5.8 PALEONTOLOGICAL RESOURCES

Paleontological resources (fossils), for the purposes of CEQA, may be defined as remains or other indications (trace fossils) of prehistoric organisms such as animals and plants. Three scientific enterprises necessitate fossils: (1) establishing the relative ages of geologic horizons that contain them; (2) reconstructing the ancient environments which these organism inhabited; and (3) detecting the existence, distribution, and evolutionary trends of diverse types of organisms, many of which are now extinct. Investigation of the geologic events that deposited the fossils cannot adequately proceed without an understanding of those fossils.

This Application for Certification (AFC) section summarizes the potential environmental impacts on paleontological resources that may result from construction of the San Joaquin Solar 1 & 2 Hybrid Project (SJS 1&2). Section 5.8.1 describes the local environment that may be affected by the proposed Project: construction. Operation of the proposed Project may have predictable impacts on paleontological resources. Section 5.8.2 describes these environmental consequences. Section 5.8.3 presents potential cumulative impacts to paleontological resources. Section 5.8.4 presents proposed mitigation measures to reduce potential adverse impacts to paleontological resources. Section 5.8.5 lists the federal, state, and local LORS and the professional standards that protect paleontological resources. Section 5.8.6 presents the participating agencies and agency contacts. Section 5.8.7 discusses the permits that may be required. Section 5.8.8 discusses professional standards for paleontological work. The last section, Section 5.8.9, lists the references cited in this document.

This AFC section on paleontological resources was prepared by Dr. Joe Stewart, Ph.D. It conforms to the requirements of the CEC. It is consistent with the standard measures for mitigating adverse construction-related environmental impacts on significant paleontological resources established by the Society of Vertebrate Paleontology (SVP 1995, 1996). The complete technical report, *Paleontological Resources Assessment, San Joaquin Solar 1 & 2 Hybrid Project*, is included as Appendix H (submitted separately under rules of confidentiality).

5.8.1 Affected Environment

The Project site is in western Fresno County, on the south flank of the Guijarral Hills, approximately 6 miles east of the City of Coalinga. The Project includes two solar hybrid plants located entirely on Section 3, and 6 miles of power transmission lines connecting the SJS 1&2 to the Gates Substation approximately one mile east of Interstate 5. The primary land use is now agricultural; however, much of the surrounding land has been used as an oilfield, but no petroleum wells in the immediate area are active. A more extensive discussion of land use in this vicinity is provided in Section 5.9, Land Use.

5.8.1.1 Geographic Location

The proposed site of the SJS 1&2 is in an unincorporated area near the City of Coalinga in Fresno County, California, on the south flank of the Guijarral Hills. The main portion of the proposed Project lies in Section 3, Township 21 South, Range 16 East. The northern alternative route for the transmission line connecting SJS 1&2 to the Gates Substation passes through the northern edges of sections 2 and 1 of Township 21 South, Range 16 East, and Sections 6, 5, 4, and 3 of Township 21 South, Range 15 East.

The southern alternative route for the transmission line passes through the northern edges of Sections 11 and 12 of Township 21 South, Range 16 East and of sections 7 and 8 of Township 21 South, Range 17 East. The Project lies at the boundary of the Guijarral Hills and the Avenal USGS 7.5-minute quadrangles (Figure 5.8-1). The elevation of the main Project site (Section 3) from the southwest to northeast corners varies from 570 to 640 feet above mean sea level (amsl) respectively, and the northern alternate transmission line route varies from 640 to 415 feet amsl, west to east. The elevation of the southern alternate route varies from 570 to 415 feet amsl, west to east. The proposed Project site lies within the Great Valley physiographic province. More specifically, it is at the northern end of the Kettleman Hills and at the southern tip (Guijarral Hills) of the anticline forming Anticline Ridge. The site is situated near the western edge of the San Joaquin Valley.

5.8.1.2 Regional Geologic Settings

The general geology and paleontology of the Kettleman Hills has been described in detail by Woodring *et. al.,* (1940). Numerous other publications have documented aspects of the geology and paleontology of these hills. The general area was mapped by Jennings and Strand (1958) at a scale of 1:250,000. The geology of the Coalinga and Guijarral Hills quadrangles was published by Dibblee (2006, 2007) at a scale of 1:24,000. The geology of the Gates Substation was reviewed by Padon and Stewart (2003). Information in these geologic maps and in published and unpublished reports form the basis of the following discussion. Individual maps and publications are incorporated into this report and referenced where appropriate. The aspects of geology pertinent to this report are the types, distribution, and age of sediments immediately underlying the proposed SJS 1&2 area (including the alternate transmission line routes) and their probability of producing fossils during Project construction. Site-specific geology in the vicinity of the proposed SJS 1&2 site is discussed separately, below.

