wire (OHGW) for shielding or an optical ground wire (OPGW) for shielding and communication purposes would be installed on the transmission line. Final engineering will determine which configuration is installed. The OHGW/OPGW would be installed in the same manner as the conductor; it is typically installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. On the last structure at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

Telecommunications Facilities Installation

Two telecommunication paths are required for the Calico Solar early interconnection of 275 MW. The two separate paths are needed due to 220kV line protection and SPS requirements. The two separate telecommunications paths are:

- Constructing a new fiber optic communication line on existing poles between SCE's Pisgah and Gale substations (Pisgah-Gale Fiber Optic Cable).

- Replacing existing Overhead Ground Wires with new Optical Ground Wire on a 65-mile segment of SCE's Eldorado-Lugo 500 kV line between SCE's Lugo and Pisgah substations (OPGW Installation on Eldorado – Lugo 500kV T/L)

Note, with respect to the OPGW installation mentioned above, SCE anticipates installing a repeater station shelter, the likely size of which could be 15 feet x 20 feet, within the Eldorado-Lugo 500kV T/L ROW. This repeater station shelter will likely require a distribution power connection that could involve the installation of several wood distribution poles. The repeater station and distribution poles will involve minimal permanent ground disturbance in addition to temporary ground disturbance during construction. However, because final engineering has not yet been completed, the exact location for facilities has not been determined.

In addition, two separate telecommunications paths will be required from the Calico Solar Substation to SCE's Pisgah Substation. The paths are as follows:

- Calico Solar will install OPGW on its 220 kV Gen-tie line between Calico Solar Substation and SCE's Pisgah Substation

- SCE will install fiber optic cable between Calico Solar Substation and SCE's Pisgah Substation on a combination of existing distribution and new communication poles and/or within new underground conduits

Additional information regarding the major communications paths (Pisgah-Gale Fiber Optic Cable and OPGW Installation on Eldorado – Lugo 500kV T/L), which is based on preliminary engineering, follows below. Please note, however, with respect to the communication paths required between Calico Solar Substation and Pisgah Substation, detailed project information is not available at this time. Further, as previously noted, the OPGW path between Calico Solar and Pisgah will be constructed by TSNA and not SCE.

Pisgah-Gale Fiber Optic Cable

Engineering Plan, Structures and Route: The Pisgah-Gale Fiber Optic Cable will consist of one All-Dielectric Self-Supporting (ADSS) 48 strand single mode fiber optic cable between SCE's Pisgah and Gale substations to provide for telecommunication interconnection between Pisgah Substation and Gale Substation, including protective relay circuits, Supervisory Control and Data Acquisition (SCADA) circuits, data, and telecommunication services.

Approximately 151,141 feet of new fiber optic cable will be installed between the MEER at Pisgah and Gale substations. Portions of the fiber optic cable will be constructed on existing overhead

transmission, distribution and communication wood pole structures. In addition portions of the cable will be constructed within newly constructed underground conduit system(s). On average, all existing overhead structures are approximately between 40 feet and 55 feet tall. Any new structures will likely be the same height, but this will be dependent on wind-loading analysis and further engineering.

The proposed Pisgah-Gale Fiber Optic Cable route is as follows: From the existing Gale Substation, proceed east from the MEER building approximately 200 feet installing underground cable in existing underground cable trench, continue east approximately 150 feet installing underground cable in existing underground conduit to existing riser pole located on SCE ROW, go up riser continue south on SCE ROW approximately 210 feet installing overhead cable on existing overhead distribution poles continue east on National Trails Highway installing approximately 16,588 feet installing overhead cable on existing overhead distribution poles, continue south approximately 90 feet installing overhead cable on existing overhead distribution poles, continue east on National Trails Highway approximately 34,678 feet installing overhead cable on existing distribution poles, continue north approximately 110 feet installing overhead cable on existing distribution poles, continue east on National Trails Highway/Pioneer Road approximately 10,935 feet installing overhead cable on existing distribution poles, continue south on Newberry Road approximately 1,800 feet installing overhead cable on existing overhead distribution poles, continue east on National Trails Highway approximately 83,200 feet installing overhead cable on existing overhead distribution poles, continue north crossing the Interstate Highway 40 and on the SCE ROW approximately 2,580 feet installing overhead cable on existing overhead distribution poles to pole # 429143S, install new riser on pole #429143S and drop down through the riser to underground and continue north east trenching approximately 600 feet installing underground cable in new underground conduit into the MEER in Pisgah Substation.

Construction Activities: As noted earlier, the Pisgah-Gale Fiber Optic Cable will be a newly constructed fiber optic cable line, approximately 151,141 feet in length, on existing overhead SCE distribution wood pole structures between and into SCE's Pisgah and Gale substation MEERs. In addition, as noted earlier, portions of the cable will be constructed on newly constructed underground conduit system(s).

For the attachments (pole framing) to existing and overhead wood pole structures the fiber optic cable will utilize a five foot wood cable arm and Fiberlign high-strength engineered dielectric suspension support block. This suspension support block is oriented vertically and attached to the cable arm. One per overhead structure would be required.

For the installation in the new underground conduit and underground structures entering Pisgah Substation, the fiber optic cable will utilize a high density polyethylene smoothwall innerduct which provides protection and identification for the cable. The fiber optic cable will be installed in and throughout the length of the new underground conduit structure.

The construction of the fiber optic cable will utilize existing franchise (public ROW) locations, and existing access and spur roads. Access roads are through roads that run between and along overhead wood pole structures form the main transport route along the major extent of the fiber optic cable. Spur roads are roads that lead from the access road and dead-end into one or more overhead

structure sites. The existing and new overhead structures that do not have vehicle access will be walked-in to each location by SCE crews.

Fiber optic cable stringing includes all activities associated with the installation of cables onto the overhead wood pole structures. This activity includes the installation of vibration dampeners, and suspension and dead-end hardware assemblies. Stringing sheaves (rollers or travelers) are attached during the framing process. A standard wire stringing plan includes a sequenced program of events starting with determination of cable pulls and cable pulling equipment set-up positions. At this time, exact locations of the pulling locations are not yet engineered.

Typically, fiber optic cable pulls occur every 6,000 feet to 10,000 feet on flat and mountainous terrain. Fiber optic cable splices are required at the end and beginning of each cable pull. "Fiber optic cable pulls" are the length of any given continuous cable installation process between two selected points along the overhead or underground structure line. Fiber optic cable pulls are selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of fiber optic cable stringing and splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain, however a typical stringing set up is 40 feet by 60 feet. Where necessary due to suitable space limitations, crews can work from within a substantially smaller area.

The crews will utilize Pisgah and Gale substations as a laydown area for all material for the proposed fiber optic cable which would be delivered by truck. Material would be placed inside the perimeter of the fenced substation in a designated area during construction. The majority of the truck traffic would use major streets and would be scheduled for off-peak traffic hours. All construction debris would be placed in appropriate onsite containers and periodically disposed of in accordance with all applicable local jurisdiction regulations.

The primary marshalling yard for the Pisgah-Gale Fiber Optic Cable project element would be established inside Gale Substation, or, if room is not available, a suitable existing manned SCE facility outside the substation would be located. Materials and equipment to be staged to this yard include but are not limited to: fiber optic cable reels and hardware, heavy equipment, light trucks, and portable sanitation facilities. In addition to the materials and equipment already detailed for new construction, the following may be routed through this yard: empty fiber optic cable and innerduct reels, and other debris associated with the installation of the fiber optic cable process.

OPGW Installation on Eldorado – Lugo 500kV T/L

Engineering Plan, Structures and Route: Approximately 60 miles of the existing SCE Eldorado-Lugo 500kV T/L between Lugo and Pisgah substations will need to have one of the two existing half-inch steel overhead ground wires (OHGW) replaced with OPGW in order to accommodate the early 275 MW interconnection of Calico Solar. The replacement of the OHGW with OPGW on the existing 500kV steel lattice towers (LST) will require some modifications on the existing LSTs. The loading capacity of modified tower structures with the new OPGW needs to conform to the California Public Utilities Commission (CPUC) General Order (GO) 95 loading criteria.

