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March 19, 2009

Mr. Christopher Meyer
Project Manager
Attn: Docket No. 08-AFC-5
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: SES Solar Two (08-AFC-5)
Responses to CEC and BLM Data
URS Project No. 27657106.00400

Dear Mr. Meyer:

On behalf of SES Solar Two, LLC, URS Corporation Americas (URS) hereby submits the Responses to CEC and BLM Data Requests 1-3, 5-10, 14, 24-26, 31-33, 36-38, 44 and 111-127 (SES Solar Two 08-AFC-5).

I certify under penalty of perjury that the foregoing is true, correct, and complete to the best of my knowledge. I also certify that I am authorized to submit the Data Responses on behalf of SES Solar Two, LLC.

Sincerely,

Angela Leiba
Project Manager

AL:ml

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In Response to CEC & BLM Data Requests 1-3, 5-10, 14, 24-26, 31-33, 36-38, 44 and 111-127 Application for Certification (08-AFC-5)

SES Solar Two, LLC

Submitted to:
Bureau of Land Management
1661 S. 4th Street, El Centro, CA 92243

Submitted to:
California Energy Commission
1516 9th Street , MS 15, Sacramento, CA 95814-5504

Submitted by:
SES Solar Two, LLC
2920 E. Camelback Road, Suite 150, Phoenix, AZ 85016

URS

With Support From:
URS Corporation

March 2009

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TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 1: Please provide the wetland delineation report and the final determination from the USACE regarding whether or not jurisdiction will be asserted. Should the USACE assert jurisdiction, please explain the project-specific circumstances that would necessitate substantial temporary or permanent impacts to jurisdictional waters.

Response: A site visit with URS and USACE occurred on January 7th, 2009. A Wetland Delineation Report and additional information requested by the USACE was submitted first quarter 2009. This report is being docketed under separate cover.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 2: Please contact CDFG and provide a record of correspondence regarding the need to complete a Streambed Alteration Agreement. Should a Streambed Alteration Agreement be needed, please explain the project-specific circumstances that would necessitate substantial temporary or permanent impacts to jurisdictional waters of the State.

Response: CDFG has indicated a Stream Bed Alteration Agreement would be required. This process ultimately requires a certified CEQA-equivalent document for agency execution of the Streambed Alteration Agreement. The Applicant and/or representatives will meet with CDFG to follow-up on this process 2nd quarter, 2009.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 3: Please provide the anticipated schedule of USACE and Regional Water Quality Control Board (RWQCB) permitting for (and verification of) jurisdictional waters, and expected mitigation measures likely to be included in USACE and RWQCB permits, if appropriate.

Response: USACE determination is expected May 2009. Once this determination occurs, the Applicant will enter into discussions with RWQCB as to which law (state or federal) is applicable. CWA 401 certification would be part of the 404 permit process and would proceed in parallel with that permit process. If a 404 permit is not required, water quality certification would be sought via Porter-Cologne.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 5: Please provide a detailed monitoring plan for the evaporation ponds, including:

a. A discussion of the frequency and nature of monitoring;

b. Elements that will be monitored (e.g., sodium);

c. A list of resident and migratory species that could be at risk;

d. Remedial actions that could be taken if the ponds become a hazard for wildlife; and

e. Events that might trigger implementation of those remedial actions.

Response: See data response filed December 2008 for details on monitoring. Additional information relating to the monitoring plan for the evaporation ponds will be prepared, if needed, following the submission of additional information relating to the Applicant's new primary source of water (expected 2nd quarter, 2009).

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 6: Please provide details on how the evaporation ponds will be designed, built, and operated to discourage wildlife use.

Response: See data response filed December 2008 for details on how the evaporation ponds will be designed, built and operated to discourage wildlife use. Additional information relating to the evaporation ponds discouraging wildlife will be prepared, if needed, following the submission of additional information relating to the Applicant's new primary source of water (expected 2nd quarter, 2009).

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 7: Please provide a detailed raven monitoring and control plan that discusses:

a. How the monitoring and control plan will be coordinated with CDFG and USFWS;

b. Area covered by the plan;

c. Potential use of perch-deterrent devices and locations of their installation;

d. Measures that might reduce raven presence and nesting activities (e.g., removing food items, garbage, and access to water);

e. A monitoring plan, including discussion of survey methods and frequency for establishing baseline data on pre-project raven numbers and activities, assessing post-project changes from this baseline, and the funding mechanism for the monitoring plan;

f. Remedial actions that would be employed (e.g., nest removal) if raven predation of flat-tailed horned lizard is detected; and

g. The circumstances that would trigger the implementation of remedial actions.

Response: A draft raven monitoring and control plan has been developed and is docketed under separate cover.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 8: Please describe the likely components of a facility closure plan (e.g., decommissioning methods, timing of any proposed restoration, restoration performance criteria) and discuss each relative to biological resources and specifically species of concern such as flat-tailed horned lizard and burrowing owl.

Data Request 9: Please describe the potential funding (e.g., a bond) and/or legal mechanisms for decommissioning and restoration of the project site that could be used at the end of operations.

Data Request 10: Please describe the potential funding and/or legal mechanisms for decommissioning and restoration of the project site that could be use din the event of bankruptcy or the untimely closure for financial reasons.

Response: On December 8, 2008, the Applicant submitted responses to several of the CEC and BLM's data requests. Data Requests 8 and 9 requested information of SES's plans for closure of the Solar Two project as they relate to biological resources and Data Request 10 asked for information on funding of the closure activities. The following are more details on the Applicant's proposal related to the timing and content of facility closure plans for Solar Two. We look forward to discussing these concepts at an upcoming workshop with the agencies. This additional information prepared by the Applicant is submitted behind this response as attachment BIO-1.

FACILITY CLOSURE – SOLAR TWO

As with any power plant, at some point the Solar Two facility will reach its economic or useful lifetime, cease operation, and shut down. This "planned closure" will occur with adequate advanced warning and will allow sufficient time for planning the projects closure with full participation of the appropriate agencies and input from the public to ensure minimal environmental impacts and compliance with all applicable laws, ordinances, regulations, and standards. As identified by the CEC in previous siting cases, there may be a variety of circumstances where there is either an "unplanned temporary closure" or an "unplanned permanent closure**."**

The focus of this discussion is to identify Stirling Energy System's goals for both planned and unplanned closure and identify the actions proposed to comply with the Bureau of Land Management and Energy Commission's expectations for facilitating orderly closure under any circumstance.

Closure Objectives

Stirling Energy System's primary concern related to planned or unplanned facility closure is to ensure that:

1. Materials maintained onsite which might present risks to public health and safety and the environment are properly stored and disposed, and
2. The site is secured to prevent unauthorized access and risk to public health and safety.

For planned closure, the applicant will also seek to remove structures and facilities consistent with the applicable legal requirements and planned uses of the site at the time of closure.

Planned Closure

As identified above, planned closure of Solar Two will occur at the end of its useful economic or mechanical life. A planned closure would end plant operations with no intent to restart operations. At that time, the facility will be closed in an orderly manner.

To ensure the planned facility closure does not create adverse impacts, SES will submit a proposed facility closure plan to the Bureau of Land Management and Energy Commission for review and approval at least 12 months prior to commencement of closure activities and coordinate closure activities with the Bureau of Lnad Management, Energy Commission, Imperial County, and other applicable agencies. The closure plan will identify and discuss:

- A list and schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;
- Any facilities or equipment intended to remain on site after closure, the reason and any future use, and any monitoring and the inspection of these facilities and equipment;
- Any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to any facilities, equipment, or other project related

remnants that will remain at the site;
- Details on the habitat restoration plan for the site including the timing of habitat restoration and habitat restoration performance criteria as discussed previously in response to Data Request 8; and
- Conformance of the plan with the Bureau of Land Management's right-of-way grant, applicable conditions of certification, and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure.

In addition to all permit and lease requirements, the closure plan will assess the range of available options and consider local/regional plans in existence at the time of closure, proposed uses of the site, and comments of agencies and the public.

Unplanned Temporary Closure
An unplanned temporary closure would occur if the Solar Two facility were closed suddenly or unexpectedly for a limited time, typically for a period greater than required for normal maintenance. This is expected to happen only due to unforeseen circumstances such as a natural disaster or an emergency.

Consistent with previous Energy Commission requirements, Stirling Energy Systems will develop a contingency plan to ensure that all appropriate and necessary steps to mitigate public health, safety, and environmental impacts are taken in a timely manner. Stirling Energy Systems will submit the contingency plan to the Bureau of Land Management and Energy Commission no less than 60 days before the commencement of commercial operation for their review and approval. This plan will be kept on site and at Stirling Energy System's administrative offices at all times. It will be reviewed annually and updated as necessary and consistent with changes in materials stored and applicable legal requirements.

If an unplanned temporary closure occurs, Stirling Energy Systems will notify the Bureau of Land Management and California Energy Commission and any other responsible agencies by telephone, fax, or e-mail within 24 hours. Stirling Energy Systems will identify the causes and circumstances related to the closure and the expected duration of the closure. As part of the contingency plan, Stirling Energy Systems will describe procedures to immediately secure and provide monitoring of the facility from trespassing or encroachment. If the unplanned closure lasts for more than 90 days or other time agreed to with the Bureau of Land Management and the Energy Commission, Stirling Energy Systems will remove hazardous materials and hazardous wastes from the site, drain all chemicals from storage tanks and other equipment, and safely shutdown and store all equipment.

The contingency plan will describe the nature and extent of any proposed insurance coverage or other mechanism to fund unplanned closure activities and any major equipment warranties. Stirling Energy systems will annually update the Bureau of Land Management and Energy Commission on the status of the approved mechanism to fund closure activities and major equipment warranties.

Unplanned Permanent Closure
An unplanned permanent closure would occur Solar Two closes suddenly or unexpectedly on a permanent basis. This is expected to happen only due to unforeseen circumstances such as severe natural disaster or economic crisis. An unplanned permanent closure would end plant operations with no intent to restart operations.

In the event of an unplanned permanent closure, Stirling Energy Systems will notify the Bureau of Land Management, the Energy Commission and other responsible agencies, by telephone, fax, or e-mail, within 24 hours. Stirling Energy Systems will identify the causes and circumstances related to the permanent closure and implement the contingency plan. Stirling Energy Systems will also develop and submit a closure plan, consistent with the requirements for a planned closure, to the Bureau of Land Management and the Energy Commission within 90 days of the permanent closure or other time agreed to by the Bureau of Land Management and the Energy Commission.

TECHNICAL AREA: BIOLOGICAL RESOURCES

Data Request 14: Please prepare and submit a Weed Management Plan to staff and BLM that includes a discussion of all methods to be implemented (e.g., equipment cleaning) to prevent the spread of weeds and herbicides to be used in control of undesirable plants.