Because the Project setting is the southern edge of the Guijarral Hills, the floor of Pleasant Valley and the San Joaquin Valley, the geology and the physiography are dominated by sedimentary processes, and the low-lying deposits are of Quaternary age. Dibblee (2007) mapped the Guijarral Hills, as being composed of the Tulare Formation. This formation is of freshwater origin of Plio-Pleistocene age. Older Tertiary marine sediments are exposed in the uplands to the north (Anticline Ridge) and south (Kettleman Hills) of, but not within, the Project area. The uplift of the Kettleman Hills, the Guijarral Hills, and Anticline Ridge started quite recently and is ongoing[B1] (Late Pleistocene and/or Holocene). The Tulare Formation, of Pliocene-early Pleistocene age[B2], is the uppermost part of the uplifted series of formations. It is clear from the map of Dibblee (2007) that the Guijarral Hills are the separated southern tip of Anticline Ridge. Thus, Los Gatos Creek, which separates the two, must be an antecedent stream predating the uplift.

5.8.1.3 Resource Inventory Methods

Methods used to develop the paleontological resource inventory of the proposed SJS 1&2 site and surrounding area are described below. These procedures are in keeping with guidelines of the CEC (2007) and SVP (1995) and included both a literature search and field investigation.

Both published and unpublished literature concerning area paleontological and geological topics was consulted. From such literature, it is possible to define the surface distribution of the formations involved, to estimate their subsurface distribution and gain some estimate of the paleontological productivity of

these units. Another important source for data concerning aerial distribution of known paleontological localities and productivity of various rock units is the records of pertinent paleontological collections. An archival database search was executed by the Natural History Museum of Los Angeles County (LACM) to determine whether any of the stratigraphic units found within the Project vicinity had previously yielded significant paleontological resources and whether any known localities lie within or near the SJS 1&2 site.

A field survey for any visible fossil remains within a 1-mile radius of the SJS 1&2 site was conducted on June 30 through July 2, 2008 by Joe D. Stewart, URS paleontologist, and Sarah Siren, paleontological technician, and on October 30 and 31 by Stewart and Elizabeth Hakel, paleontological technician. A search was made of exposures of sediment appropriate for producing fossils. During the field survey, attempts were made to detect the presence and nature of native sediments. Except for where Jayne Avenue cuts through subdued hills in the western 2 miles of the Project and along Zaapato Chino Creek, there are few places where stratigraphy may be observed.

5.8.1.4 Paleontological Resource Assessment Criteria

It is the position of SVP (1995) that any vertebrate fossil is considered significant unless otherwise demonstrated. Environmental statutes regard them in like manner. This position is due to the relative rarity of vertebrate fossils. Vertebrate fossils are so uncommon that, in many cases, each recovered specimen will provide additional important information about the morphological variation or the geographic distribution of its species.

A rock unit is considered "sensitive" to adverse impacts if there is a high probability that grading, excavation, or other or other earth-moving will jeopardize fossil remains. Using criteria published by the SVP (1995), the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to assessing the significance of paleontological resources, because the areal distribution of each rock unit can be delineated on a topographic or geologic map. The paleontological sensitivity of a stratigraphic unit reflects (1) its potential paleontological productivity (and sensitivity) and (2) the scientific significance of the fossils it has produced. This method of paleontological resources assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

There are many reasons for considering an individual fossil specimen scientifically important, including the following:

- If it is well preserved;
- If it can be identified;
- If it is more complete than most specimens for that species;
- If it preserves one or more elements not known in most specimens of that species;
- If it is indicative of a particular time period;
- If that species has not been recorded from that sedimentary unit;
- If it provides information concerning the environment in which it lived;

- If it could be the basis for description of a new species or comes from a site that produced the definitive specimen of its species;
- If it belongs to a species rarely encountered.

URS undertook the following tasks to establish the importance and paleontological sensitivity of each rock unit exposed in the proposed SJS 1&2 site and within the 1-mile buffer zone:

- Estimation of the potential paleontological productivity of each rock unit on the evidence of fossil localities in or near the SJS 1&2 site on the basis of published and unpublished sources.
- Consideration of the scientific significance of fossils from each of the rock units exposed within the Project.

Categories of Sensitivity

The SVP (1995), in its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, established three categories of sensitivity for paleontological resources: high, low, and undetermined.

High Sensitivity. Rock units for which vertebrate or significant invertebrate fossils or a significant suite of plant fossils have been recovered are, therefore, considered to be highly sensitive. In areas of high sensitivity, full-time monitoring is recommended during any Project-related ground disturbance.

Undetermined Sensitivity. Sedimentary rock units for which little information is available are considered to have undetermined sensitivity. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after he or she has performed a pedestrian survey and has made detailed observations of both natural and artificial exposures of the rock unit.

Low Sensitivity. Rock units that are not sedimentary in origin are assigned low sensitivity. Likewise, sedimentary rock units that have been well examined and have not produced paleontological resources are considered to have low sensitivity. Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.