Currently, SCE anticipates approximately 70 single-circuit LSTs would need to be modified, and that various types of tower modifications will be needed for the various different types of LSTs. However, as noted earlier, SCE has not yet commenced detailed engineering on the OPGW installation. Below are assumptions SCE is providing based on the likely potential modifications and typical practices. Please note, the strengthening of the LSTs for the new OPGW could require any combinations of modifications, and that each modification will consist of different steel member bundles or configurations.

The modifications of the existing 500kV LSTs may include the static peaks, tower body reinforcement, body extension, installation of horizontal diaphragms, and tower leg reinforcement. Detailed drawings and procedures for each of the tower modifications are to be developed for fabrication and installation. The modifications to be performed on each tower are identified by bundles. Each bundle will contain those components necessary to complete the required modifications, such as new steel angles to form back to back angles to the existing leg diagonals, redundant braces to the longitudinal and transverse faces, oblique braces between leg diagonals, and a new horizontal diaphragm. New redundant members will also be designed and installed at the ground peaks to support the OPGW clip-in hardware. The loading capacity of the upgraded tower structures will be able to support the loads for the new OPGW installation and meets the requirements of CPUC GO 95.

Tower modifications and installation of a new OPGW line requires access to each existing tower site for construction crews, materials, and equipment. Based on an initial review, it appears that all of the existing tower sites have existing access and spur roads these roads would be used for construction. As such, SCE does not anticipate requiring new roads to perform the work. Where needed, the existing access roads would be improved as required. After project construction, these roads would continue to be used by maintenance crews and repair vehicles for access to each tower for inspection and maintenance activities. At the end of project construction, these roads would be left in a condition equal to or better than the condition that existed prior to the start of construction. Loose rock and slide material would be removed from existing roads and used to construct dikes, fill washouts, or flatten fill slopes; all washouts, ruts, and irregularities would be filled or obliterated.

Construction Activities: All construction work for the 500kV LST modifications to accommodate the new OPGW will be performed within the existing transmission line ROW.

It is assumed that existing public roads as well as existing transmission line roads would be used during construction. Transmission line roads are classified into two groups: access roads and spur roads; access roads are through roads that run between tower sites along a ROW and serve as the main transportation route along line ROWs; spur roads are roads that lead from access roads and terminate at one or more structure sites. However, it is also assumed that rehabilitation work may be necessary in some locations for existing transmission line roads to accommodate construction activities. This work may include:

Re-grading and repair of existing access and spur roads. These roads would be cleared of vegetation, blade-graded to remove potholes, ruts, and other surface irregularities, and re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded

road would have a minimum drivable width of 14 feet (preferably with 2 feet of shoulder on each side).

Drainage structures such as wet crossings, water bars, overside drains and pipe culverts would be installed to allow for construction traffic usage, as well as prevent road damage due to uncontrolled water flow.

Slides, washouts, and other slope failures would be repaired and stabilized by installing retaining walls or other means necessary to prevent future failures. The type of structure to be used would be based on specific site conditions.

The tower modifications begin with hauling and stacking bundles of steel at tower locations per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with the structure modification to leg extensions, body panels, boxed sections, bridges, and peaks, as necessary. The various steel components used to reinforce the towers would be lifted into place with a minimum 80-ton all-terrain or rough terrain crane and the tower modification work would be performed by a combined erection and torquing crew.

The OPGW is typically installed in continuous segments of 19,000 feet or less depending upon various factors including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of OPGW stringing activities.

The following three steps describe the OPGW installation activities proposed by SCE:

- Step 1: Pulling: To minimize ground disturbance and insure controlled conditions during the OPGW installation activities, the existing static ground wire would be used to pull in the new OPGW. The existing static ground wire would be attached to the OPGW using a special swivel joint to prevent damage to the OPGW and to allow it to rotate freely to prevent complications from twisting as it unwinds off the reel. The existing static ground wire is wound onto "breakaway" reels as it is removed. The existing static ground would be transported to a marshalling yard where it would be prepared for recycling.

- Step 2: Sagging, and Dead-ending: After the OPGW is pulled in; it would be sagged to proper tension and dead-ended to structures.

- Step 3: Clipping-in: After the OPGW is dead-ended, it would be secured to all tangent structures; a process called clipping in.

The dimensions of the area needed for the OPGW stringing setups associated with installation are variable and depends upon the terrain, however a typical stringing set up is 75 feet by 100 feet, however, and crews can work from within slightly smaller areas when space is limited.

Each OPGW segment stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end. The puller and tensioner set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup.

The puller and tensioner set-up locations would be temporary and the land would be restored to its previous condition following completion of pulling activities. The final number and locations of the puller and tensioner sites will be determined during final engineering.

At the towers where the segments terminate, the OPGW cables are routed down a tower leg where the segments are spliced together. For splicing OPGW cables, special splicing lab vehicles would be used to travel to the various splicing locations. The area required for each splicing crew would be 30 feet by 40 feet. The crew would bring the OPGW cable ends into the special splicing lab vehicles and splice together the two ends. The splices are then transferred to and housed in a splice box (a 3'x3'x1' metal enclosure) that is mounted to one of the tower legs some distance above the ground. On the last tower at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

The modifications of the existing 500kV LSTs, removal of existing OHGW, and installation of the OPGW will require the establishment of approximately 3 to 5 temporary marshalling yards located at strategic points along the route.

Each yard would be used as a reporting location for workers and may have offices for supervisory and clerical personnel; the yards will also be used for the storage and staging of materials, the parking of private vehicles, and the parking of construction vehicles and equipment. Each yard would be approximately 2.5 to 5.0 acres in size, depending on land availability and intended use. Preparation of the marshalling yards may include the application of road base, depending on existing ground conditions at the yard site, and the installation of perimeter fencing.

Crews would load materials onto work trucks and drive to the line position being worked on that specific day. At the end of the day, they would return to the yard in their work vehicles and depart in their private vehicles. Materials stored at the marshalling yards would include:

- Construction trailers
- Construction equipment
- Steel
- Wire reels
- Wood poles
- OPGW cable
- Hardware

- Signage
- Consumables, such as fuel and joint compound
- Storm Water Pollution Prevention Plan (SWPPP) materials; such as straw wattles, gravel, and silt fences
- Portable sanitation facilities
- Waste materials for salvaging, recycling, and/or disposal

In addition to the primary marshalling yards, approximately 4 to 8 temporary secondary material staging yards would be established for short-term utilization near construction sites. Where possible, the secondary staging yards would be sited in areas of previous disturbance along and/or adjacent to the transmission line ROW. Typically, an area approximately 1 to 3 acres would be required. Preparation of the secondary staging yards may include installation of perimeter fencing and the application of road base, depending on existing ground conditions at the yard site. Land disturbed at the temporary material staging areas, if any, would be restored to preconstruction conditions or to the landowner's requirements following the completion of construction.

The location, size, and total number of the temporary marshalling yards and temporary secondary material staging yards are not know at this time. The selection of the location and size of these yards will be dependent upon a detailed ROW inspection and will take into account, where practical, suggestions by SCE Crew Foreman or the SCE Contractor selected to do the work, and the availability of appropriately zoned property.

Environmental Analysis - Summary of description, impact, and mitigation

SCE assumes the CEC and BLM will provide direction with respect to performing an environmental analysis for the project elements described in the previous sections based on assumed impacts associated with the construction of the Calico Solar 275 MW early interconnection.

Photograph #1

March 11, 2008.

View from the hillside of the northeast corner of assessment area looking into the distance toward Interstate-40 and the Burlington Northern Santa Fe Railroad (BNSF). Note the uniformity of Mojave creosote bush scrub habitat on the lower elevations of the site.

Photograph #2

March 26, 2008.

View of the overall assessment area from Interstate-40 looking in a northerly direction. Note the interspersion of desert pavement and volcanic rock among Mojave creosote bush scrub.