Response: A Draft Weed Management Plan has been developed and is docketed under separate cover.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 111: Please provide a discussion of the historical geomorphology of the project site to better evidence a consideration of the potential there for buried archaeological deposits. The discussion should describe the development of the landforms on which the project area is proposed, with a focus on the character of the depositional regime of each landform since the Late Pleistocene era. The basis for the discussion should be data on the geomorphology, sedimentology, pedology, hydrology, and stratigraphy of the project area or the near vicinity. The source of these data should be the available Quaternary science or geoarchaeological literature. The presentation of the discussion should also include maps that overlay the above data on the project area.

Response: See discussion of existing data and research referenced within the response to Data Request 112.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 112:

In the absence of extant Quaternary science or geoarchaeological literature pertinent to the reconstruction of the historical geomorphology of the project area, staff requests that the applicant conduct a primary geoarchaeological field study of the project area to facilitate the assessment of the likelihood that archaeological deposits are buried beneath the project area surface, where the construction and operation of the proposed project will involve disturbance at depth. The primary study should, at a minimum, provide for the following elements:

a. A map of the present landforms in the project area at a scale not less than 1:24,000. The map may be the result of any combination of satellite or aerial imagery that has been subject to field verification, or the result of a field mapping effort.
b. A sampling strategy to document the stratigraphy of the portions of the landforms in the project area where the construction and operation of the proposed project will involve disturbance at depth.
c. The collection of the data requisite to determinations of the physical character, the ages, and the depositional rates of the various sedimentary deposits and paleosols beneath the surface of each sampled landform to the proposed maximum depth of ground disturbance. Data collection at each sampling locale should include a measured profile drawing and a profile photograph with a metric scale and north arrow, and the screening of a small (3, 5 gal. buckets) sample of sediment from the major sedimentary deposits in each profile through 1/4 inch hardware cloth. Data collection should also include the collection and assaying of enough soil humate samples to reliably radiocarbon date a master stratigraphic column for each sampled landform.
d. An analysis of the data that are the result of the above field study, and an assessment, on that basis, of the likelihood that the project will encounter buried archaeological deposits, and, to the extent possible, the likely age and character of such deposits.

A qualified geoarchaeologist, a person meeting the U.S. Secretary of the Interior's Professional Qualifications Standards for archaeology and who can further demonstrate the completion of graduate level coursework in geoarchaeology or Quaternary Science, should prepare a research design for the above study, for the review and approval of the Siting Project Manager, and then conduct the research and forward a report of the results to the Siting Project Manager.

Response: The report is provided as text following this response. Figures that accompany the report are provided as attachment CUL-1.

Background and Setting

The following discussion is largely focused on identifying those portions of the project area that have the potential for harboring archaeological deposits *with no surface manifestation*. It has been shown that some alluvial landforms, with desert pavements that have evolved through accretion of eolian silts and sands and the gradual bearing of larger clasts to the surface, have the potential for containing buried archaeology (Ahlstrom and Roberts 2001). However, a representative portion of this archaeological deposit will be incorporated into the surface pavement through the same accretionary process. Thus, these older surfaces are not likely to contain archaeology that is not at least partially evident on the surface.

Geomorphologic processes have played a major role in the differential preservation of archaeological sites in the Colorado Desert. Paleo-Indian/San Diegito Culture sites (ca. 10,000 – 8,000 B.P.) and Early Archaic sites (ca. 8,000 – 4,000 B.P.) are extremely rare, especially at lower elevations within the region. These early sites are typified by sparse remains on desert pavements, often on mesas and terraces overlooking larger washes. Schaefer (1994:64) suggests that "these are zones where a variety of plant and animal resources could be located and where water would at least be seasonally available." However, it is much more likely that this is simply a matter of landscape development since the Late Pleistocene; these mesas and terraces, with well-developed desert pavements, represent the differential preservation of older landsurfaces at higher elevations.

The project area, and lower elevations within the Colorado Desert in general, appear to have experienced climatic and vegetation regimes similar to today, for most of the Holocene (ca. 11,000 years; Schaefer 1994:60-63). The creosote-scrub habitat that typifies the project area was established at lower elevations by the Late Pleistocene, indicating that people inhabiting the area would have had access to similar natural resources throughout much of prehistory. Numerous studies throughout the region, particularly the Mojave, have demonstrated relatively significant climatic, precipitation, and vegetation fluctuations throughout the Holocene (Kaijnkoski 2008). However, these studies have generally been in much higher elevations than the Yuha Desert. Those that have focused on lower areas have shown much less environmental change, likely due to the preponderance of precipitation in these low-lying areas within the rain shadow of large mountain ranges (Weide 1976). The major fluctuation in available resources within the study area through time then, and the concomitant placement of various site types on the landscape, is directly related to the episodic filling and desiccation of Lake Cahuilla (discussed below).

None the less, regional climatic trends through the Late Pleistocene and Holocene are important to the current study because of effects at higher elevations and the production of material for alluvial fan deposition. Unlike many regions in the arid basin and range, we cannot use the record of Lake Cahuilla high and low stands as indicators of local environmental change. Lake fluctuations within the Salton Basin are primarily related to structural changes in the Lower Colorado delta, and the construction or breaching of a natural dyke. These changes may or may not be environmentally dependent, and thus have little bearing on the timing of deposition–erosion cycles in the Yuha Desert. Instead, we must rely on environmental fluctuation data from nearby regions, such as the Mojave, for the timing of these events.

It has been widely demonstrated that a significant period of alluvial-fan deposition occurred in the Basin and Range during the Pleistocene-Holocene transition (McDonald et al. 2003:198). Within the Soda Mountains of the Mojave Desert, alluvial fan deposition resumed around 6,000 years ago, corresponding with a resurgence of Lake Mojave (Harvey and Wells 2003). Two later episodes of fan deposition occurred around 3,000 years ago, likely associated with changes in the North American Monsoon and an increase in effective moisture at the onset of the Late Holocene, and again during the past 1,000 years, possibly due to climate changes associated with the Medieval Climatic Anomaly. These periods of punctuated fan deposition correspond with

those observed elsewhere in the region, and are assumed to have affected the Solar 2 study area as well.

Identification of Major Landforms within the Project Area

The Solar 2 study area represents a microcosm of the geomorphic conditions that exist in the Yuha Desert. Pliocene and Pleistocene nonmarine sedimentary rock outcrops are located along the southern boundary of the study area. These formations mantle the uplifted Pliocene marine outcrops, which form the Yuha Buttes, just south of the study area (Figure 1). The nonmarine rock outcrops within the study area are heavily dissected (eroded) and mantled by Quaternary fan piedmonts. More recent fan aprons issue from the leading edge of these piedmonts and reach to the paleo-shoreline of Lake Cahuilla, where various beach deposits are also located. As with most large alluvial fans, these Quaternary landforms are actually comprised of numerous remnants and more recent deposits of varying ages. By examining the relationship between these landform components we can develop relative age estimates, conclusions as to the depositional history of that landform, and the potential of each landform to harbor buried paleosols of appropriate age.

Before beginning such a discussion, however, a common set of descriptive landscape terms and definitions is necessary. Many different terms are used to describe desert geomorphology, with vastly different implications of scale, accuracy, and implied formation processes. “Alluvial fan” and “bajada” are two common terms that are often misleading because they are used to refer to different types of depositional and erosional landscapes and subsume numerous smaller landform components. The terminology adopted in this study follows after Peterson (1981) because the classification system emphasizes the temporal and spatial relationship between landform components, and was devised in relation to the study and classification of Basin and Range soils− making it highly relevant to the current geoarchaeological study. Diagrams showing the basic major landforms are provided in Figure 2. A discussion of these various landforms is provided in the following sections, with direct reference to the Solar 2 study area.

Dating Alluvial Desert Deposits

The major landforms within the Yuha/West Mesa region were largely constructed during Pleistocene time or earlier (California Department of Conservation 1984; Strand 1964). As suggested by Peterson (1981:4), by “mid-Pleistocene time… parts of these major landforms [began to be] cut away by periodic erosion or buried by periodic sedimentation… This resulted in a mosaic of old, remnant land surfaces and relatively young land surfaces.”

The age of alluvial deposits within the project area is of central concern because it is the single most important factor in constraining the possibility of buried archaeological deposits. Older land surfaces− those that were deposited prior to human occupation in the Americas (ca. 13,000 years ago) and which are still exposed on the surface− have very little possibility of containing buried archaeological deposits. On the other hand, younger land surfaces, if deposited in the right location, with low enough energy, may bury and preserve archaeological material previously deposited on an older surface. However, if these younger deposits unconformably overlie heavily eroded older formations, any archaeology that may have originally been deposited on the older surface would be effectively destroyed.

Unfortunately, dating of alluvial fan deposits is difficult and there is significant variation in the precision of various methods used in determining relative and numerical ages (McDonald et al. 2003:190). Two primary, non-chronometric methods (e.g., not carbon-14, thermo-luminescence), are used for determining the age of desert alluvial landforms: soil development and desert pavement development. Figure 3 provides a graphic representation of pavement and subsoil horizon development through time in desert environments. Both of these methods are heavily

dependent on environmental factors such as temperature, precipitation, and parent material. As such, they are most effective within a confined relatively homogeneous area, such as the Solar 2 project area.

While desert pavement formation is dependent on factors of time and climate, parent material also plays a major role. In general, alluvium derived from plutonic (e.g., granitic) sources form much weaker pavement– with fewer interlocking stones and less evident varnish– than volcanic and limestone sources (McDonald et al. 2003:193). In the Solar 2 project area, granite is the dominant parent material within the older fan piedmont. Some portions of the fan piedmont are also derived from Pliocene marine formations (i.e., the Yuha Buttes)− as evidenced by reworked fragmentary fossilized marine shell− but are generally well mixed with granitic material. The younger inset fans and fan aprons consist primarily of reworked material from the older fan components. Given the predominance of granitic parent material, we can expect that desert pavements within the project area will be much weaker than in other areas of the Colorado Desert, where more resistant parent material may be present. None the less, comparison of pavement surfaces within the project area should provide a reliable estimate of relative age. Unfortunately, due to heavy OHV use within the project area, some older pavement surfaces have been severely disturbed and may appear younger than the landform actually is.

As such, perhaps a more reliable estimate of landform age within the project area is soil horizon development. Due to the time-transgressive nature of soil development in arid environments, the stage of calcium-carbonate (k) illuviation and development and the degree of B horizon development are identifiable markers of age (McDonald et al. 2003). In this study of the Solar 2 project area, the degree of desert pavement formation and calcic horizon formation were used in conjunction as indicators of landform age during field studies. In addition, more typical soil classifications were made on exposed profiles in order to assess pedogenic processes at play in the project area.

Master soil horizons were defined using standard United States Department of Agriculture soil taxonomy (Soil Survey Staff 2006). This organizational system uses upper-case letters (A, B, C) to describe in-place weathering characteristics. Most horizons and layers are given a single capital letter symbol where: “A” is the organic-rich upper horizon developed at or near the original ground surface; “B” is the horizon formed in the middle of a profile, with concentrations of illuviated clays, iron, etc., and general changes in soil structure; and “C” is the relatively unweathered parent material which the other soil horizons formed upon.