5.8.1.5 Resource Inventory Results

Stratigraphic Inventory. The mapping of Dibblee (2007) indicates that there are only two geological units within the Project boundaries: the Tulare Formation and Quaternary (less than 1.8 ma)[B3]alluvium. The field survey revealed that there are actually five distinct units. One can see, in addition to the Tulare Formation, a presumably late Pleistocene paleosol beneath a presumably late Pleistocene horizon of sediments bearing caliche structures. Above these are the surficial soils deposits. Incised into the surficial soils are the humus-rich sands and silts of the Zapato Chino Creek alluvium.

Project Geology. The general geology of the Coalinga area has been mapped by Jennings and Strand (1958) at a scale of 1:250,000 and by Dibblee (2006, 2007) at a scale of 1:24,000. Dibblee (2007) mapped the raised areas of the northeast quarter of Section 3 and the north one-half of Section 2 as Tulare

Formation, which he described as weakly indurated valley sediments of Pleistocene and possibly latest Pliocene age and deposited as alluvial fans[B4]. He mapped the valley floor in the area as Qa, alluvial gravel, sand, and clay of valley area. He assigned the Qa a Holocene age (less than 10,000 years)[B5]. The field survey indicated that five stratigraphic units are present.

The Tulare Formation is the oldest geological unit within the immediate area of the Project; it underlies the northwest quarter of Section 3 of the project area. The Tulare Formation is a semi-consolidated, poorly sorted deposit of clay, silt, and gravel. Along Jayne Avenue, in sections 2 and 3 of Township 21 South, Range 16 East, and in section 35 and the adjoining part of section 34 in Township 20 South, Range 16 East, the silts and clays are predominantly white (Figure 5.8-3). But in Section 33 of the latter township and range, there re grey-green sands and silts. The clasts in the formation include a goodly percentage of Franciscan debris. The Tulare Formation is of Plio-Pleistocene age and, in some regions, was deposited in a freshwater lake and river environment (Woodring *et. al.,* 1940). The Tulare Formation in the Project area was deposited as alluvial fans (Dibblee 2007). Evidence that the formation extends as far back as the Pliocene is provided by a volcanic ash near its base. This ash is correlated with the Putah Tuff and dates to 3.3 $\pm$ 0.1 million years (Swarna-Wojkicki 1976; Graymer *et. al.,* 1994). The currently accepted date for the Pliocene-Pleistocene boundary is 1.81 ma (Gradstein *et. al.*, 2004). This is the formation that will be most impacted by earth disturbance in the north half of section 3.

At an unknown distance above the Tulare Formation is a paleosol lacking obvious caliche structures (Figures 5.8-4 and -5). Above that is a late Pleistocene zone with caliche. These sediments bear unconnected bits of caliche (Figure 4.8-4) or solidified horizons of caliche (Figure 5.8-5). This paleosol and the sediments bearing caliche are exposed in the walls and floor of Zapato Chino Creek, and it is unknown how far these extend laterally from the creek. Above these are the surficial soil deposits, and they bear no caliche (Figure 5.8-6).

The alluvium of Zapato Chino Creek is dark-colored and rich in humus (Figure 5.8-7). Deposits of this alluvium are incised into the surficial soil deposits and must be younger. Whether they are entirely of Holocene age or whether the lower parts are of Pleistocene age is unknown, but the question might be amenable to radiocarbon dating techniquest. This alluvium could be impacted only if it if towers for a power line are erected in or immediately adjacent to Aapate Chino Creek.

Summary. The Project area has five distinct geologic units. These are the Tulare Formation, Pleistocene paleosol, the Pleistocene sediments bearing caliche, the surficial soil deposits, and Zapato Chino Creek alluvium.

Paleontological Resource Inventory. The location of fossils observed during the pedestrian survey of the Project are shown in Figure 5.8-8**.**

Tulare Formation. The oldest geological unit within the immediate area of the Project is the Tulare Formation, which underlies the northeast quarter of Section 3 of the Project area. The Tulare Formation is of Plio-Pleistocene age. It was deposited in a freshwater lake and river environment in some areas (Woodring *et. al.,* 1940), but as alluvial fans in this area (Dibblee 2007). Four localities in the Tulare Formation southeast of the Project site have produced vertebrate fossils. The LACM records search results indicate that four localities in the Tulare Formation in the northern Kettleman Hills produced fossil fish bones and a sea lion fossil. The report also stated that the Tulare Formation in the Panoche Valley

and the Little Panoche Valley produced fossils of bears, horses, and camels. Stewart (2005) mentioned that fish fossils were recovered from borings in the Tulare Formation at structure 69/4 of the Path 15 power transmission line project. This point is approximately nine miles northwest of the Project. Woodring *et. al.,* (1940) listed fish fossils and a horse tooth from the Tulare Formation of the Kettleman Hills. Casteel and Hutchison (1973) documented fossils of *Orthodon* (a minnow), *Acipenser* (a sturgeon) and a centrarchid fish (freshwater bass family) from the Tulare Formation of Alameda County, California. Casteel (1978) cited the occurrence of fossil embiotocid (surfperch) otoliths from the Tulare Formation south of the Project area. Jefferson (1991) listed three localities in the Tulare Formation of Alameda County that produced three kinds of fish plus *Branta* (Canada goose); those three localities apparently are the same localities mentioned by Casteel and Hutchison (1973). These documents indicate that the Tulare Formation has a high sensitivity for paleontological resources under the SVP (1995) criteria because of the many vertebrate fossils reported from the formation. In accordance with SVP guidelines, fulltime monitoring is required during earth moving activities in this unit. Reworked fragments of marine mollusks occur in the non-lacustrine parts of the Tulare Formation (Figure 5.8-3). The field survey did not produce any non-reworked fossils in the Tulare Formation.