Photograph #3

March 24, 2007.

Desert pavement is scattered throughout the project site. Desert pavement is the arrangement of stones left behind as infrequent rain showers slowly wash away the supporting soil, leaving behind a layer of rocks.

Photograph #4

March 28, 2008.

View of mountains to the north from the area that was designated by the Bureau of Land Management as an Area of Critical Environmental Concern (ACEC). Portions of ACEC were surveyed along with the project assessment area.

Photograph #5

March 25, 2008.

Representative photo of desert dandelion (*Malacothrix glabrata*) found blooming in large swaths throughout Mojave creosote bush scrub found on-site.

Photograph #6

March 21, 2008.

The BNSF railroad runs through the site in an east-west direction parallel to Interstate-40. Interstate-40 runs along the southern boundary of the project site.

Photograph #7

March 27, 2008.

View of the southeast corner of assessment area looking northwest. Note the prevalence and uniform distribution of creosote bush throughout the habitat; creosote bush is a dominant species in Mojave creosote bush scrub habitat.

Photograph #8

June 3, 2008.

Westward view from the foothills in the northwest corner of the assessment area. The topography of the project site is dominated by broad, flat valleys, but also includes portions of very steep terrain as pictured here.

Photograph #9

June 3, 2008.

Sandy, almost dune-like Mojave creosote bush scrub habitat. This type of habitat was found in isolated patches of the Assessment and ACEC areas and supports Mojave fringe-toed lizard.

Photograph #10

April 3, 2008.

Partial glimpse of a desert tortoise (*Gopherus agassizii*) inside its typical half-moon shaped burrow. The light source seen in picture is provided by mirrors used by biologists to shine light inside burrows to determine presence of desert tortoise.

Photograph #11

April 3, 2008.

Desert tortoise found walking through an area of desert pavement. Note the abundance of native herbaceous plants surrounding the tortoise. Herbaceous plants are the tortoise's primary source of food.

Photograph #12

April 15, 2008.

Sand dunes in the ACEC forming along the southern face of a hill surrounded by Mojave creosote bush scrub. Windblown sand dunes with low-growing vegetation are the primary habitat type preferred by the Mojave fringe-toed lizard (*Uma scoparia*).

Photograph #13

March 31, 2008.

Desert tortoise found just as it was exiting its burrow. Presence of dirt on the shell could be indicative of fresh excavation activity.

Photograph #14

May 10, 2008.

Two desert tortoises found together. Note the long gular horn visible on the tortoise to the left; the pronounced length of the horn indicates that the tortoise is male. Also note the variation in shell color.

Photograph #15

March 20, 2008.

Desert tortoise plastron. The disarticulating scutes and carapace, and bleached (white) appearance of the shell are indicative of prolonged exposure to the elements.

Calico Site - Entire Site

Table 4. USFWS Desert Tortoise Pre-Project Survey Guidance

What is the estiamted number of tortoises in the project area?

N =	93
Lower 95% Confidence limit for N =	47
Upper 95% Confidence limit for N =	185
Total project area (acres) =	6215
Pa (from Table 2) =	0.80
Number of 10-km long transects walked (K) =	258
Number of tortoises found during surveys (n) =	48
Estimated total number of tortoises found during surveys (N) =	93
Estimated density per sqr km (D) =	3.69

Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were seen
0	221
1	31
2	3
3	1
4	2
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

var(n) =	75.36
var(D) =	1.78
var(Pa) (from Table 2) =	0.05
Pd (from Table 3) =	0.63
var(Pd) (from Table 3) =	0.008
C for N	1.99

Calico Solar - Phase One Areas

Table 4. USFWS Desert Tortoise Pre-Project Survey Guidance
What is the estiamted number of tortoises in the project area?

N =	**27**
Lower 95% Confidence limit for N =	**10**
Upper 95% Confidence limit for N =	**75**
Total project area (acres) =	**2327**
Pa (from Table 2) =	**0.8**
Number of 10-km long transects walked (K) =	96
Number of tortoises found during surveys (n) =	**14**
Estimated total number of tortoises found during surv	**27.2**
Estimated density per sqr km (D) =	**2.9**

Number of tortoises (n_i)	**Number of transects on which (n_i) tortoises were seen**
0	85
1	9
2	2
3	3
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

var(n) =	40
var(D) =	3
var(Pa) (from Table 2) =	0
Pd (from Table 3) =	1
var(Pd) (from Table 3) =	0
C for N	3

Calico Solar - Phase Two Areas

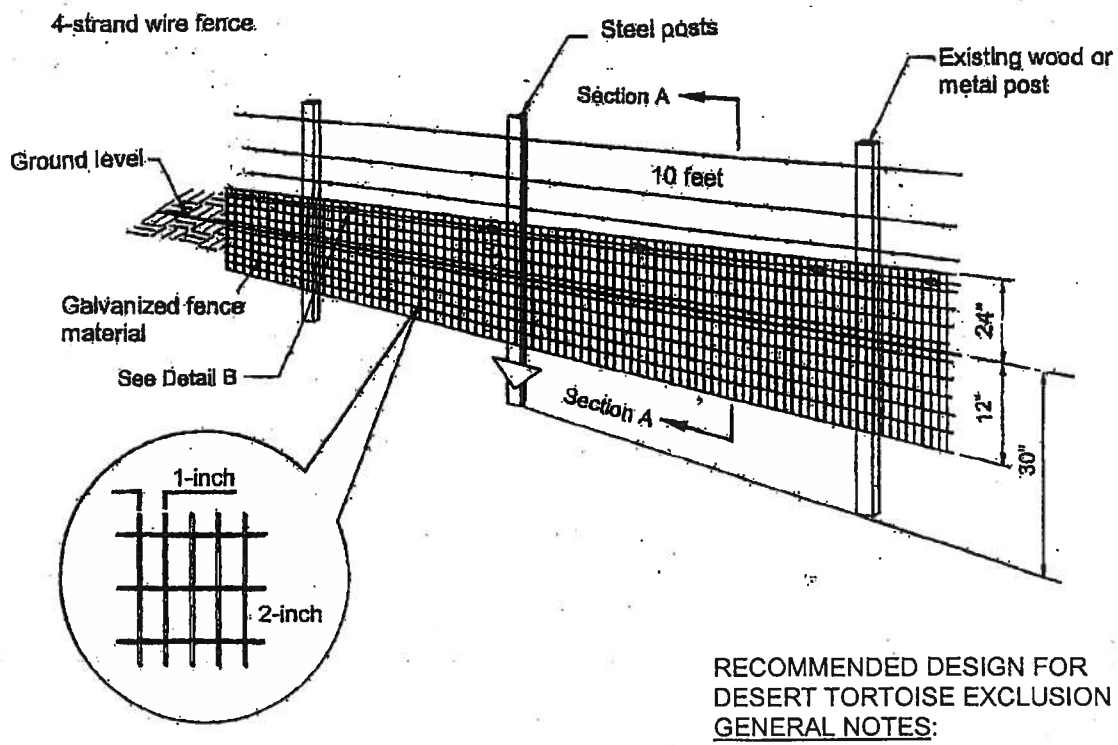
Table 4. USFWS Desert Tortoise Pre-Project Survey Guidance
What is the estiamted number of tortoises in the project area?