These master horizons are preceded by Arabic numerals (2, 3, etc.) when the horizon is associated with a different stratum; where number 1 is understood but not shown, and lower numbers indicate superposition over larger numbers. Lower-case letters are used to designate subordinate soil horizons (Table 1). Combinations of these numbers and letters indicate the important characteristics of each major stratum and soil horizon, from which inferences about deposition and pedogenic history can be drawn.

Table 1. Subordinate Distinctions Within Master Soil Horizons

Subordinate Horizon	Description
c	Cementation or induration of the soil matrix
k	Accumulation of pedogenic carbonates, commonly calcium carbonate.
ox	Oxidized iron and other minerals in parent material (C-horizon)
t	Accumulation of subsurface silicate clay (illuviation)
v	vesicular soil development
w	Development of color or structure with little apparent illuvial accumulation

Methods and Results

Major landforms within the project area were initially identified using 1x1 meter resolution black-and-white aerial photography. Given these designations, certain broad assumptions could be made about the age and depositional history of each portion of the project area. This mapping and assumptions were verified and modified in the field, through on the ground examination of the landscape and key indicators such as relative slope, desert pavement development, and subsoil formation. The latter was largely examined in soil profiles exposed in active or recent stream channels, smaller erosional side slopes on the fan piedmont, and at least two older unfilled backhoe trenches that were discovered during the course of field investigations. The combined results of this study are shown in Figure 4 and summarized in Table 2. The following is a discussion of these results.

Table 2. Summary of Geoarchaeological Sensitivity of Landforms within the Solar 2 Study Area

Landform	Age	Depositional Regime*	Sensitivity
Rock Outcrops	Pliocene	Erosional	None
Fan Piedmont (and remnants)	Pleistocene	Erosional	Very Low
Fan Apron/Skirt	Pleistocene to Holocene	Depositional	Low to Moderate
Lake Basin (Beach Zone)	Holocene	Depositional	Moderate

Table 2. Summary of Geoarchaeological Sensitivity of Landforms within the Solar 2 Study Area

Landform	Age	Depositional Regime*	Sensitivity
Lake Basin (Lower Lake Basin)	Holocene	Variable	Low to Moderate
Recent/Active Channels	Late Holocene	Erosional	Very Low

*Represents the dominant regime since the terminal Pleistocene

Fan Piedmont (Sensitivity: Very Low)

The fan piedmont, which makes up the majority of the project area (Figure 4), is actually a complex of component landforms dominated by erosional fan remnants, erosional sideslopes and gullies, and inset fans, which themselves have been further eroded and redeposited downslope. In general, the landscape is heavily dissected. Peterson (1981:22) suggests that the fan piedmont is generally made up of "contiguous or imbricated mantles deposited during the Pleistocene… [and] collectively the portion of the fan surface that they form are all so old that their soils have relict features reflecting past Pleistocene climates."

The majority of exposed surfaces within this area are very old fan surfaces with moderately well-developed pavement and overthickened calcic subsurface soil development. The subsurface exposures suggest a much older landscape than might be initially assumed from pavement development (Figures 5 through 8). The lack of well defined, late-stage interlocking desert pavement, which is often seen in other parts of the Basin and Range, is due to two primary factors: parent material and historic land use (see previous discussion). Material for the fan piedmont within the Solar 2 Project Area appears to be largely derived from a granitic parent source. The granite is easily weathered and, when exposed on the surface, decomposes to fine grain material− as evidenced by the large amount of decomposing granite that makes up subsurface soils and fills the gullies between interfluves. Extensive OHV use of the project area further degrades these pavements and exposes the surface to further erosion (Figure 5b).

The lack of very well-developed pavement on some older surfaces within the project area also has an effect on erosion and subsurface soil development. Figures 5a, 7a, and 8b show typical very old soils within the fan piedmont, where strongly developed, Stage III to IV calcic horizons extend to, or very near, the surface. In some cases, this is the direct result of soil horizons typically found in the upper portions of the profile (e.g., an Av-horizon) having been eroded away. In others, it is simply that the calcic development is so advanced that the typically vesicular Av or BAv horizons have been infilled and incorporated and cemented by calcium carbonate.

Figure 5a shows a representative profile from the central portion of the fan piedmont. The exposure shows a Stage III−IV calcic sandy loam soil overlying and incorporating a very high energy bed load of rounded granite cobbles. This high energy contact overlies (most likely as an erosional unconformity) a much older, thinly bedded terrestrial poorly consolidated formation. Several petrocalcic laminae can be seen throughout the upper profile. Despite the antiquity of the overlying alluvial fan deposits, the desert pavement at the surface is very weak, with countless overlapping tire tracks indicating that OHV mechanical erosion has likely played a significant role.

A quite different but equally well developed soil profile, from the northern lower-elevation portion of the fan piedmont, is shown in Figure 7. This profile shows a surface horizon that appears to be an altered Av, with very strong calcic and silt matrix supporting primarily decomposing granite sand and gravels. This may indicate that previously formed upper horizons have been eroded away or that significant amounts of calcium carbonate have been precipitated into the upper horizon through eolian silt and/or dissolved in surface sheet floods. Underlying the upper calcic cemented horizon is a partially oxidized and cemented gravelly loam. This, in turn, overlies a thick, well developed argillic Btk horizon with strong blocky structure and very common large carbonate inclusions and sills. A large crack at the side of the profile (Figure 7b) has a very thick carbonate lining which diminishes with depth, indicating that carbonates are leaching through the column. This well developed B-horizon overlies a C-horizon of reddish-brown oxidized decomposing granite sands with some carbonate concretions (Coxk), which in turn overlies primarily unaltered, thinly cross-bedded lenses of decomposing granite sand parent material (C). A general fining upward sequence is observable throughout the profile. An outcrop along a large erosional sideslope just east of the profile shows that the well developed soil overlies a dark, strongly cemented fine-grain sandstone (Figure 8a).

The soils and land surfaces observed throughout the fan piedmont suggest an antiquity that precludes any significant buried archaeological deposits that are not at least partially evident on the surface. In general, the dissected fan piedmont consists of very old (Late Pleistocene or older) alluvium mantling uplifted non-marine formations. No buried paleosols were observed in the cuts and profiles examined within the fan piedmont. Soils and pavements developed at or near the surface are consistent with Late Pleistocene or older alluvial deposits dated by other studies in the region (e.g., McDonald et al. 2003, Harvey and Wells 2003).

The greatest− perhaps only− potential for buried archaeological deposits within the fan piedmont exists in the larger Holocene inset fan drainages, where recent fine grain alluvium *may* have been deposited as an inset pediment, prior to scouring of the surface by the actively incising drainage (Figure 4). In general, these inset fan portions are unlikely to contain buried archaeology because they were largely laid down unconformably on eroded Pleistocene deposits. The preservation of archaeological material is wholly dependent on the erosional history prior to deposition of the fine grain pediment. Given the highly erosive nature of the fan piedmont in general, this type of localized subsurface preservation seems unlikely. However, these isolated areas appear to represent the only possibility for preserved subsurface archaeology− with no surface manifestation− within the fan piedmont region of the project area. If cultural deposits are present under these isolated inset pediments, they will most likely be very similar, both in quality and quantity of artifacts, to those sites found on the surface in nearby remnant portions of the fan piedmont.

Fan Apron/Skirt (Sensitivity: Low to Moderate)

Often termed a fan skirt, this portion of the project area is defined by a broad area at the base of the fan piedmont, where the finer grain material eroded from the fan piedmont is deposited on the basin floor. In this case, the fan skirt actually consists of a number of fan “aprons” which do not individually fully cover the entire area, and which interfinger and partially bury one another and piedmont remnants.

The large fan aprons that dominate the central portion of the study area enter the basin floor up to 3 km from the Lake Cahuilla high shoreline, and extend up to and, in some places, past that line. Where the aprons appear to extend past the shoreline, we can assume that these aprons were deposited after the last high stand (ca. 1700 A.D.) as they have not been modified by lake actions (either erosional or depositional). Though erosive braided channels make up a portion of each successive fan apron, especially at the head of the aprons as they usher from the piedmont, a significant portion of each apron is also comprised of thin alluvial mantles deposited to the side of

each channel. Younger apron deposits may cover, or partially cover through the infilling of swales, older apron deposits.

Figure 9 depicts a soil profile observed in the northwest portion of the fan apron complex, just east of the interface with the fan piedmont. The exposure, in a moderate size shallow gradient drainage, appears to represent a series of at least two master soil profiles. The upper unit consists of a surface vesicular horizon (Av) approximately 4-5cm thick, grading to an ABv horizon of sands and gravels (clast supported) with weakly developed columnar structure and fine rootlets. This horizon overlies a thick but weakly developed Btk horizon with a weak blocky structure and thin clay accumulations on grains and voids, which in turn sits on top of an unusually thin C-horizon of relatively unweathered, poorly sorted coarse sands and fine gravels that have been slightly oxidized. This low-energy alluvial deposit overlies a second, older unit. The lower unit appears to have been partially truncated, with a small amount of heavily oxidized coarse sands (remnant Av?) incorporated into the upper portions of a Btk horizon with strong blocky structure, well developed clay films, and common root holes. This horizon has developed on a brownish-yellow moderately sorted fine to medium sand, with trace larger grains and gravels. This lower unit may be contemporaneous with lower portions of the fan piedmont, representing the finer toe-slope of those fan units.

The surface soil, although relatively thin, is more well developed with a higher organic humic and illuviated clay content than would be expected of younger Holocene soil (McDonald et al. 2003). This may be attributable to the near-drainage low-gradient location of the profile, where vegetation cover and moisture content may have been higher through time than surrounding locations. While the contact between these two soil units appears to be at least partially erosional, it does indicate the possibility of buried surfaces (and potentially associated archaeological deposits) within the more recent Holocene alluvial fan aprons. Additional evidence for burial of older surfaces within the fan apron area is seen in other locations as well.

Figure 10 represents the largest vertical exposure observed within the fan apron area. The profile is telling as to the larger formation processes that have influenced the project area, as well as the potential for buried paleosols. Figure 10a shows a series of well cemented thick clay and sand beds, uplifted and tilted to the east between 25 and 30º. This very old formation has been uplifted and deformed by the same tectonic forces that created the Salton Trough, with lateral extension combined with uplifted blocks forming the bounding mountains to the east and west of the Trough. Several ancient minor fault planes can be seen in the continuous profile. It is this same tectonic action that has caused continued uplift and erosion of the fan piedmont.

The deformed older formation is unconformably overlain by much more recent shallow Holocene alluvial fan deposits, suggesting a long period of significant prior erosion. Two fan units are observable in Figure 10b, separated by a remnant pavement of larger gravels and cobbles. The upper unit (2) consists of a 50 cm thick deposit of sandy loam with Stage I calcic development, that pinches out to the west, where the buried unit and pavement become exposed at the surface. The lower, older unit (1) is approximately 35 cm thick and consists of a similar sandy loam with more frequent and larger gravels and cobbles and weak Stage II calcic development. The exposed surface pavement of the older unit is only slightly stronger than the younger unit feathered on top of it.