Pleistocene paleosol. A tour of Zapato Chino Creek revealed 1.2 feet of a Pleistocene paleosol (fossil soil) bearing no caliche. A partial skeleton of a ground squirrel (Figure 5.8-4) , bones of geomyid rodents, heteromyid rodents, and reptile or amphibian bones, and pulmonate (terrestrial) snails were recovered from approximately one cubic foot of sediment. This paleosol lies approximately 15.5 feet below ground level (bgl), which is a plowed field. It is not known how far below the paleosol lies the Tulare Formation. Inasmucn as the Tulare Formation is exposed in the Guijarral Hills to the north and the Kettleman Hills to the south, it must occur at unknown depths below Zapato Chino Creek. These sediments are highly sensitive for paleontological resources. Any ground disturbin activites that would reach this depth would be required to have fulltime paleontological monitoring.

Pleistocene sediments bearing caliche. Above the paleosol is a zone of up to 3.2 feet of sediment bearing caliche structures. These can be disconnected (Figure 5.8-4) or fused into a massive caliche horizon (Figure 5.8-5). There are numerous small burrow structures (trace fossils) in the caliche horizon (Figure 5.8-9) and numerous probable root structures. The small burrows could be from some sort of arthropod. None are large enough to accommodate an animal the size of the ground squirrel found below. In freshly broken surfaces of the massive caliche, there is a strong presence of manganese oxide.

Surficial soil deposits. At least seven feet of soil are visible immediately below ground level along parts of Zapato Chino Creek. A rodent incisor was collected 4.9 feet bgl. It was not associated with any visible burrow structures. Slumping of the creek walls prevented access to exposures where the contact between the Pleistocene sediments bearing caliche and the surficial soil deposits could be viewed. If the soil deposits continue for a considerable interval, radiocarbon dating of the soils might reveal the approximate Pleistocene/Holocene boundary. Under SVP (1995) criteria, Holocene sediments have a low sensitivity for producing paleontological resources. It is not known whether the rodent incisor collected from these deposits is of Pleistocene or Holocene age. Therefore, the paleontological sensitivity of this unit is unknown. Any earth moving activities extending below the cultivated horizon will impact this sedimentary unit. Therefore, full time monitoring would be required until these sediments can be shown to be paleontologically unproductive, or until the approximate depth of the Pleistocene/Holocene boundary can be determined.

Zapato Chino Creek alluvium. Near the current channel of Zapato Chino Creek, alluvial deposits rich in humus occur. Two types of fossils were encountered in these sediments. One is abraded bones of rodents or other small mammals. The second type is small pieces of pectens and oysters derived most recently from the Tulare Formation, but ultimately from Neogene marine formations underlying the Tulare Formation. The occurrence of historic artifacts in the upper parts of this alluvium (Figure 5.8-7) demonstrates that these parts are not of Pleistocene age (greater than 10,000 years). If any of the bones from the lower parts of this alluvium prove to be of Pleistocene age, it could demonstrate that the unit has a high sensitivity for paleontological resources. The SVP Guidelines do not recommend monitoring for deposits of Holoene age. Nonetheless, fossils and radiocarbon dates from older Holocene sediments may help establish the approximate date for the transition from the Pleistocene climate to the modern climatic regime. Under SVP (1995) criteria, Holocene sediments have a low sensitivity for producing paleontological resources.

Summary. Identifiable fossil remains salvaged from these sedimentary units during Project construction could be scientifically important and significant. Identifiable fossil remains discovered during Project construction could represent new taxa or new fossil records for the area, or for the State of California. They could also represent geographic or temporal range extensions. Moreover, discovered fossil remains could make it possible to more accurately determine the age, paleoclimate, and depositional environment of the sediments from which they are salvaged. Finally, fossil remains salvaged during Project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in Fresno County.

5.8.2 Environmental Consequences

Potential Impacts from Project Construction. Potential impacts on paleontological resources resulting from construction of the proposed Project primarily involve excavations for structure foundations and trenching for pipes and conduit. Paleontological resources that could be adversely impacted by ground disturbance and earth moving are not restricted to the fossil remains. Other resources include undetermined numbers of fossil remains and unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. Direct impacts could result from vegetation clearing, grading, excavations or trenching for structures, and any other earthmoving activities that disturb previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation. The construction of support facilities such as temporary construction offices, laydown areas, and parking areas could adversely impact significant paleontological resources, if they involve extensive new ground disturbance. In general, any Project-related ground disturbance could have adverse impacts on significant paleontological resources. A properly designed and implemented mitigation program, however, would reduce these impacts to a less-than-significant level.