N =	71
Lower 95% Confidence limit for N =	35
Upper 95% Confidence limit for N =	144
Total project area (acres) =	**3886**
Pa (from Table 2) =	**0.8**
Number of 10-km long transects walked (K) =	162
Number of tortoises found during surveys (n)	**37**
Estimated total number of tortoises found dur	**71.3**
Estimated density per sqr km (D) =	**4.5**

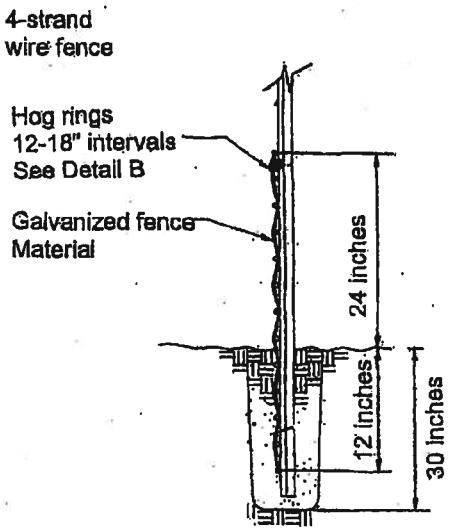
Number of tortoises (n_i)	Number of transects on which (n_i) tortoises were seen
0	136
1	22
2	2
3	0
4	2
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

var(n) =	55
var(D) =	3
var(Pa) (from Table 2) =	0
Pd (from Table 3) =	1
var(Pd) (from Table 3) =	0
C for N	2

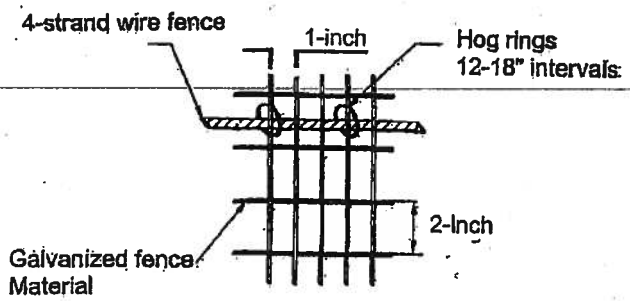
DESERT TORTOISE EXCLUSION FENCE (2005)



DETAIL A



SECTION A



DETAIL B

RECOMMENDED DESIGN FOR
DESERT TORTOISE EXCLUSION FENCE
GENERAL NOTES:

1. Ensure that fence posts and materials conform to the standards approved by the U.S. Fish and Wildlife Service.
2. Ensure that the height above ground level is no less than 18 inches and no higher than 24 inches.
3. Ensure that the depth of fence material below ground level is about 12 inches but no less than 6 inches. (See SECTION A above)
4. Install additional steel posts when span between existing fence posts exceed 10 feet.
5. Attach fence material to existing fence or wire using hog rings at 12-inch intervals.
6. Fasten fence material to posts with 3 tie wires with a wire near the top, bottom, and center of the fence material.
7. Backfill trenches with excavated material and compact the material.
8. Attach fence material to all gates. Ensure that clearance at base of gate achieves zero ground clearance.
9. Substitute smooth wire for barbed wire if additional support wires are necessary.
10. The number and placement of support wires may be modified to allow sheep and deer to pass safely.
11. Erosion at the edge of the fence material where the fence crosses washes may occur and requires appropriate and timely monitoring and repair.
12. Tie the fence into existing culverts and cattleguards when determined necessary to allow desert tortoise passage underneath roadways.

FOR BEDROCK OR CALICHE SUBSTRATE

1. Use this fence design (see below) only for that portion of the fence where fence material cannot be placed 6 inches below existing ground level due to presence of bedrock, large rocks or caliche substrate.

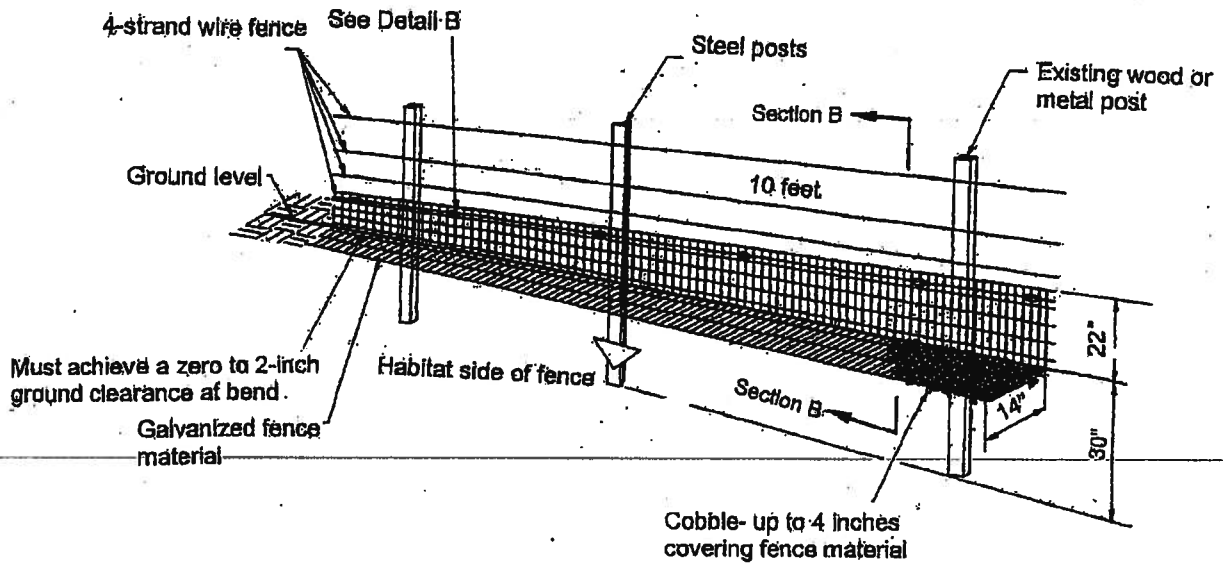
2. Ensure that the fence height above ground level is no less than 22 inches.

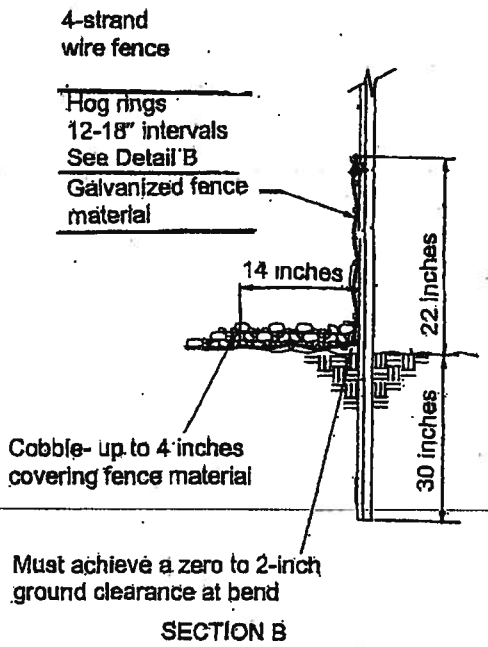
3. Ensure that there is a zero to 2-inch ground clearance at the bend.

4. Ensure that the bent portion of the fence is lying on the ground and pointed in the direction of desert tortoise habitat.

5. Cover the portion of the fence that is flush with the ground with cobble (rocks placed on top of the fence material to a vertical thickness up to 4 inches).

6. When substrate no longer is composed of bedrock or caliche, install fence using design shown above.





SECTION B

1133

Summary of Changes to the Desert Tortoise Biological Assessment 08-AFC-13

This Supplement to the Desert Tortoise Biological Assessment for the Calico Solar Project is provided to identify the revisions that have been made to the Biological Assessment based on discussions with USFWS, BLM, and CDFG, which have been continuing since the BA was originally submitted to the USFWS on April 1, 2010. This supplement is a summary of updates and resulting changes to the Project Description that the USFWS has been using to develop the Biological Opinion.

Page ES-1, Executive Summary

Revisions:
Line 6: The Project site acreage has been changed from 8,230 acres to 6,215 acres. This change has been made for all instances where the total acreage of the Project is identified.

Lines 10 and 11: The acreage and boundaries of Phase 1 and Phase 2 have changed. New acreage for Phase 1 is approximately 2,327 acres; Phase 2 is approximately 3,887 acres. This change has been made for all instances where the acreage of the phases has been identified.

Line 22: Revised sentence: 'All contiguous Desert Tortoise habitat within 6.2 miles of long-distance translocation sites - based on the average distance Desert Tortoise may range following a translocation.' ('*and control sites*' was removed). This revision was made in all instances where this text occurs.