The lack of soil development within the capped alluvial unit, and the similar degree of pavement development between the two units suggests that this buried portion of the lower alluvial fan deposit may not have been exposed at the surface for an appreciable amount of time; thus reducing the potential for extensive buried archaeology on that surface. None the less, it demonstrates the potential for (shallowly) buried preserved surfaces within the fan apron area. Figure 11 shows much more obvious examples of a younger Holocene fan apron overlying an older remnant apron surface.

Lake Basin

The lake basin portion of the project area consists of at least two distinct components: (1) the nearly flat lake basin itself ("lower lake basin"), which represents the abandoned Lake Cahuilla basin, and (2) the interface between that basin and the fan apron. The lake basin−fan apron interface consists of the Lake Cahuilla highstand shoreline, and a beach zone associated with that shoreline and its most recent recession.

Beach Zone (Sensitivity: Moderate)

Figure 12b shows the typical landscape of the beach zone near the Lake Cahuilla highstand of 12 meters above mean sea level (AMSL). The undulating landscape consists of (generally from west to east) beach flats, sand berms and deflated beach sands that are consistent with the multiple formation and recessional events of the maximum Lake Cahuilla shoreline between at least 1200 and 1700 A.D. (750−250 B.P.; Laylander 2006). Figure 12a shows a nearby profile in the beach deposits. The profile consists of a very weakly developed soil overlying unmodified beach sands with no matrix (i.e., fines). The beach sands are non-cohesive and are bedded in 5−15 cm thick lenses, varying from coarse subangular to rounded sand and small gravels (nearshore?), to medium and coarse well rounded sands (foreshore?). The overlying very weakly developed soil is approximately 45 cm thick, and consists of an incipient Aw-horizon with fines (silts and clays) introduced either through eolian transport or very low energy fluvial sheet wash, and an incipient B-horizon with very limited clay films on small root holes. A small piece of charcoal as well as evidence of bioturbation (krotovina) can be seen in Figure 12a. No evidence of cultural material was seen in the profile.

Although no buried soils or cultural materials were identified in this portion of the shoreline, the beach zone and the interface with the fan apron is considered the most likely area for site deposition and preservation within the study area. Given the dynamic, but generally low-energy depositional nature of geomorphic processes at the distal fan apron-beach-lake basin interface, the potential for site burial is heightened. Regionally, prehistoric surface site density and complexity is notably higher within the region adjacent to the Lake Cahuilla shoreline (URS 2008). Given the resource potential of Lake Cahuilla in the otherwise sparse Yuha Desert, this pattern is not unexpected. A similar pattern should also be seen at all periods and locations of Lake Cahuilla shorelines since the Late Pleistocene. However, in order to more accurately assess the potential for prehistoric shoreline sites within the study area, we must know when and at what height Lake Cahuilla existed throughout prehistory.

Significant effort and thought has been put into this archaeological question over the last century. A recent summary of various findings and hypotheses related to the impact of Lake Cahuilla's fluctuations on prehistoric peoples and archaeology is presented by Laylander (2006). Unfortunately, the majority of these studies are purely theoretical, limited by the time depth of documented 12-meter lake highstands (approximately 1,000 years) and other evidence of prehistoric lake desiccation buried deeply within the lake basin (Waters 1983). However, very recent isotopic studies have begun to greatly expand our understanding of the nature and extent of Lake Cahuilla during the Late Quaternary.

A study by Li *et al.* (2008a) of carbonate tufas from 24 meters below sea level in the Salton Basin provides intriguing evidence that a lake existed more or less continuously in the basin between 20,500 and 1,300 years ago. No hiatuses in tufa formation were observed over this period and, given that under current climatic conditions it would take only 30 years for a completely filled Lake Cahuilla to desiccate to -24 meters AMSL (above mean sea level; Wilke 1978), it suggests that at least a portion of the Colorado River flowed into the Salton Basin during that entire time span. While there is evidence for brief shifts of the Colorado River away from the basin between 8000-7000, and at 3050, 2180, and 1660 cal B.P., this investigation failed to identify any complete

desiccation episodes during almost the entire span of human history in the Salton Basin (Li et al. 2008b).

In light of this new evidence, an important research agenda for future geoarchaeological analysis of the region will be to identify the locations of prehistoric lake shorelines and the potential for preservation of associated archaeological sites. However, in relation to our current study area, some basic inferences may be made about prehistoric lake levels.

The most recent Lake Cahuilla highstand of 12 meters AMSL was dictated by the elevation of natural levees formed by the Colorado River delta, which were over-topped when the lake reached that elevation. It may be reasonable to assume that these delta levees acted as the ultimate control of maximum lake height throughout the Late Pleistocene and Holocene. However, the elevation of the Colorado River delta system has almost certainly changed significantly over the last 20,000 years.

As with other major delta systems in California (e.g., the San Joaquin and Sacramento River deltas in the San Francisco Bay Area) delta formation is largely dictated by sea level (Shlemon and Begg 1975). During the last glacial maximum 15,000 years ago, global sea level was over 90 meters lower than today. As the ice sheets began to melt, sea levels began to rise substantially between 15,000 and 11,000 B.P., at a rate of 13 meters every 1,000 years. This rate decreased to about 8 meters every 1,000 years between 11,000 and 8,000 B.P., at which point sea level rise slowed considerably. Between 6,000 B.P. and the present, sea level has risen at an average rate of a little over 1 meter every 1,000 years. As the base level rises, river systems deposit material at higher elevations, essentially retreating or prograding.

Prior to 6,000 B.P. maximum lake levels may have been controlled by other geological factors (e.g., bedrock). Deltaic levee control of maximum lake stands may not have played a major role until the Middle or Late Holocene, when sea levels began to stabilize and approach modern levels. Lake highstand shorelines were likely much lower for the majority of the Late Pleistocene and Early Holocene, and probably well outside of the current study area. This hypothesis is supported by the Li *et al.* (2008b) analysis of tufas collected from 8 meters AMSL, which did not begin accretion until approximately 5,000 B.P., suggesting that deltaic controls may have started to play a role at this time. Interestingly, this is precisely when the modern Sacramento-San Joaquin Delta began to form (Shlemon and Begg 1975). Based on this evidence, and an apparently much lower height of Lake Cahuilla prior to 5,000 B.P., we may expect that pre-Middle Archaic sites related to the Lake Cahuilla shoreline will be absent from the study area.

Several potential problems exist with the Li *et al.* reporting (2008a, 2008b), including only cursory treatment of the reservoir effect on alteration of 14C dates derived from the tufa, and no discussion of evidence for depositional hiatuses (i.e., lake recession) which should be readily evident in the higher elevation (8 meter AMSL) tufa. None the less, their initial findings are significant and have dramatic implications for understanding the nature and extent of the Late Pleistocene and Holocene Lake Cahuilla.

Lower Lake Basin (Sensitivity: Low to Moderate)

Very few exposures were available for examination within the low-lying lake basin portion of the study area. The landsurface within the lake basin is generally very flat to very gently sloping, with a thin mantle of latest Holocene alluvium and eolian silts overlying lake silts and clays. Vegetation cover in this portion of the project area is slightly denser than adjacent areas, due to the termination of seasonal washes within the basin and the greater water holding capacity of the fine lake sediments.

Figure 13 depicts a large vertical profile which was developed in a foreshore environment, perhaps related to the large embayment depicted by the proposed Buckles and Grant (n.d.) Lake Cahuilla highstand shoreline (Figure 4). The profile is primarily made up of thick deposits of grey fine sand and silt that may be a combination of Colorado River supplied lake sediments, and fines flushed into the lake by the stream/wash that once terminated nearby at the shoreline. Discrete oxidation at the surface of and within the lake sediments indicates periodic wetting and drying. At least two beach sand lenses are identifiable within the profile. The upper beach deposit caps the exposure, likely representing the last Lake Cahuilla recession, and contains numerous fresh water gastropods at the contact with the underlying lake sediments (Figure 13b). The only buried soil developed within the profile is located approximately 1.5 meters below the surface (indicated by the north arrow in Figure 13a). This is a weak soil developed in lake sediments with a thin dark A-horizon overlying a B-horizon with weak structure (but stronger than the overlying sediments). The unit is overlain by more lake sediments, indicating that the soil is the result of a brief lowering of lake levels and the formation of a brief marshy environment which provided the organic input to the A-horizon. This poorly developed brief marshy/lake surface is unlikely to contain extensive archaeological deposits, but suggests the potential for buried paleosols within the lake basin sediments.

An early survey and compilation of site locations within the Salton basin found that sites were differentially distributed along the Lake Cahuilla shoreline, due to local geomorphology and a diverse range of shoreline types (Gallegos 1980). The study indicated that sites tend to concentrate near small bays and sandy pits where marsh habitats were more likely to develop, as well as steeper rocky shorelines, where proximal alluvial cones met the shoreline and fish traps could be more easily constructed. Additionally, a few archaeological sites have been identified on recessional beach deposits that postdate the final lake highstand. One of these is the Dunnaway Road site, located very near the project area (Schaefer 1986). The site is situated on a raised, remnant beach berm at sea level (i.e., approximately 12 meters below the maximal shoreline). No raised remnant shoreline deposits were identified in the project area below approximately 7.5 meters (25 feet) elevation. As Schaeffer (1994:72) suggests, “recessional beachlines in many areas have been destroyed by natural erosion or agricultural development.” This appears to be the case within the project area. As such, it is not anticipated that significant buried archaeological deposits, associated with recessional shorelines, are preserved within the western lake basin portion of the project area (Figure 4).

Although remnant recessional shoreline features may not be preserved, Waters’ (1983) dating of archaeological hearth features in stratified lake and alluvial sediments north of the study area, at or below sea level, indicates that there is a possibility of subsurface archaeological preservation within the lower-lying lake basin portion of the study area. However, the same processes that effect and destroy recessional beach formations have also likely disturbed archaeological sites deposited within the lake basin. Archaeological features preserved within the lake basin landform will likely be disturbed and/or fragmentary.

Conclusions

Based on a combination of aerial imagery, GIS aided analyses, existing data and literature, and intensive field verification, the Solar 2 study area has been divided into a series of geomorphic landforms. These landforms and their various sub-components have been assessed for geoarchaeological sensitivity, the results of which are summarized in Figure 4 and Table 2.

No evidence of buried cultural material was seen in any of the profiles examined during the field study. The most likely location for preservation of older buried archaeological sites within the study area appears to be within remnant nearshore beach deposits of Lake Cahuilla or under more recent Holocene alluvial deposits at the distal (eastern) end of the fan apron zone. Buried sites within this area are most likely to be younger than Middle Archaic.