If paleontological finds are encountered during SJS 1&2 construction, the potential cumulative impacts would be low as long as mitigation measures were implemented to salvage the resources. Section 5.8.3 provides mitigation measures that would effectively preserve the value to science of any significant fossils uncovered during Project-related excavations.

Potential Impacts from Project Operation. It is anticipated that continuing operation of the proposed SJS 1&2 and its related facilities will have no impacts on paleontological resources.

5.8.3 Cumulative Impact

If paleontological resources are not encountered during Project construction, there would be no cumulative impact. If significant paleontological resources are encountered in the course of construction, and if adequate mitigation measures were then implemented, the potential cumulative impacts would be low. The mitigation measures proposed in Section 5.8.4 would effectively preserve the value to science of any significant fossils uncovered during Project-related excavations.

5.8.4 Mitigation Measures

This section presents mitigation measures designed to minimize the impact to paleontological resources of the Project construction activities. The known high sensitivity of the Tulare Formation and the Pleistocene paleosol for paleontological resources necessitates these measures. Implementation of these measures would reduce the Project's impact to significant paleontological resources to a less-than-significant level. These measures conform to the standard guidelines developed by the SVP for mitigating the impact of such construction activity to significant paleontological resources (SVP 1995, 1996).

PAL-1 Monitoring and Mitigation Program

Prior to construction, a qualified paleontologist should be retained to both design a monitoring and mitigation program and implement the program during all Project-related ground disturbance. The paleontological resource monitoring and mitigation program should include these elements:

- An agreement with an accredited paleontological collection to curate significant fossils from the Project;
- Preconstruction coordination;
- Construction monitoring;
- Emergency discovery procedures;
- Sampling and data recovery, if needed;
- Testing of paleosols, if impacted, for vertebraet microfossils;
- Radiocarbon dating of deeper soils and paleosols.
- Preparation, identification, and analysis of the significance of fossil specimens salvaged, if any;
- Museum curation of any specimens and data recovered; and
- Reporting.

Monitoring for paleontological resources shall be done for all activities that will disturb previously undisturbed sediment. Monitoring is not required in areas where sediments have been previously disturbed or in areas where exposed sediments will be buried but not otherwise disturbed.

PAL-2 Pre-Construction Meetings

Pre-construction meetings will be held to brief key construction personnel on paleontological resource significance, visual identification, and fossil discovery notification procedures. A qualified paleontologist will periodically consult with the Project geologist and Project engineer regarding the scheduling and extent of subsurface excavations, particularly where undisturbed areas may be encountered.

PAL-3 Construction Personnel Education

Prior to the start of construction, construction personnel involved with earthmoving activities should be informed that fossils may be discovered during excavation, that these fossils are protected by law, on the forms of common fossils, and on the proper notification procedures. This worker training should be prepared and presented by a qualified paleontologist.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of Project-related ground disturbance and earthmoving on paleontological resources to an insignificant level, by allowing for the salvage of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might be lost to earthmoving and to unauthorized fossil collecting.

With a well-designed and implemented paleontological resource monitoring and mitigation plan, Project construction could actually yield beneficial effects on paleontological resources through the discovery of fossil remains that would not have been exposed without Project construction, and would not otherwise have been available for study. The salvage of fossil remains as part of Project construction could help answer important questions regarding the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the Project area.

5.8.5 LORS Compliance

Paleontological resources are included among nonrenewable scientific resources by governmental agencies. Protection of such resources is provided by federal and state legislation and even by some local ordinances. As mentioned in Section 5.8.3, the SVP has developed guidelines and professional standards for assessing the impact of projects on paleontological resources and for mitigation of adverse impacts (SVP 1995, 1996). The proponent intends for construction and operation of the proposed Project to take place in a manner consistent with all LORS relevant to paleontological resources. Table 5.8-1 summarizes these LORS and a discussion is provided below

Table 5.8-1
Applicable Paleontological Resources LORS

LORS	Applicability	Agency	Section
Federal			
Antiquities Act of 1906	Protects paleontological resources on federal lands, therefore not applicable		7.16.5.1
National Environmental Policy Act, 1969	Protects paleontological resources on federal lands, therefore not applicable	EPA	7.16.5.1
State			
California Environmental Quality Act	Regulates industrial/residential development projects. Project direct or indirect impacts on unique paleontological resources or site – resource assessment, monitoring and mitigation required (superseded by CEC process)	CEC	7.16.5.2
Public Resources Code Sections 5097.5/5097.9	Protects paleontological resources on state owned or managed lands		7.16.5.2
Local			
Fresno County General Plan	Promotes conservation of paleontological resources within the County	Fresno County Planning Department	7.16.5.3
Professional Standards			
Society of Vertebrate Paleontologists	Paleontological Resources – Nationwide. Recommended set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources.	n/a	7.16.5.4