Line 24: Changed table to identify effects on critical habitat:

Species	Listing Status	Critical Habitat within the Action Area	Effects Determination
Desert Tortoise (*Gopherus agassizii*)	Threatened	Yes	May affect, likely to adversely affect tortoise. May affect, not likely to adversely modify critical habitat.

Line 30: Update/Clarification: There are 47 fewer desert tortoise detections within the revised project boundary: A total of **48** live adult/subadult desert tortoise and **9** juveniles were detected during the 100% surveys for a total of 57 detections within the reduced project boundary.

Lines 31-32: **Changed text to:** Designated critical habitat is located within the Ord-Rodman DWMA ACEC south of I-40, which is included within the Action Area.

Page ES-2, Executive Summary

Lines 43-78. The following changes were made to the FWS estimations for tortoise individuals and resulting impact numbers, and text was added:

Summary of Changes to the Desert Tortoise Biological Assessment 08-AFC-13

Approximately 93 adult desert tortoise (95 percent confidence range of 47 to 185 individuals) and 6,215 acres of occupied tortoise habitat may be affected by the proposed project. An estimated 83 adult tortoise may be indirectly affected due to edge effects in habitat directly adjacent to the project site. Additional tortoise would be affected through implementation of the Translocation Plan, based on best available data, potentially 264 (= 2 x (93 + 39) tortoise could be handled, blood sampled and radio transmitters attached so that these individuals can be used as resident or control individuals for comparison to the translocated individuals. Therefore, it is estimated that 347 adult tortoise (264 directly and 83 indirectly) may be affected by this proposed project.

Juvenile desert tortoises are extremely difficult to detect because of their small size and their cryptic nature. Based on 4-year study of their population ecology, Turner et al. (1987) determined that juveniles accounted for 31.1 to 51.1 percent of the overall population. Using this range and a maximum 93 adult desert tortoises on the proposed site, we estimate that the 6,215-acre project area may support from 29 to 48 juveniles.

To estimate the number of eggs that could be present on the project site, we used the average number of clutches per reproductive female in a given year, (i.e., 1.6, see Turner et al. 1984), multiplied by the average number of eggs found in a clutch (i.e., 5.8, see Service 1994). By approximating a 1:1 sex ratio, we assumed that 47 out of the 93 adult desert tortoises onsite are reproductive females and that, together, they could produce approximately 436 eggs in a given year. Fewer eggs are likely to be onsite at any given time because the territories of the female desert tortoises likely extend, at least in part, off of the project site and individuals may establish nests in these areas.

The Project site itself does not contain any designated critical habitat (DCH) for the desert tortoise. However, the implementation of the Translocation Plan will require the movement of tortoises into the Ord-Rodman Desert Wildlife Management Area (DWMA) which encompasses DCH. Increasing tortoise densities within the critical habitat along with the potential to introduce diseased animals into DCH has the potential to adversely affect the constituent elements of the critical habitat unit. In total, the long-distance translocation receiver site is composed of 9,833 acres of critical habitat. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of the DCH. While the implementation of the Translocation Plan has the potential to adversely affect critical habitat, the BLM has determined that implementation will not adversely modify DCH given that the Translocation Plan has protocols which will prevent the translocation of diseased animals and will limit translocation densities to levels which will not exceed the habitat carrying capacity. Furthermore, we have reached this conclusion because most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements.

Page 1-1, Section 1

Line 86: **Changed text to** DCH occurs within the Action Area.

Page 1-2, Section 1.2

Lines 122-123: Text/acreages changed: The Action Area encompasses nearly 283,000 acres, and includes over 244,000 acres of USGS modeled tortoise habitat.

Page 1-2, Section 1.3

Summary of Changes to the Desert Tortoise Biological Assessment 08-AFC-13

Lines 151-156: Added text: All of these structures would be constructed within the Project site, except for a portion of the transmission line that would extend off site for approximately 2,800 feet, and would include a maximum of a 200-foot wide temporary impact buffer area (12.9 acres). Water will be delivered to the Project site through an underground pipeline from a production well that is located in N.A.P. Area 1. Approximately 990 feet of pipeline will be required within NAP Area 1, with a maximum temporary construction buffer area of 200 feet (4.5 acres). Measures to reduce impacts to desert tortoise would include pre-construction clearance surveys, installing temporary exclusionary fencing prior to construction, and removal of fence after construction. Temporary impacts to up to 12.9 acres of tortoise habitat would be restored to pre-construction conditions upon completion of construction as described in the Restoration Plan for temporary impacts.

Page 1-4, Section 1.3

Lines 183-191: All detention basins will be located within the perimeter fence. These will range from small detention basins along the proposed access roads, to larger detention basins at road intersections to the larger detention basins south of the Cady Mountains within the Project site (Figure 2). No tortoise habitat or individuals would be affected by maintenance activities. Lines 166-173 have been deleted.

Line 197: Added text: Permanent desert tortoise exclusionary fence will surround the road.

Line 198: Added text: Detention basins will be located throughout the Project site, **inside of the Project boundary.**

Page 1-5, Section 1.3

Lines 208-214: Replaced 'additional impacts to tortoise habitat may occur due to the pipeline required to deliver the water from those wells' with: Water will be delivered to the site through an underground pipeline from a production well that is located in N.A.P. Area 1. Approximately 990 feet of pipeline will be required within NAP Area 1, with a maximum construction buffer of 200 feet. Temporary impacts (4.5 acres) to tortoise and tortoise habitat will be minimized through installation of a temporary exclusion fence while the new pipeline is buried. Once the pipeline is buried, the fence will be removed and the temporary impacts of up to 4.5 acres of tortoise habitat would be revegetated as described in the Restoration Plan associated with this Project. A permanent fence around the production well is not expected, but will be placed if found to be necessary.

Lines 216-227: Text removed and revised to identify the original Project boundary and Reduced Alternative 1:

At the request of agency representatives and interested parties and to help lessen potential impacts to biological resources, the Applicant modified the northern Project boundary by moving it south approximately 0.55 miles (2900 feet), allowing an approximate 0.65 mile wildlife corridor between the revised northern project boundary and the toe of slope of the Cady Mountains. The Project boundary modification resulted in a reduction of the Project area from approximately 8,230 acres to approximately 7,130 acres. The modified Project boundary avoided direct impacts to occupied habitats for tortoise and other species of concern (e.g., special status plants, burrowing owls, and bighorn sheep). The modifications to the Project boundary would expand the east-west

movement corridor by about 2,900 feet and allow for tortoise to move past the steeper topography that may hinder regular movement through this area. Additionally, the boundary modifications increased the distance between the Project and the nearest known golden eagle nest site, from approximately 2.5 miles from the previously proposed boundary to three miles from the modified Project boundary (URS 2010a).

Line 229: The following text was added:

Reduced Footprint Alternative 2: Based on input from the U.S. Fish and Wildlife Service's Desert Tortoise Recovery Office (DTRO) and the BLM, the northern boundary of the Project site has been further modified to include a 4,000-foot (1,591 acre) desert tortoise linkage between the Project (exclusive of all detention basins) and the base of the Cady Mountains. This is also the preferred alternative and identified throughout this document as Alternative 2. To accommodate this modification, the detention basins were re-configured to extend east to west along the northern Project boundary and the boundary between Phases 1 and 2, which allows the detention basins to be included within the Project fenceline and outside of the 4,000-foot wildlife linkage. The detention basin design also maintains the natural drainage patterns of the site. Additional modifications were made to the overall project, resulting in a decrease in project acreage to 6,215 acres (a 2,015-acre reduction). Several support facilities were adjusted, and the remainder of the Phase two solar field footprint was decreased to avoid the majority of the biological and flood prone areas of the site and minimize the distance needed for desert tortoise translocation. This new footprint will allow the Applicant to meet the requirements of the PPA, avoid environmentally sensitive areas, reduce the loss of desert tortoise, avoid or reduce impacts to special status plants, and pull away from the toe of the Cady Mountains. It should be noted that the spacing between and the number of the SunCatchers is not being changed.