Some evidence for preserved buried landsurfaces was seen in profiles throughout the fan apron area, between the older erosional fan piedmont and the shoreline. Within these overlapping fan aprons, preservation will most likely be sporadic and areally confined, dependant on minimal erosion and surface scouring through time and low-energy deposition of overlying sediments. Given these factors, and the sparse nature of most surface sites identified in the region− dominated by sparse lithic assemblages− identification of buried sites will likely be very difficult. Perhaps the most effective means of identifying potentially buried archaeological components within the fan apron area is through archaeological sites which appear to be isolated on older remnant surfaces and surrounded by younger alluvium. If the sites do not extend onto the younger surfaces, it is possible that they are old enough that they may have been partially buried by the more recent depositional event.

Given the age of landsurfaces within the fan piedmont, and no indication of buried soils of appropriate age, the geoarchaeological sensitivity of the approximately western 2/3 of the Solar 2 Project Area is considered very low. For both the fan piedmont area and the fan apron area, any potentially buried archaeological deposits are not likely to be significantly different than those exposed on the surface of remnant landforms.

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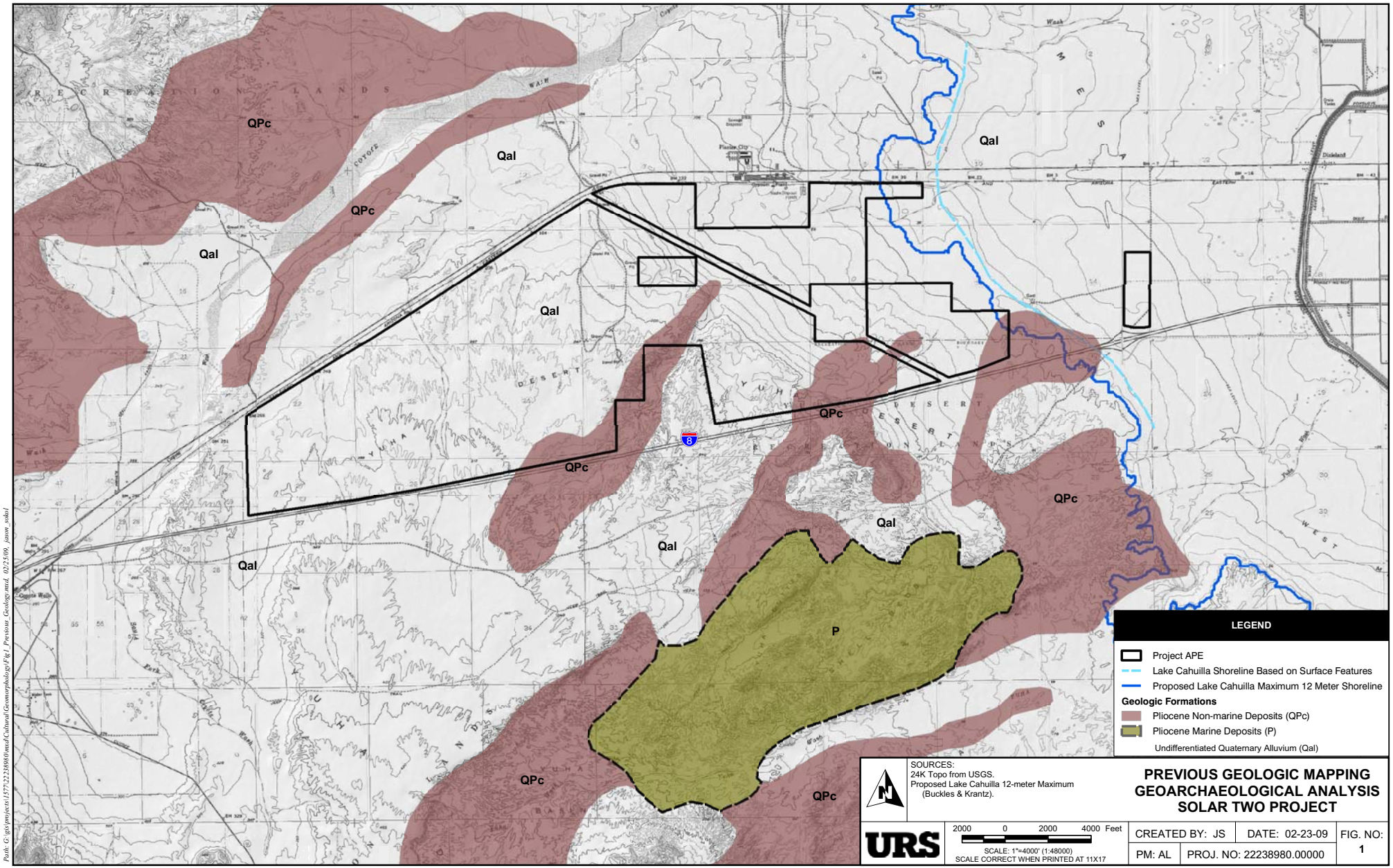

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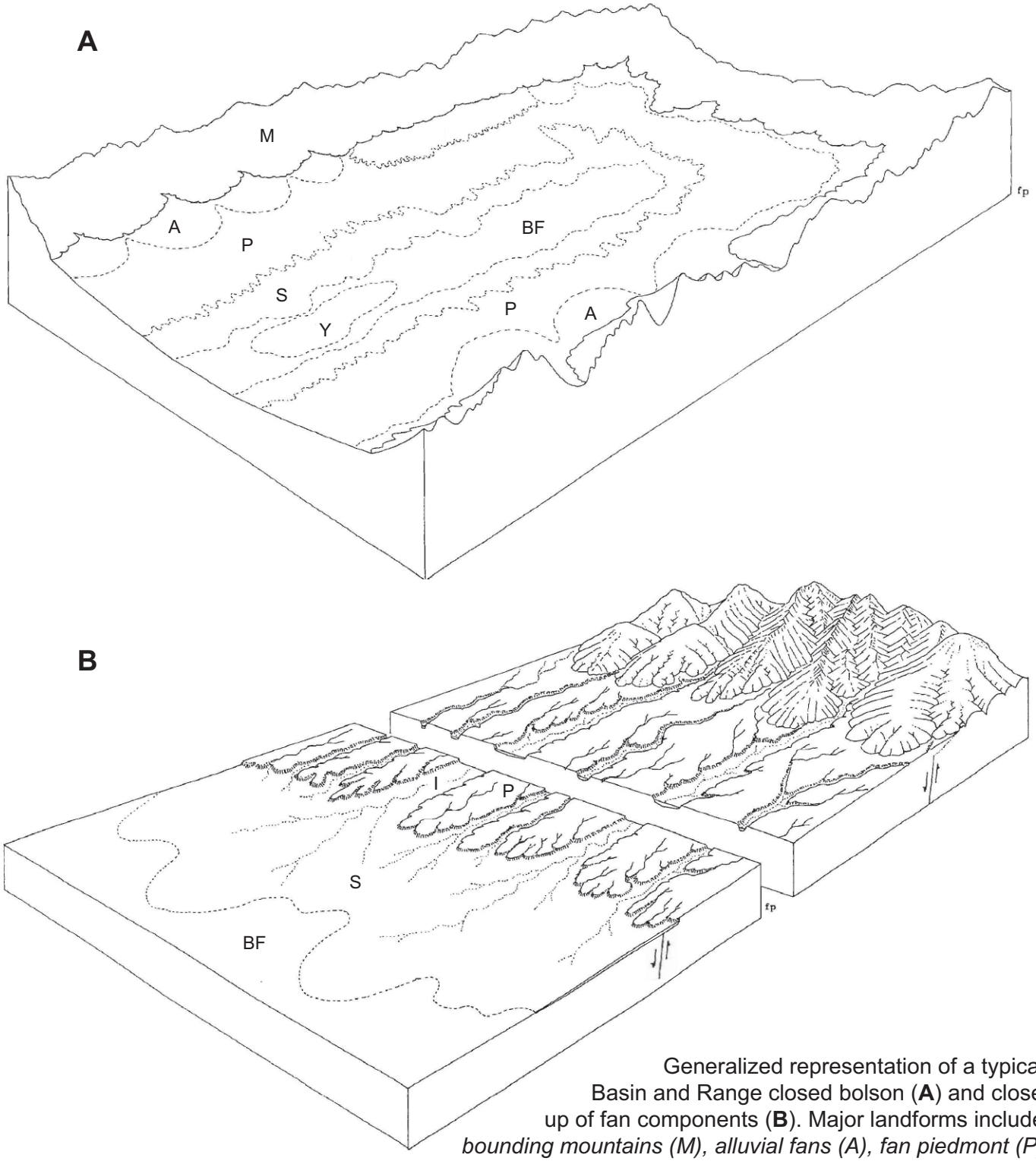

Generalized representation of a typical Basin and Range closed bolson (**A**) and close-up of fan components (**B**). Major landforms include: *bounding mountains (M), alluvial fans (A), fan piedmont (P), fan skirt* or *aprons (S), alluvial flat* or *basin floor (BF),* and *playa (Y)*. In the Solar Two study area, the fan skirt area is actually comprised of a series of interfingered aprons.

SOURCES: Peterson 1981:12,29

MAJOR BASIN AND RANGE LANDFORMS
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS

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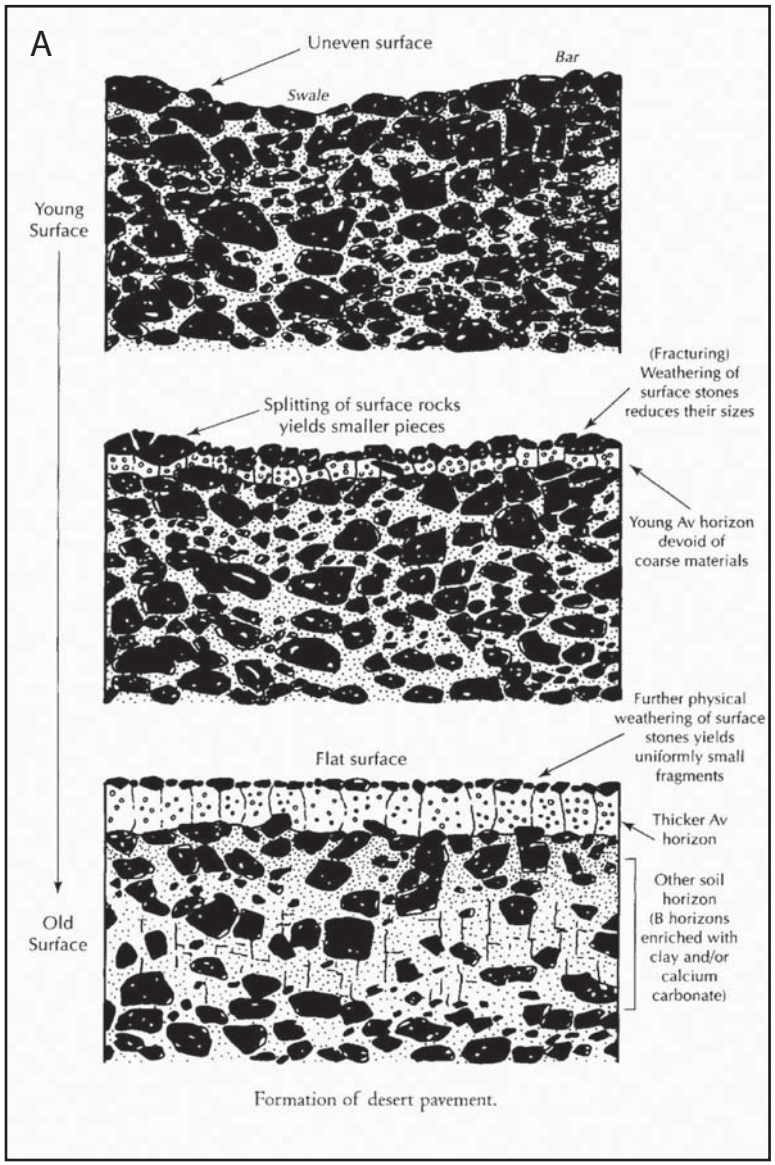