5.8.5.1 Federal

The Antiquities Act of 1906 is used as the basis for federal protection of paleontological resources on federal lands. The Antiquities Act of 1906 authorizes the government to regulate the disturbance of objects of antiquity on federal lands through the responsible managing agency and to prosecute unauthorized damage or removal. The National Environmental Policy Act of 1969 (NEPA) requires that important natural aspects of our national heritage be considered in assessing the environmental consequences of any proposed project. The Federal Land Policy Management Act of 1976 (PL 94-579; 90 Stat. 2743, USC 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under

40 CFR 1508.27 as a subset of scientific resources. These regulations apply only to paleontological resources on federal lands; they are not applicable to the Project.

5.8.5.2 State

CEQA applies to projects within California. The legislation does not specifically address paleontological resources, but the Guidelines for the Implementation of the California Environmental Quality Act, as amended in 2004, include a standard checklist which requires proponents and regulators to determine whether the proposed Project will directly or indirectly destroy a unique paleontological resource or site. A paleontological mitigation plan is mandated if the answer is "yes" or "possibly." The CEC environmental review process treats paleontological resources in a manner similar to CEQA.

5.8.5.3 Local

The County of Fresno General Plan specifically addresses paleontological resources in its Open Spaces and Conservation Element. "Policies in this section seek to preserve the historical, archeological, paleontological, geological, and cultural resources of the county through development review, acquisition, encouragement of easements, coordination with other agencies and groups, and other methods.

"Goal OS-J To identify, protect, and enhance Fresno County's important historical, archeological, paleontological, geological, and cultural sites and their contributing environment."

"Policy OS-J.1 The County shall require that discretionary development projects, as part of any required CEQA review, identify and protect important historical, archeological, paleontological, and cultural sites and their contributing environment from damage, destruction, and abuse to the maximum extent feasible. Project-level mitigation shall include accurate site surveys, consideration of the Project alternatives to preserve archeological and historic resources, and provision for resource recovery and preservation when displacement in unavoidable."

5.8.5.4 Professional Standards

SVP is an international scientific organization of professional and a vocational vertebrate paleontologists. In the 1990s, the society perceived a growing need to address standards for mitigating impacts to paleontological resources resulting from construction activities. Standard guidelines were developed, considered, and adopted (SVP 1995, 1996). These guidelines delineate standards for assessing paleontological resources; for paleontological surveys; for monitoring and mitigation; for the types of data to be recorded; for sampling vertebrate microfossils; and for preparing, identifying, analyzing, and curating specimens recovered. Many federal and California state regulatory agencies have used these guidelines as their guidelines, although the U.S. Department of the Interior is developing a more complicated system for rating sensitivity for paleontological resources. These guidelines recommend an archival review in a museum having collections pertinent to the Project area and a review of published and unpublished literature pertinent to the Project paleontology. If the probability of the Project impacting significant paleontological resources is high, the guidelines recommend developing a mitigation and monitoring plan; salvaging paleontological resources encountered; preparing, identifying, and curating recovered resources; the compiling a final report describing all these activities and the significance of the resources recovered.

5.8.6 Agencies and Agency Contacts

No state or local agencies have specific jurisdiction over paleontological resources. The Project area is in unincorporated Fresno County. Table 5.8-2 lists agency contact information for the County of Fresno.

Table 5.8-2
Involved Agencies and Agency Contacts

Agency	Contact	Address	Telephone
Department of Planning and Development Fresno County	Chris Motta Senior Planner	2220 Tulare Street, 6th floor Fresno, CA 93721	(559) 262-4022

5.8.7 Permits Required and Permitting Schedule

No state or county agency requires a paleontological collecting permit to allow for the salvage of fossil remains discovered as a result of construction-related earthmoving on state or private land in a project site.

5.8.8 References

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Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Paleontological Resources** Project: San Joaquin Solar 1&2 Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	5.8.1; 5.8.2 – 5.8.4		
Appendix B (g) (16) (A)	Identification of the physiographic province and a brief summary of the geologic setting, formations, and stratigraphy of the project area. The size of the paleonotological study area may vary depending on the depositional history of the region.	5.8.1, 1-2 and 5		
Appendix B (g) (16) (B)	A discussion of the sensitivity of the project area described in subsection (g)(16)(A) and the presence and significance of any known paleontologic localities or other paleontologic resources within or adjacent to the project. Include a discussion of sensitivity for each geologic unit identified on the most recent geologic map at a scale of 1:24,000. Provide rationale as to why the sensitivity was assigned.	5.8.1.5		
Appendix B (g) (16) (C)	A summary of all local museums, literature searches and field surveys used to provide information about paleontologic resources in the project area described in subsection (g)(16)(A). Identify the dates of the surveys, methods used in completing the surveys, and the names and qualifications of the individuals conducting the surveys.	5.8.1.3		