Lines 213-236: These 4 paragraphs were deleted because all of the detention basins will be located inside of the perimeter fence in the revised footprint. No maintenance activities will occur outside of the tortoise exclusion fence. If any repairs to the roads between the exclusion fence and perimeter fence are required, surveys for and clearance of listed species shall occur prior to repairs.

Page 1-6, Section 1.3.4

Line 233: Changed first sentence to: Maintenance shall be restricted to within the tortoise exclusion fence. Deleted discussion regarding stormwater facilities, which are now located within the Project and tortoise exclusion fencing.

Lines 268-272: *weekly intervals* was deleted. Replaced with: After all tortoise have been removed from the active construction area, an authorized biologist shall be on-call and available at all times. Should a tortoise be located within the perimeter exclusion fence, the authorized biologist will be contacted to move the tortoise to outside the exclusion fence and to notify BLM within 1 business day.

Page 1-7, Section 1.3.6

Lines 299-308: Text added/revised to: Desert tortoises from Phase One will be held in temporary holding pens in the Pisgah Crater ACEC, which has been identified and approved as the short-distance translocation area (Figure 3). Those desert tortoises found to be healthy will be released into this translocation area. Tortoises found within 500 meters of the boundary of the detention basin area of Phase 1 will be moved into

the desert tortoise linkage area. Approximately 12 tortoise are located within 500 meters of the boundary of the Phase 1 detention basin areas and can be moved without requiring blood testing; however, the number of tortoise that would be placed in the linkage will be limited to avoid raising the tortoise density of the linkage above 10% of its current density (4.5 tortoise per kilometer). Any additional individuals that are detected in the detention basins will be placed in temporary holding pens within the short-distance translocation area (Figure 3), and once they are found to be healthy they will be released.

Inserted into Lines 309-321: Two desert tortoises were detected in an area that was recently identified as an environmentally sensitive area on the west side of NAP Area 2 and this area has been excluded from the Project footprint. To avoid loss of tortoise in this recently excluded area, the Applicant proposes to relocate the tortoise found in this area by following the methods identified in the approved Desert Tortoise Translocation Plan. These tortoises would have to be relocated greater than 500 meters from this location, which would require blood testing prior to moving them to the long-distance translocation site. The Applicant proposes to install temporary desert tortoise exclusionary fencing around this area, following the west side of NAP Area 2 and south side along the Caltrans I-40 Caltrans Right of Way (ROW) that surrounds this environmentally sensitive area while waiting for blood test results (Figure 4). This would help avoid the need to move the tortoises more than one time. The fencing would be placed outside of the Caltrans ROW along I-40. There is a culvert that crosses under I-40 that will not be blocked by the fencing, ensuring that tortoise movement between the Caltrans ROW and the habitat south of I-40 is not impaired. The fencing would be removed once the tortoises are relocated to the long-distance translocation areas in Spring 2010. An unknown (but small) number of tortoises reside in the NAP Area 2, and these tortoises will be blood tested and translocated to the long-distance translocation site if the individuals are found disease free. Since these tortoises are on private lands in NAP 2, these tortoise will be identified and translocated to the extent that land owner approval can be obtained.

Lines 327-331: Inserted text: The temporary exclusionary fencing will be in place for over one year; therefore, in compliance with USFWS guidelines, a 4-strand wire exclusion fence that is made of galvanized material or an ERTEC polymer matrix (USFWS 2005, ERTEC 2010; Appendix E) will be placed during construction and removed after construction has been completed. This type of fencing is usually used for permanent fencing, thus providing the level of protection needed for the extended length of Project construction, which is expected to be approximately 4 years.

Lines 333-345: Revised to/inserted: A permanent security fence will surround the Project site. To continue to allow access to the public lands north of the Project site, the perimeter road surrounding the Project site will be left open to the public. A permanent tortoise exclusionary fence will be constructed on the outside of this perimeter road to minimize the potential for tortoise mortality from traffic (Figure 4). Where there are intersections with other roads, the fence will remain on the outside of the perimeter road (creating a 'T' of fencing on the outside of each road) thereby allowing uninterrupted use of the road. These intersections are shown in detail on Figure 4. The exclusionary fence will be consistent with USFWS design criteria as described above.

In addition to the exclusionary fencing, cattle guards will be placed where the perimeter access road meets the permanent security fencing near the southeast and northeast boundaries of Section 9 in Phase 2, and in two locations where additional breaks are needed in the permanent security fence for access to the NAP 1 Area (Figure 4).

Page 1-8, Section 1.3.5

Summary of Changes to the Desert Tortoise Biological Assessment 08-AFC-13

Lines 328-331 - paragraph deleted. No maintenance activities will occur outside of the tortoise exclusion fence that surrounds the Project. If any repairs to the roads between the perimeter fence and the exclusion fence are required, surveys for listed species shall occur prior to repairs.

Lines 343-355:

Following installation of the desert tortoise exclusion fencing for both the permanent site fencing and temporary fencing exclusion areas, the fencing shall be regularly inspected. If tortoise were moved out of harm's way during fence construction, permanent and temporary fencing shall be inspected at least two times a day for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, permanent and temporary fencing shall be inspected monthly and within 24 hours following all major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of permanent site fencing shall occur for the life of the Project. All fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise. If fencing is not repaired within 48 hours, the BLM Wildlife Biologist shall be notified within 5 business days to determine if additional remedial action is required, such as the need for conducting additional clearance surveys within the Project footprint.

Page 1-9, Section 1.3.5

Line 359-364 – paragraph deleted. All detention basins will be located within the perimeter and tortoise exclusion fences in the revised footprint.

Page 1-12, Section 1.4

Inserted at Lines 468-475:

May 17, 2010:

BLM provided a revised BA to the USFWS.

June 21, 2010:

The USFWS sent the BLM a Sufficiency Letter stating that the revised BA was sufficient to initiate consultation. The Sufficiency Letter requested clarification regarding the Alternative #2 Reduced Footprint Proposed Action.

July 2, 2010:

BLM provided USFWS with an Appendix to the revised BA which addressed the USFWS information needs.

Page 2-1, Section 2

Line 485-486: Revised to: Designated critical habitat for the desert tortoise occurs in the Action Area directly adjacent to the southwestern edge of the Project site south of I-40 within the Ord-Rodman DWMA. A total of 9,833 acres of DCH has been targeted for use as long-distance translocation receptor sites.

Page 2-2, Section 2.1.4

Lines 532-533: **Revisions to tortoise detections**:

A total of 57 individual tortoise were detected, including 48 adults and 9 juveniles (Figures 6 and 7).

Lines 538-545: Revisions to paragraph based on revised Project boundaries:

Phase One areas support 18 individuals; 6 tortoise in the 1,876-acre Phase One area immediately north of the railroad and 12 tortoise within the northern detention basin area (451 acres; Figure 7). The 1,747-acre Phase Two area between the two Phase One areas supports 39 individuals. No tortoises were detected within the 2,139 acre Phase Two area between Interstate 40 and the railroad (Figure 7); however, 2 tortoise were detected in the recently excluded Environmentally Sensitive Area. Two of the tortoise detected showed sign of disease or ill health. A total of 347 burrows categorized as Class 1 through 5 were recorded on the site during the surveys (Figure 8).

Lines 546-550: Revisions to paragraph based on revised Project boundaries:

Using the USFWS formula to estimate tortoise population based on 10 m transect survey data, approximately 93 desert tortoise (95 percent confidence range of 47 to 185 individuals) may occupy the 6,215-acre Calico Project site (See Appendix B). It is expected that an additional 31.1-51.1% of the individuals detected during 5m clearance surveys will be juveniles (Turner et al. 1987); therefore, an estimated 29-48 (= 93 x 0.311 and 93 x 0.511) juveniles may need to be relocated.