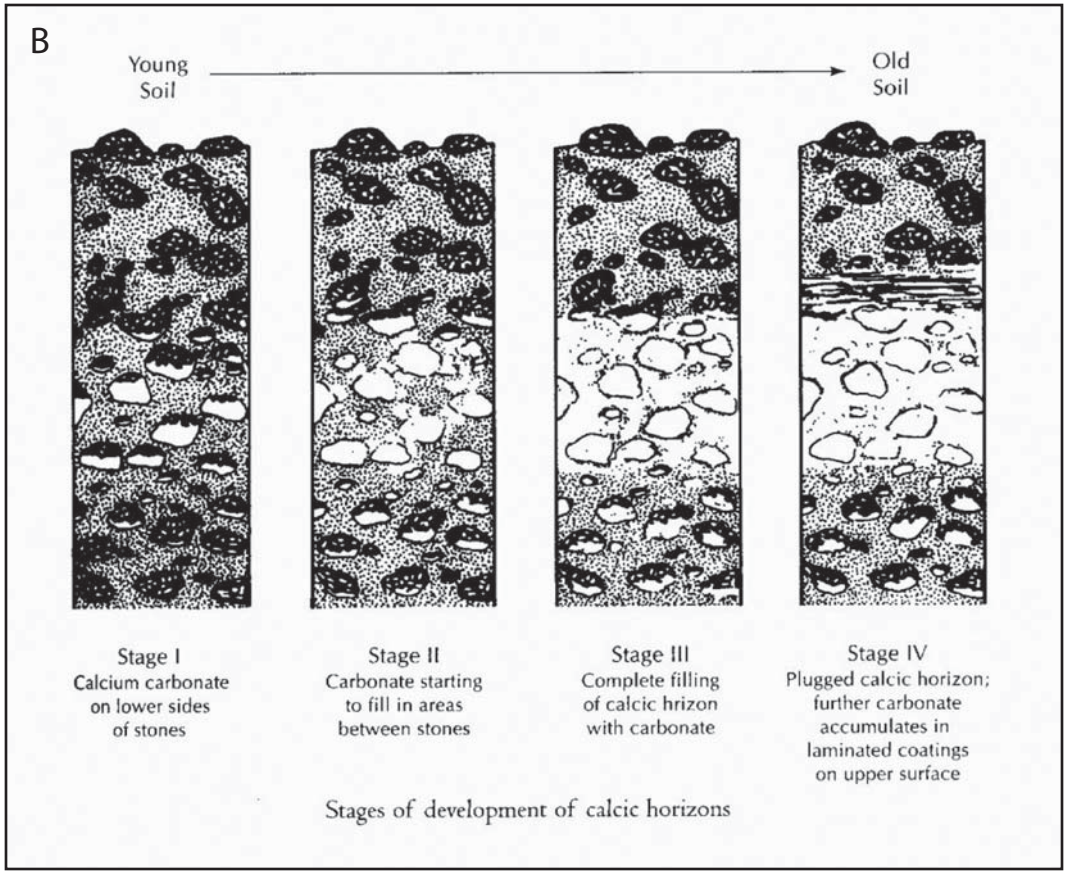

Schematic showing development of desert pavement (**A**) and stages of calcic horizons (**B**).

SOURCES: Phillips and Wentworth 2000

DEVELOPMENT OF DESERT SOIL FEATURES
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

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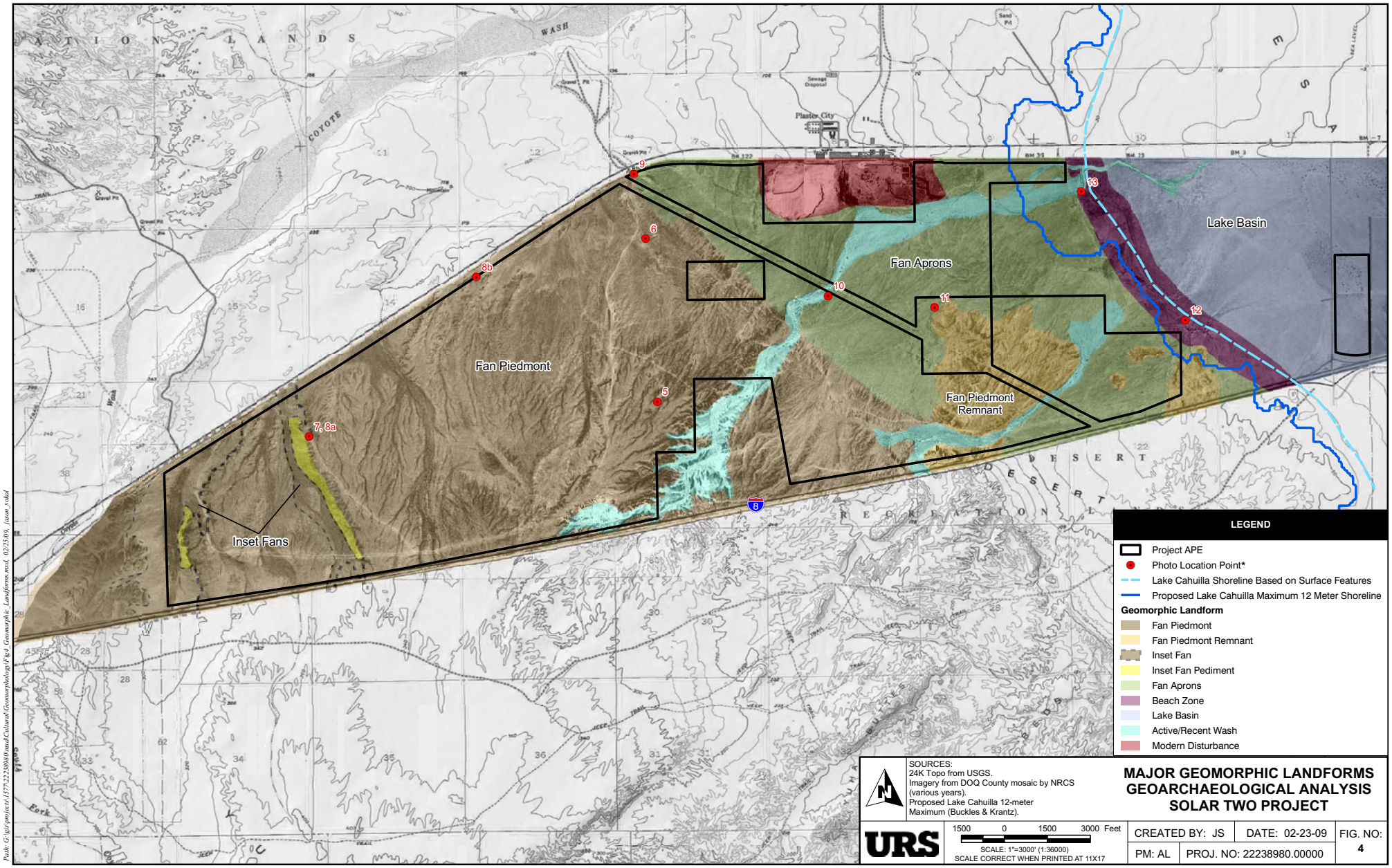

SOURCES:
24K Topo from USGS.
Imagery from DOQ County mosaic by NRCS (various years).
Proposed Lake Cahuilla 12-meter Maximum (Buckles & Krantz).

MAJOR GEOMORPHIC LANDFORMS GEOARCHAEOLOGICAL ANALYSIS SOLAR TWO PROJECT

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1500 0 1500 3000 Feet

SCALE: 1"=3000' (1:36000)
SCALE CORRECT WHEN PRINTED AT 11X17

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* Numbers shown next to photo location point represent the figure number the photo will be shown on in the report.

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(**A**) Profile in central portion of upper fan piedmont showing Stage III+ calcic development in overlying alluvium (handtool = approx. 40 cm).

(**B**) Heavily disturbed/eroded desert pavement at surface of above profile.

SOURCES:

FAN PIEDMONT PHOTOS 1
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

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(**A**) Stage III+ calcic horizon profile in erosional wash at northeastern portion of fan piedmont area.

(**B**) Intact desert pavement at surface nearby.

SOURCES:

FAN PIEDMONT PHOTOS 2
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

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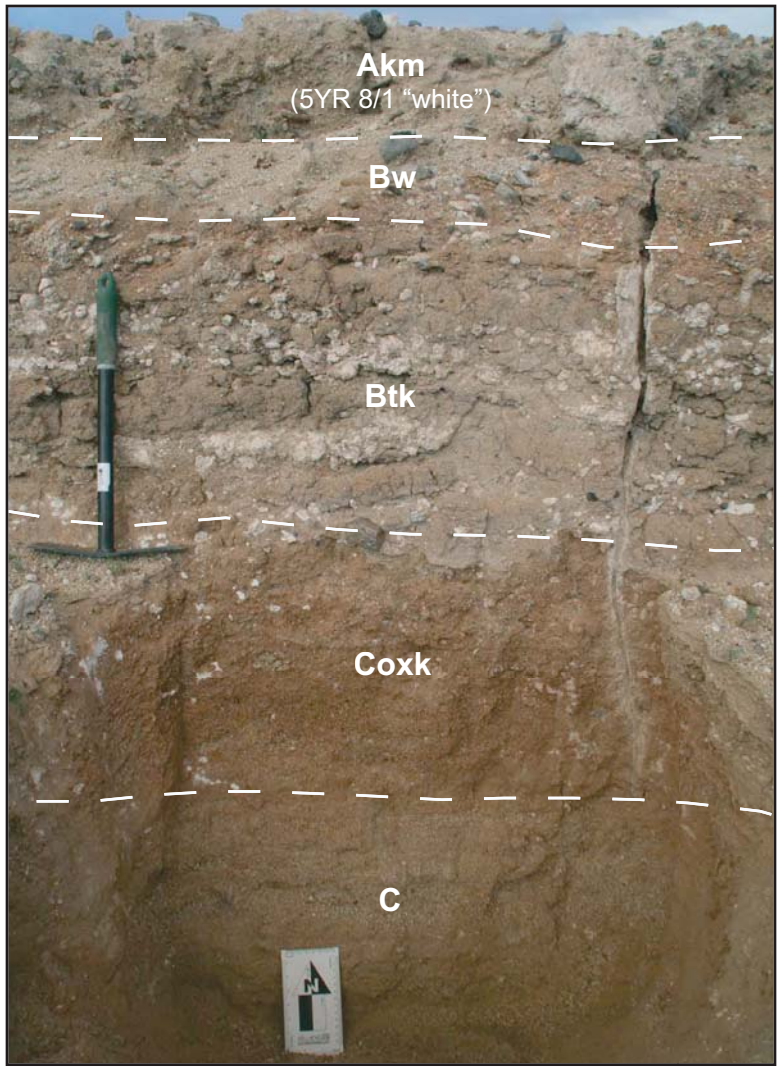

(**A**) Soil development in lower, eastern fan piedmont
(handtool = approx. 40 cm. total length)

(**B**) Close-up of calcification along fracture.