Adequacy Issue: Adequate ____ Inadequate ____

DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

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SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (16) (D)	Information on the specific location of known paleontologic resources, survey reports, locality records, and maps at a scale of 1:24,000, showing occurrences of fossil finds, if known, within a one-mile radius of the project and related facilities shall be included in a separate appendix to the Application and submitted to the Commission under a request for confidentiality, pursuant to Title 20, California Code of Regulations, s 2501 et seq.	Map to be included in Final Report as Confidential Appendix		
Appendix B (g) (16) (E)	A discussion of any educational programs proposed to enhance awareness of potential impacts to paleontological resources by employees, measures proposed for mitigation of impacts to known paleontologic resources, and a set of contingency measures for mitigation of potential impacts to currently unknown paleontologic resources.	5.8.4		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Tables 5.8-1; 5.8-2		

Adequacy Issue: Adequate ____ Inadequate ____

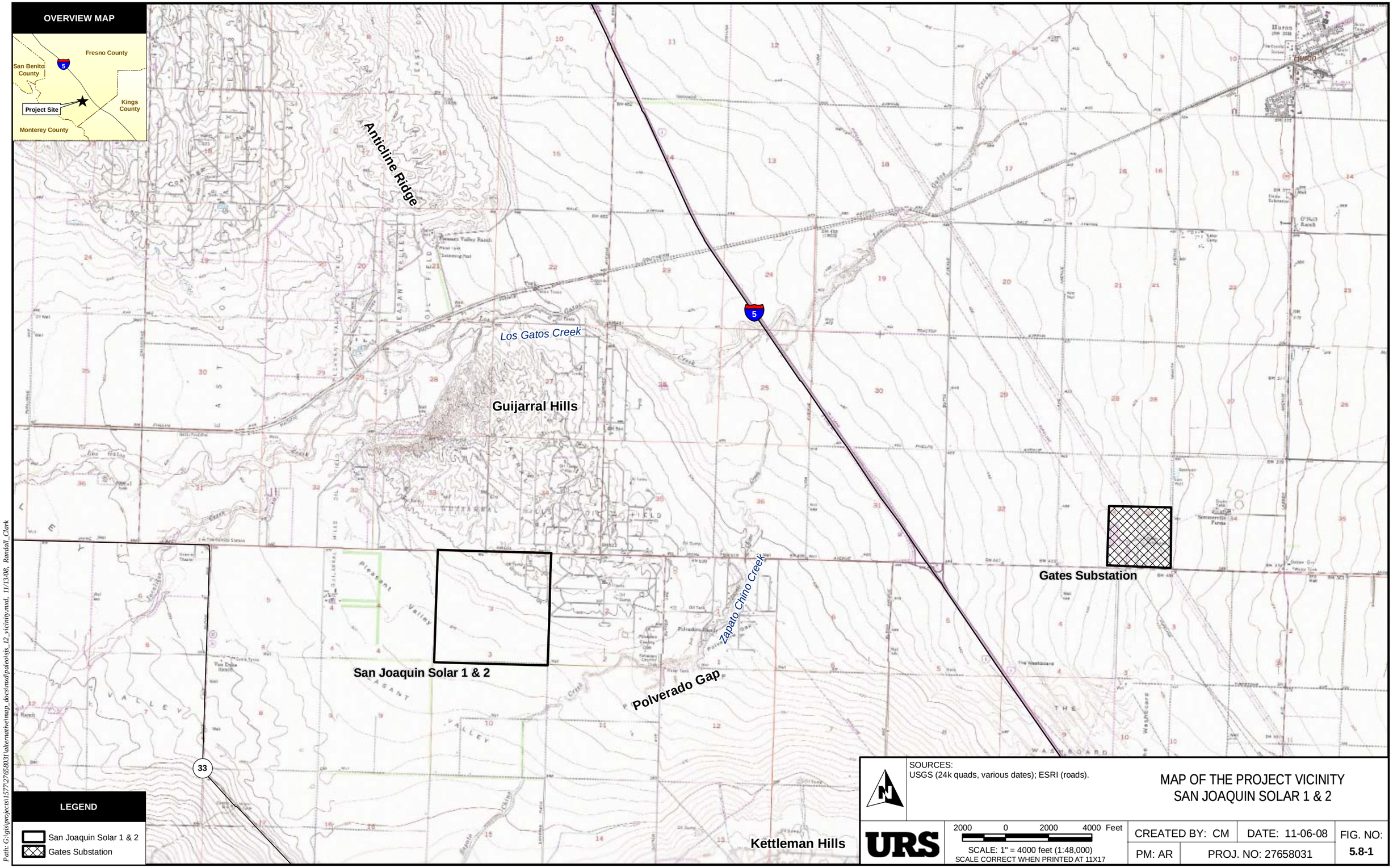
DATA ADEQUACY WORKSHEET

Revision No. 0 Date ____

Technical Area: **Paleontological Resources** Project: San Joaquin Solar 1&2 Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	None applicable		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Table 5.8-2		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Not applicable		



SOURCES:
USGS (24k quads, various dates); ESRI (roads).