Page 2-3, Section 2.1.5

Lines 556-581: Text added/revised to:

DCH for desert tortoise has five Primary Constituent Elements:

1) sufficient space to support viable populations within each of the six recovery units and to provide for movement, dispersal, and gene flow;

2) sufficient quality and quantity of forage species and the proper soil conditions to provide for the growth of these species;

3) suitable substrates for burrowing, nesting, and overwintering; burrows, caliche caves, and other shelter sites;

4) sufficient vegetation for shelter from temperature extremes and predators; and

5) habitat protected from disturbance and human-caused mortality.

The Project site is not located within any DCH for listed species (Figure 3); however, the Project Action Area includes areas of DCH for desert tortoise (i.e., Ord-Rodman DWMA/ACEC) (Figure 3). Project activities are not anticipated to impact desert tortoise DCH, but implementation of the Translocation Plan may adversely affect DCH. Areas of DCH are needed to be used as long-distance recipient sites (up to 9,833 acres), therefore there is a potential for moving diseased individuals into DCH and in increasing population densities of tortoise within DCH.

The translocation of tortoises from the Project Site to the Ord-Rodman Desert Wildlife Management Area may adversely affect DCH through the introduction of additional animals into occupied critical habitat, through the potential introduction of diseased animals into the DCH, and through increasing the population density in DCH. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of the DCH.

Summary of Changes to the Desert Tortoise Biological Assessment 08-AFC-13

Page 3-1, Section 3.1

Line 602: The Kinder-Morgan pipeline that bisects the southern portion of the Project site was added to the list of existing developments on the Project site.

Lines 617-632: Text inserted:

The remainder of the Action Area is composed of generally the same habitats, dominated by Mojave Desert creosote bush scrub, with many areas of disturbance, and dirt and paved roads. A habitat assessment was conducted on the translocation recipient sites and the control sites in spring 2010, to ensure that tortoise are relocated to habitat that is of equal or better quality than the habitat from which they are moved.

Portions of the DWMA were surveyed in the spring, and the remaining areas that were identified as long-distance translocation receiver sites will be surveyed in the fall of 2010. The habitat in the southern long-distance translocation area in the DWMA is comprised of Mojave Desert creosote bush scrub, with a diverse assemblage of vegetation and little to no disturbance. Large erosional features with braided washes with areas of large boulders and cobbles dominate the landscape with a gravelly substrate and few areas of pure sand. This area is excellent DT habitat and is also about 30 minutes down the transmission line road south of I-40 so it is relatively isolated. The area on the western side of the DWMA that was surveyed in the spring contains several deep washes, with variable terrain and sandy loam soils with gravel, rocks and cobble. The vegetation is diverse, but is lower in cover than the Project site. DT density was lower here than in the southern DWMA survey area, and several desert tortoise carcasses were observed.

Page 3-2, Table 4

Acreages of vegetation communities in the revised boundary changed in this table and in all occurrences in the text.

Table 4
Vegetation Communities Occurring within the Calico Solar Biological Site and 1,000 Foot Buffer

Community Name	Holland Code	Project Boundary Acreage	1,000 Foot Buffer Acreage
Developed	12000	27.8	239.9
Desert Saltbush Scrub	36110	241.7	278.7
Disturbed Mojave Creosote Bush Scrub	34000	70.64	68.5
Mojave Creosote Bush Scrub	34000	5874.5	2543.7
Total		6,215.0	3130.8

Page 3-5, Section 3.3

Lines 734-738: added text:

The recently proposed and accepted Reduced Footprint Alternative would expand the linkage by about 4,000 feet south, and reduce the project area by 2,015 acres (Figure 11). This expanded undeveloped area between the Project and the Cady Mountains creates a functional tortoise linkage with live-in and move-through habitat instead of only move-through habitat that would have been provided with the original Project footprint.

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Lines 750-751: Sentence Revised to: The Action Area includes portions of the Ord-Rodman DWMA because this area will be used as a long-distance receiver site for tortoises found on the Project site.

Lines 753-755: Added text: There is a total of 80,563 acres of DCH within the Action Area, up to 9,833 acres of which will be used as a receptor site during implementation of the Desert Tortoise Translocation Plan (Figure 3).

Page 4-1, Section 4.1

Line 763-764: 'NAP Area A' changed to 'NAP Area 1' here and in all instances where 'NAP Area A' text occurs.

Line 779-780: Text revised to: 48 adult tortoise and 9 juvenile tortoise were detected within the revised boundary of the Project...

Page 4-2, Section 4.1.1

Line 798-823: Text revised to reflect revised boundary values:

With the Reduced Footprint Alternative 2, modifying the Project boundary to exclude 2,015 acres of habitat avoids approximately 39 percent of the adult desert tortoise found on the project site. Of the 104 total tortoise found during 2010 surveys on the original Project footprint, 47 desert tortoise would now be avoided (Table 5). In addition, 164 desert tortoise burrows will also be avoided by the project boundary change. With a total of 511 burrow locations on the original Project site, this Project modification will result in approximately a 47 percent reduction of direct impacts to 347 burrow locations within the new boundary (Table 6). Using the USFWS formula to estimate tortoise population based on 10-meter transect survey data, it is estimated that direct impacts to approximately 93 individual adult tortoise may be avoided due to the Project boundary modifications.

The Project boundary modifications reduce the estimate of desert tortoises requiring translocation for the Project from 176 to 93 adult individuals and from 32-53 to 29-48 juveniles. These excluded desert tortoise may be indirectly affected due to being adjacent to the Project perimeter, though direct impacts to habitat will be reduced by 2,015 acres.

The modifications to the Project boundary would expand the east-west movement corridor by about 4,000 feet and create a functional habitat linkage that is adequate as live-in habitat as well as move-through habitat. Approximately 12 tortoise found in the Phase 1 detention basin area during the clearance surveys could be placed into this new linkage without requiring blood testing as long as they are not moved further than 500 meters from the location which they were found. The number of individuals that will be placed into this new linkage will be limited to avoid raising the tortoise density above 10% of its current density (4.5 tortoise per square kilometer). The carrying capacity of the linkage will also not be exceeded.

Some areas of DCH (inside the Ord-Rodman DWMA) will be used as long-distance recipient sites (up to 9,833 acres), creating a potential of moving diseased individuals into DCH; however, all long distance translocations will only involve individuals that have been tested for disease to minimize this potential adverse effect. Animals showing clinical signs of disease or testing positive in blood tests will not be moved.

Lines 826-832: Text added:

Most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements of DCH. A small amount of DCH adjacent to roads may be temporarily disturbed; we expect the size of this disturbance to be minimal and its effects on the function of DCH to not be measurable. All vehicular access will occur on authorized open routes of travel, where the primary constituent elements of DCH are absent. Only foot traffic will occur away from designated open routes of travel; we anticipate that the effects of foot traffic on the primary constituent elements of DCH would not be measurable.

Lines 835-836: Approximately 6,215 acres of occupied desert tortoise habitat would be removed from the adjacent habitat as a result of Project fencing.

Lines 738-740 deleted; all detention basins are located inside the exclusion fence that surrounds the perimeter fencing around the Project.

Page 4-3, Section 4.1.2, Table 5 revisions, Table 6 added

Table 5 – Revised
2010 Desert Tortoise Observations on Calico Solar Project Site
Reduced Footprint Alternative 2

Tortoise by Age and Location	Acres Surveyed	Adult on surface	Adult In Burrow	Sub-Adult	Juvenile	Total Detected	Tortoise Detected Per 1000 Acres
Excluded Area along northern boundary	1,746	25	3	1	5	34	19.4
Phase 1 - North of Railroad	1,876	2	0	0	4	6	3.2
Phase 1 - Northern Detention Basins	451	9	1	0	2	12	26.6
Phase 2 - North of Railroad between Phase One	1,747	32	0	4	3	39	22.3
Phase 2- South of Railroad	2,139	0	0	0	0	0	0
Total on Calico Solar Site - Reduced Footprint	**6,215**	**43**	**5**	**0**	**9**	**57**	**9.17**

Table 6

Distribution of Tortoise Burrows Classes 1 through 5* at Calico Solar Site

Reduced Footprint Alternative 2

	Class 1	Class 2	Class 3	Class 4	Class 5	Total
Phase 1 - North of Railroad	9	17	24	6	6	62
Phase 1 - Northern Detention Basins	16	13	12	1	0	42

Phase 2 - North of Railroad between Phase One	74	57	75	4	2	212
Phase 2- South of Railroad	0	4	23	4	0	31
Total	91	91	134	15	8	347

*Tortoise Burrow Classification

1. Currently active, with tortoise or recent tortoise sign
2. Good condition, definitely tortoise, no evidence of recent use
3. Deteriorated condition definitely tortoise, no evident of recent use
4. Deteriorated condition and possibly tortoise, no evident of recent use
5. Good condition and possibly tortoise, no evident of recent use

Page 4-4, Section 4.1.3

Lines 876-883: Text revised to reflect current tortoise numbers: The reduced footprint alternative 2 would expand the east-west linkage corridor by about 4,000 feet and allow for tortoise and other wildlife to move past the steeper topography that may hinder regular movement through this area (Figure 12). The expanded linkage is also large enough to support desert tortoise and is designed to function as live-in habitat. A total of 25 adult tortoises and 5 juveniles were detected in this 1,591-acre linkage area during 2010 surveys. About 93 adult/subadult individuals may use the Project site based on the USFWS formula. An additional 29-48 juveniles may be present in this area, based on a 4-year study of tortoise population ecology (Turner et al. 1987) which determined that juveniles account for 31.1 to 51.1 percent of the overall population.

Line 885: A total of 45 adult tortoises may be affected indirectly by the proposed project. Assuming a local density of 16 individuals per sq mi based on the population estimate for areas north of the railroad...

Lines 891-895: **Text revised to**: Project construction will occur up to the boundary on three sides of NAP Area 1, and approximately 990 feet into the south end of the NAP Area 1 Parcel for installation of the underground water pipeline. All impacts as a result of the pipeline will be temporary and the ground will be revegetated according to the Restoration Plan once the pipeline is buried and construction is completed in that area.

Lines 896-902: Tortoise numbers and text revised: About 45 adult individuals may have portions of their home ranges within this buffer area. Juveniles would be an additional 31.1-51.1 percent of this adult estimate (14-23 juveniles). Specifically, the entire buffer area contains 1,495 acres of land, a portion of which is already impacted by existing development, such as the BNSF railroad and I-40 to the south, the Kinder-Morgan gas pipeline that crosses the southern portion of the site and to the east of the site, and the existing transmission line along the eastern boundary.

Page 4-5, Section 4.1.4

Lines 913-916: Text revised: The expanded habitat associated with the reduced footprint alternative would provide a functional linkage and movement corridor and a greater opportunity for tortoise to move into and out of NAP Area 1, and it would provide approximately 1,591 acres of live-in habitat for desert tortoise.

Page 4-5, Section 4.1.5

Lines 918-919: Text revised: The linear extent of the Project footprint, which is also the length of permanent perimeter and tortoise exclusion fencing, is approximately 45 miles (Figure 4).

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Page 4-8, Section 4.1.9

Lines 1015-1019: All Project-related vehicles traveling in the recipient sites and control areas (Action Area) must follow the requirements of the Calico Weed Management Plan to minimize the potential for the introduction of substantial numbers of non-native species in the Action Area. All vehicles are required to go through vehicle wash stations before leaving the Project site, especially when heading to the recipient and control sites.

Page 5-1, Lines 1083-1099, Table 7, and Lines 1104-1128: Text revised and added, and numbers revised to reflect current tortoise estimates.

Revised to: The implementation of the Calico Solar Project may affect and is likely to adversely affect the desert tortoise. Effects would occur in the form of behavioral harassment, potential injury or mortality, and loss and degradation of occupied habitat. Implementation of the Translocation Plan and exclusion fencing is intended to minimize direct mortality of tortoise. Based on the amount of suitable habitat that would be directly impacted and population estimates based on desert tortoise 10m transect surveys conducted in the Project site, approximately 93 adult/subadult desert tortoise (95 percent confidence range of 47 to 185 individuals), 29-48 juveniles, and 6,215 acres of tortoise habitat may be directly affected by the proposed project. All tortoises captured during preconstruction clearance surveys and construction monitoring will be translocated offsite to minimize direct mortality of individuals. Approximately 45 adult/subadult tortoise and 14-23 juveniles that may have partial home ranges reduced by the Project within the 1,495-acre, 1000-foot buffer area would also be indirectly affected through loss of foraging and sheltering habitat and associated edge effects. About 24 adult/subadult tortoise and 8-13 juveniles may occur in the 960-acre NAP Area 1 and would be indirectly affected similar to tortoise in the 1000-foot buffer area. In order to implement the Translocation Plan, a similar number of tortoise would be directly affected by the proposed project (366 to 699 individuals) and may be handled for the purpose of monitoring recipient site populations and control area individuals for comparison with translocated individuals. We assume approximately 31.1-51.1% of the population may be juveniles.

Table 7
Summary of Potential Effects

Project Component	Estimated Adult/Subadult Tortoise	Estimated Juvenile Tortoise	Total
Project Site (Individuals to be translocated; 6,215 acres)	93 (max:185)	29-48	122 (max: 233)
1000-foot Buffer Area (1,495 acres) indirectly affected	45 (based on an assumed density of 16 per sq mi)	14-23	59-68
NAP Area 1 (960 acres) indirectly affected	24 (based on an assumed density of 16 per sq mi)	8-13	32-38

Recipient Site Resident Individuals	93 (max: 185)	29-48	122 (max: 233)
Control Area Individuals	93 (max: 185)	29-48	122 (max: 233)
Total Directly Affected	**279-555**	**87-144**	**366-699**
Total Directly and Indirectly Affected	**348 (max: 624)**	**109 (max:180)**	**457 (max:804)**

The reduced footprint alternative would reduce the amount of habitat directly affected by about 1,746 acres. A portion of this excluded area (a 1,000-foot buffer) may support 45 adult individuals based on the number of tortoise found in the immediate vicinity of the Phase 1 area north of the railroad (16 adult/subadult tortoise per sq mile). Juvenile tortoise occupation is assumed to be 31.1% - 51.1% of the adult population estimate: 14-23 juvenile tortoise for a total estimate of 59-68 individuals occupying the 1,000 acre buffer area that would be indirectly affected by the Project. Approximately 32-38 tortoise that are estimated to occur within NAP Area 1 would also be indirectly affected.

The translocation of tortoises from the Project Site to the Ord-Rodman Desert Wildlife Management Area may adversely affect DCH through the introduction of additional animals into occupied DCH, through the potential introduction of diseased animals into DCH, and through increasing the population density in the critical habitat unit. Also, activities such as driving vehicles through critical habitat could impact vegetation, and thus degrade the Primary Constituent Elements of DCH. These potential adverse affects will be minimized through the implementation of the Desert Tortoise Translocation Plan. The Translocation Plan includes a disease testing program which will preclude, to the best of our ability, the translocation of disease-positive animals into DCH. Also, the Translocation Plan provides for maximum density limits which are designed to prevent the density from exceeding carrying capacity of the DCH. Most activities associated with the translocation would be conducted on existing roads, which do not support the primary constituent elements. A small amount of DCH adjacent to roads may be temporarily disturbed; we expect the size of this disturbance to be minimal and its effects on the function of critical habitat to not be measurable. All vehicular access will occur on authorized open routes of travel, where the primary constituent elements of DCH are absent. Only foot traffic will occur away from designated open routes of travel; we anticipate that the effects of foot traffic on the primary constituent elements of DCH would not be measurable. Therefore, we conclude that the implementation of the Plan will not adversely affect DCH.

Section 6, Pages 6-2 through 6-3

Added to References:

Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Prepared for the Southern California Edison Company, Rosemead, California.

Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. Copeia 1984(4):811-820.

U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.