MAP OF THE PROJECT VICINITY
SAN JOAQUIN SOLAR 1 & 2

URS

2000 0 2000 4000 Feet
SCALE: 1" = 4000 feet (1:48,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 11-06-08	FIG. NO:
PM: AR	PROJ. NO: 27658031	5.8-1

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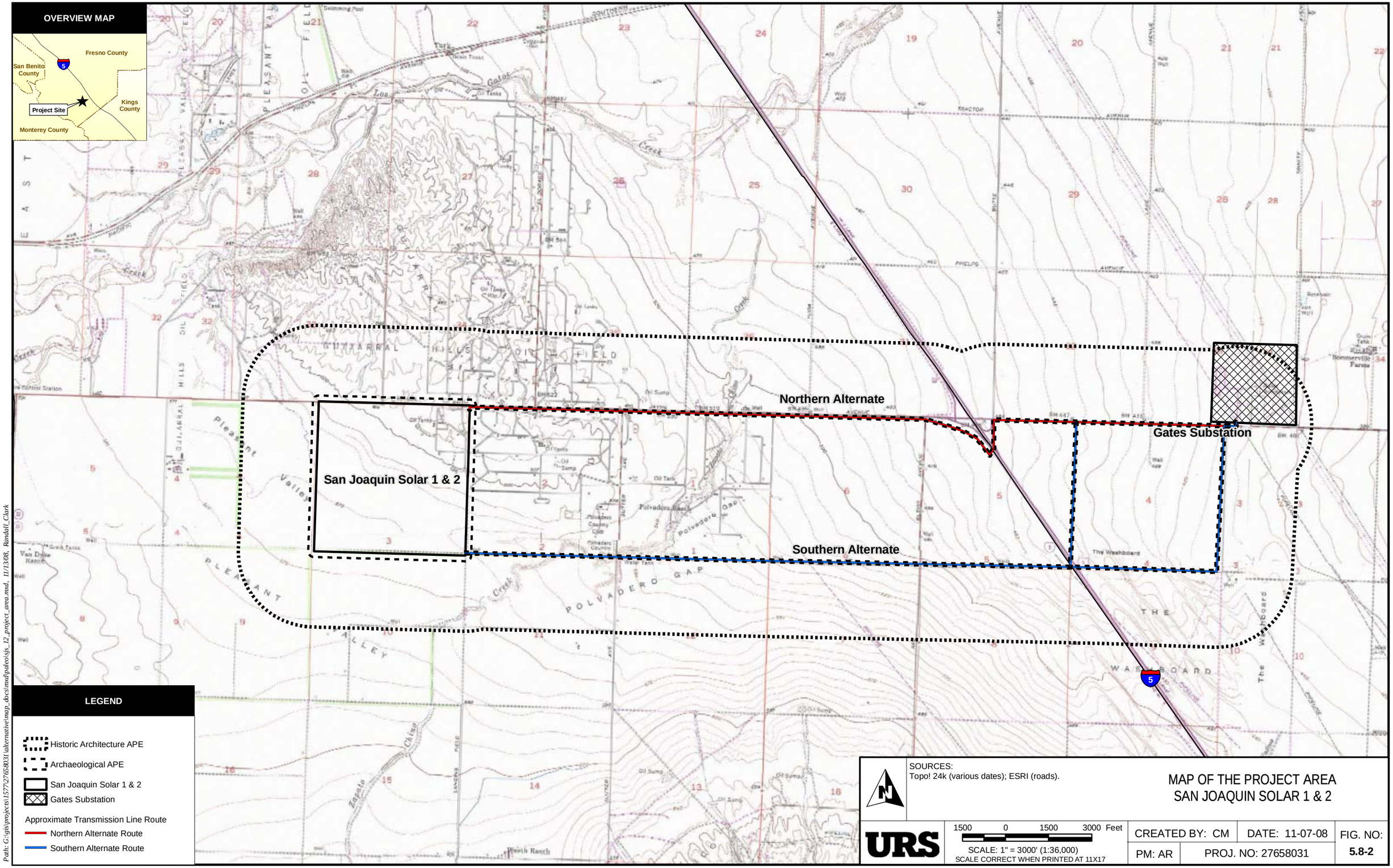

SOURCES:
Topo! 24k (various dates); ESRI (roads).

MAP OF THE PROJECT AREA
SAN JOAQUIN SOLAR 1 & 2

URS

1500 0 1500 3000 Feet
SCALE: 1" = 3000' (1:36,000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: CM	DATE: 11-07-08	FIG. NO:
PM: AR	PROJ. NO: 27658031	5.8-2

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