SOURCES:

FAN PIEDMONT PHOTOS 3
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

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Not to Scale

CHECKED BY: JR	DATE: 02-23-09	FIG. NO: 7
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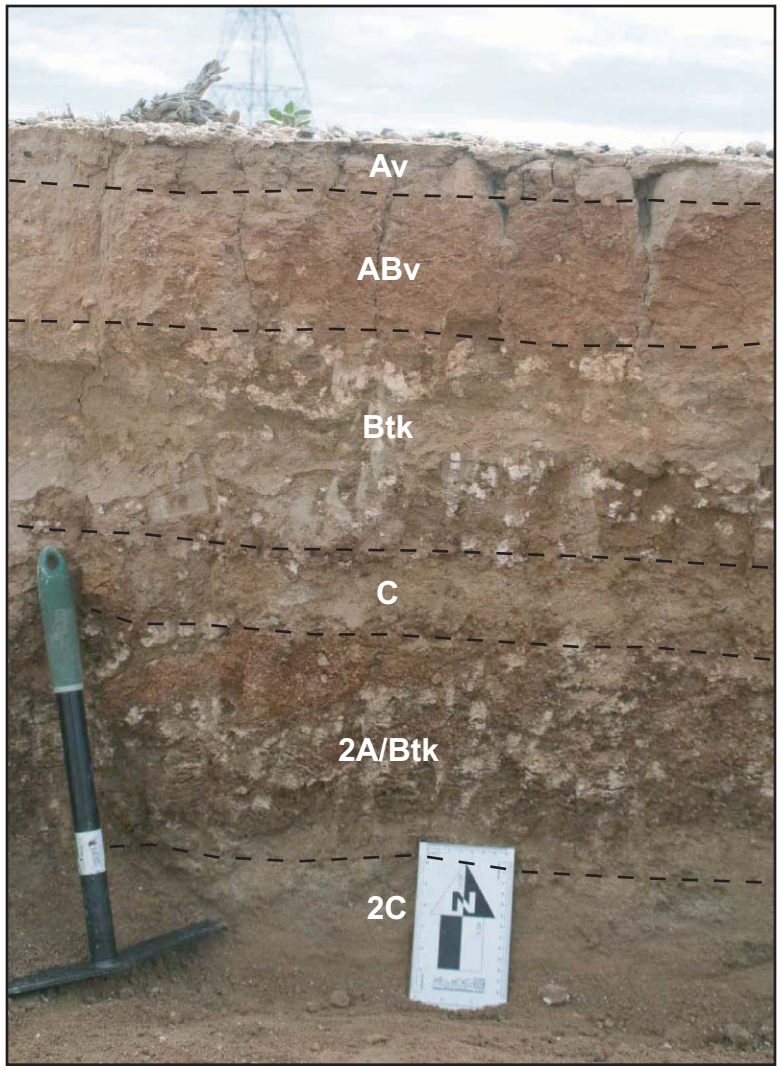
(**A**) Sandstone outcrop underlying alluvium, 10 meters east of profile in Figure 7.

(**B**) Incipient calcrete development within the fan piedmont (handtool sitting on very hard laminae).

SOURCES:

FAN PIEDMONT PHOTOS 4
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS	Not to Scale	CREATED BY: JR	DATE: 02-23-09	FIG. NO: 8
		PM: AL	PROJ. NO: 27657104.00607	



(**A**) Profile in active wash along northwestern fan apron.

(**B**) Small pebble pavement on surface of profile.

SOURCES:

FAN APRON PHOTOS 1
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS

Not to Scale

CHECKED BY: JR	DATE: 02-23-09	FIG. NO: 9
PM: AL	PROJ. NO: 27657104.00607	

(**A**) Angular unconformity in profile along active wash in central western portion of fan apron area (total profile height = approx. 2.5 meters).

(**B**) Partial burial of older pavement surface in overlying alluvial mantle (dashed line showing contact between alluvial units).

SOURCES:

FAN APRON PHOTOS 2
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

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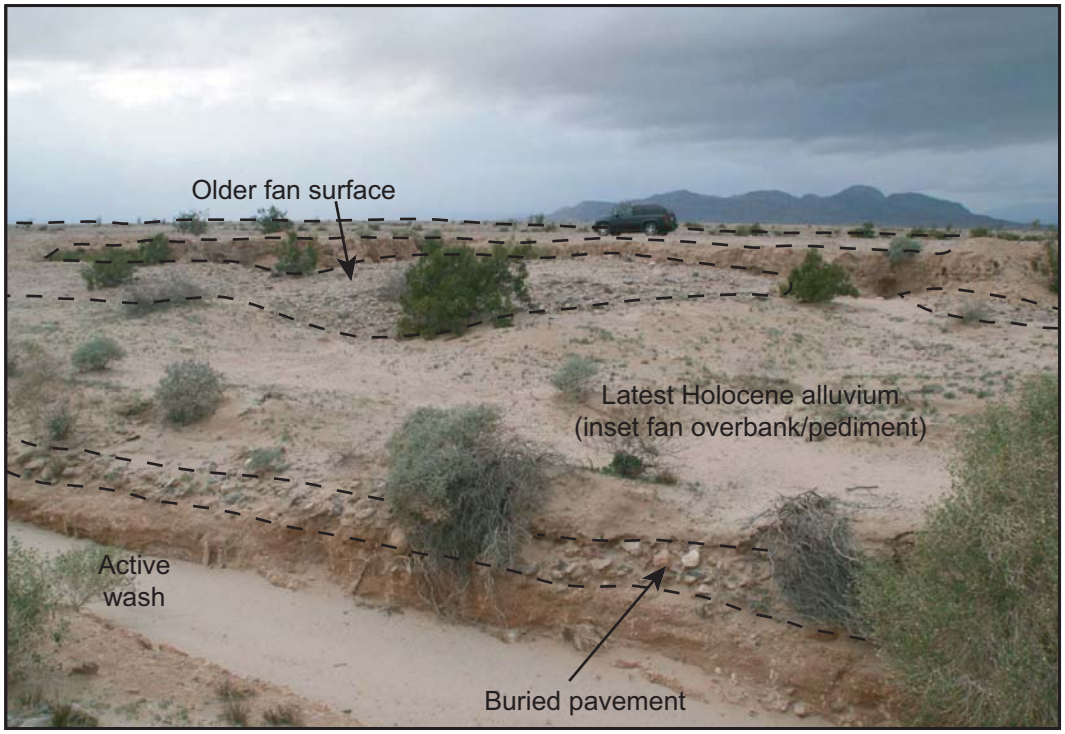
Not to Scale

CREATED BY: JR	DATE: 02-23-09	FIG. NO: 10
PM: AL	PROJ. NO: 27657104.00607	



(**A**) Isolated area of shallowly buried old fan remnant, under recent alluvium (pediment) from inset fan/active wash.

(**B**) Recent alluvial fan mantling toe of fan remnant with moderately well-developed pavemet.

SOURCES:

FAN APRON PHOTOS 3
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS

Not to Scale

CREATED BY: JR	DATE: 02-23-09	FIG. NO: 11
PM: AL	PROJ. NO: 27657104.00607	

(**A**) Very weak incipient soil development in beach deposits (handtool = approx. 40 cm).

(**B**) Nearshore beach landscape with eroded and deflated beach sands and berms (view to North).

SOURCES:

BEACH ZONE PHOTOS
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS

Not to Scale

CREATED BY: JR	DATE: 02-23-09	FIG. NO: 12
PM: AL	PROJ. NO: 27657104.00607	

(**A**) Profile in active wash at beach/lake basin interface (north arrow pointing at weakly developed buried soil).

(**B**) Close-up of freshwater gastropod shells at contact between most recent foreshore beach deposits (top) and slightly oxodized lake silts (bottom).

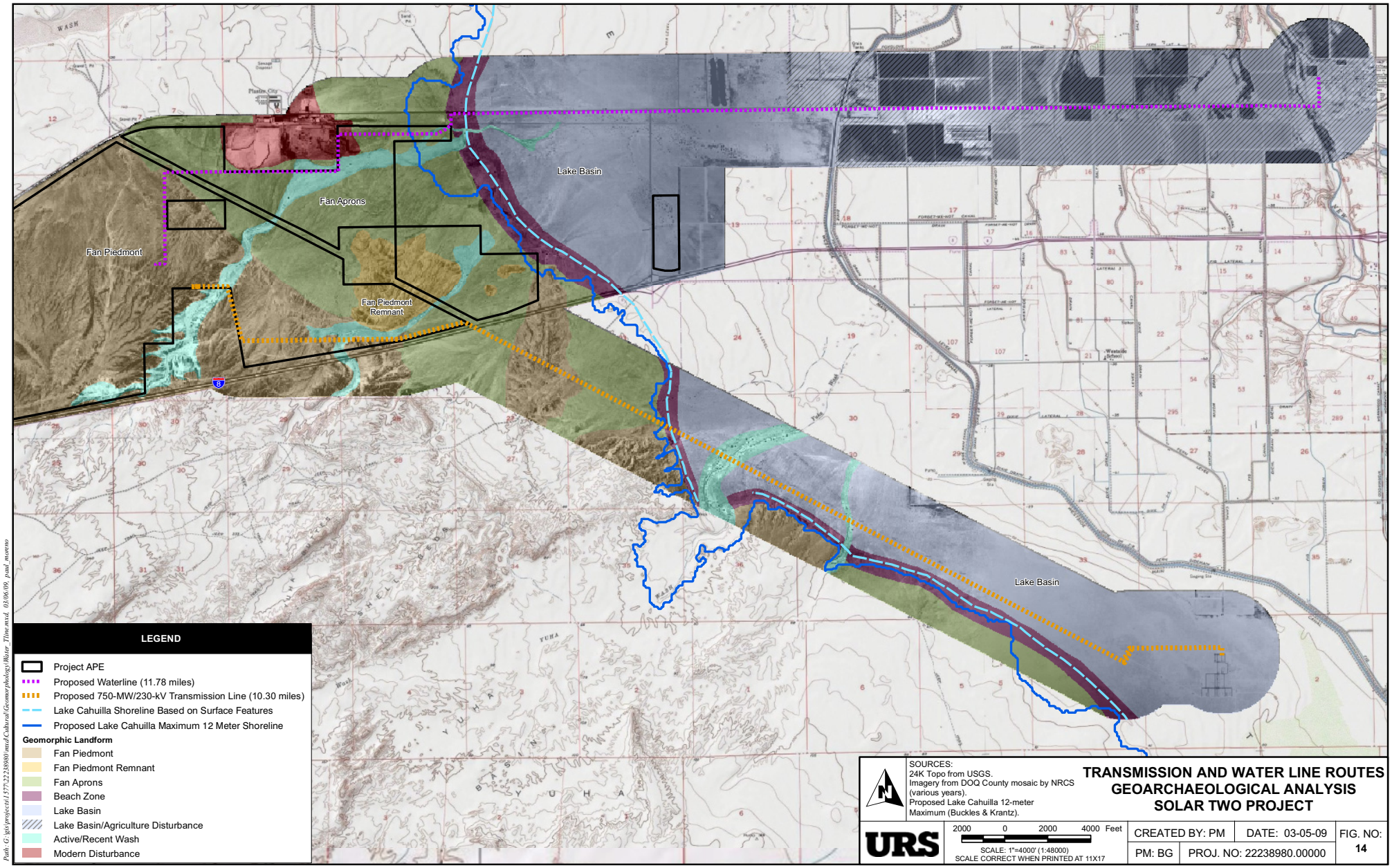
SOURCES:

LAKE BASIN PHOTOS
GEOARCHAEOLOGICAL ANALYSIS, SOLAR TWO PROJECT

URS

Not to Scale

CREATED BY: JR	DATE: 02-23-09	FIG. NO: 13
PM: AL	PROJ. NO: 27657104.00607	



SOURCES:
24K Topo from USGS.
Imagery from DOQ County mosaic by NRCS (various years).
Proposed Lake Cahuilla 12-meter Maximum (Buckles & Krantz).

TRANSMISSION AND WATER LINE ROUTES GEOARCHAEOLOGICAL ANALYSIS SOLAR TWO PROJECT

URS

2000 0 2000 4000 Feet
SCALE: 1"=4000' (1:48000)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: PM | DATE: 03-05-09 | FIG. NO: 14
PM: BG | PROJ. NO: 22238980.00000

*Numbers shown next to photo location point represent the figure number the photo will be shown on in the report.

Path: G:\gis\projects\15772\22238980\mxd\Cultural\Geomorphology\Water_Tline.mxd 03/06/09 paul_moreno

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 113: Staff requests that the applicant modify the inconsistent conventions that the applicant uses in the Technical Report to describe the geomorphic settings of the cultural resources that the applicant found in the project area of analysis to reflect more standard geomorphic conventions for landforms and subordinate landform features. The present descriptive conventions in the Technical Report, conventions such as "desert pavement terrace," "raised open terrace," and, "flat desert pavement plateau," do not help place the individual cultural resources in the context of the major landforms in the project area. The modifications to the present conventions should correlate with the results of the above research into the geoarchaeology of the project area. The modifications will enable meaningful interpretations of the distribution of found cultural resources across the project area landscape that the present descriptive conventions now obfuscate.

Response: Terminology regarding geomorphic settings in the Technical Report will be made consistent using that presented in DR 112.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 114: Using the *Cultural Setting* section of the Technical Report as a point of departure, please develop a discussion that provides the following information, particularly for the Paleoindian, and early and middle Archaic periods:

a. Sparse as the deposits may be for particular periods, what do the deposits look like on the ground?
b. What artifact types typically make up the deposit assemblages?
c. With what frequency are the types typically found in the assemblages?
d. Are features or architectural ruins deposit components?
e. Where on the landscape are period deposits found?
f. Are period deposits typically surface expressions, or are buried components known?

Response: Prehistoric site types common to the project area include (from most to least complex): open camps, with a variety of artifact classes (chipped stone, ground stone, and ceramics) and sometimes features; lithic scatters, with varying frequencies of cores, core tools, flakes, flake tools, and hammerstones; and trails, linear features with or without associated artifacts. To this basic site typology can be added isolated artifacts, which are most valuable in the aggregate. In the absence of chronometric age estimates and/or temporally diagnostic artifacts (e.g., projectile points and ceramics), assigning an age range to each of these loci of human activity is difficult and, oftentimes, impossible. The problem is exacerbated by the fact that many sites are probably palimpsests; that is, dense mixtures of occupational debris scattered over a large area, created through constant use or repeated seasonal use of a location. Thus, artifacts from late occupations may be conflated (through natural or cultural factors) with artifacts from earlier occupations, making it difficult to "tease apart" the multiple strands of human occupation and activity.

The Paleoindian and Archaic period sites are particularly problematic because their assemblages are limited to lithic artifacts. It has oft been stated that heavily patinated artifacts found in desert environments are indicative of greater age, but patination is the product of a complex interaction of natural and cultural factors, the interpretations of which are often subjective and idiosyncratic (cf. Werlhof and Werlhof 1977: 70). One can be confident, however, that heavily patinated artifacts are most likely older that less patinated and unpatinated artifacts, if one is so lucky to have such gradations of artifacts present in an assemblage. Thus, sites without diagnostic artifacts can only be categorized as of unknown age and cultural affiliation.

In an effort to define and delimit extensive scatters of undated lithic artifacts in the Yuha Desert, situated immediately south of the project area, the BLM El Centro Resource Area nominated in 1981 the Yuha Basin Discontiguous District (District) for listing in the National Register of Historic Places (Welch 1981). They described the district as four separate, but archaeologically related areas that share common features and create a unified whole. Most of the sites are classified as surface lithic scatters on a stable desert pavement surface that define "concentrated paleo-Indian cultural resources." (Welch 1981). The sites

in each area are generally composed of large percussion flaked bifaces and bifacially flaked cobbles, and resultant debris (i.e., flakes), without pottery and sometimes with features, which are ascribed to the Paleoindian San Dieguito cultural tradition (Welch 1981). Many of the artifacts are heavily patinated, which some archaeologists believe reflects long exposure to weathering, but that interpretation is by no means universally accepted. Associated features include cairns, cleared circles, rock alignments, and trails. These sites are predominantly located on terrace remnants and residual ridges, overlooking drainages and the former basin of Lake Cahuilla. It has been interpreted that San Dieguito people followed a generalized hunting and gathering pattern of settlement and subsistence, with an emphasis upon hunting (Welch 1981).

More direct, and seemingly more definitive, evidence of Paleoindian occupation was documented by the Yuha burial (4-IMP-115), located south of the project area. This burial consisted of a nearly complete skeleton encased within a large rock cairn (Chartkoff and Chartkoff 1984: 56). A radiocarbon age estimate of 21,500 ± 2000 years BP and 22,000 ± 400 years BP were obtained on caliche that encrusted the human bone (von Werlhof and von Werlhof 1977). Most archaeologists judge this date to be unreliable, however. Moreover, the burial style is unlike any other known Paleoindian burials and similar to more recent styles (Chartkoff and Chartkoff 1984: 56).

Evidence for Archaic period sites is nearly as scanty in the project area. Again, in the absence of chronometrically datable materials, temporally diagnostic artifacts distinguish the occupational period. Pinto series (stemmed indented) projectile points define the Early Archaic, while Elko (corner-notched and side-notched) and Gypsum (contracting stem) points represent the later Archaic periods (Apple et al. 1997: 2-19). Groundstone artifacts are also common on Archaic sites in the area, especially on open camps, which are mostly located in the transitional zone between and within the Fan Apron landforms in the central portion of the project area and the Beach Zone.

Constant ORV traffic through the project area may have destroyed most evidence of Middle Archaic and Late Archaic period occupations. Some sites in the project area contain *olivella* shell beads, but are probably related to more recent occupation of the project area. If Middle and Late Archaic sites are located in the project area, they are most likely buried and located within the Fan Apron landforms in the central portion of the project area and the Beach Zone.

Thus, unambiguous evidence of Paleoindian and Archaic occupations in the project area has not yet been found. It will take more data, particularly from chronometrically dated contexts or in association with diagnostic artifacts, to resolve the uncertainty.

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1997 *Archeological Survey and Evaluation Program for the Salton Sea Test Base, Imperial County, California*. Report prepared for U.S. Department of the Navy, Southwest Division, Naval Facilities Engineering Command by KEA Environmental, Inc., San Diego, California.

Chartkoff, Joseph L. and Kerry Kona Chartkoff
1984 *The Archaeology of California*. Stanford University Press, Stanford, California.

Von Werlhof, Jay and Sherilee von Werlhof
1977 *Archaeological Survey of the Yuha Basin, Imperial County*. Imperial Valley College, El Centro, California.

Welch, Pat
1981 *Yuha Basin Discontiguous Distric*t. National Register of Historic Places Inventory—Nomination Form, submitted to the National Park Service by the Bureau of Land Management, El Centro Resource Area, El Centro, California.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 115: Please provide a discussion of the methods and the criteria that were used to delimit the boundaries of the archaeological sites that were found in the proposed project area, and comment on whether there is any justification for breaking up any of the larger sites.

Response: In the field, survey crews delineated boundaries by recording the extent of the cultural resources observed on the surface of a site. A site is three or more artifacts within 30 meters of one another, a single feature (i.e. hearth) or a trail; any survey markers are considered objects. Site boundaries were separated by a 50-meter buffer. When field work concluded, the GPS data were transferred to GIS. The information was then examined on aerial maps. Sites with boundaries separated by 50 meters or less were combined. Sites recorded during initial survey for the geotechnical investigations were expanded to reflect the information collected during the Class III intensive pedestrian survey. An isolate was defined as 2 or less artifacts within 30 meters of one another.

Site EBR-19 was an exception to the standardized methods used. The delineation of the boundary of EBR-19 was determined based on extensive surface observations. The site encompasses approximately half of a quarter section and contains over 10,000 artifacts. The site has high potential for buried deposits, is located in the Beach Zone on eastern boundary of the project area. The site contains cremations, and associated grave goods. At least three different types of pottery were observed along with numerous tools, groundstone fragments and fire altered rock features. Three field crews were assigned to three separate segments of the site. The information collected in the field, was combined in the office after the fieldwork concluded to create one large site with several loci. The data collected is a sample of the surface deposits. Extensive amount and variation of artifacts and features on this site warranted a sample inventory. It took three crews (15 individuals) nearly a month to record a sample inventory of the site. The information collected is adequate to make a recommendation for nomination to the National Register of Historic Places (NRHP). This site is recommended as eligible for nomination to the National Register of Historic Places. It has been suggested that a 100% survey of the site should be a dual effort combining Native American and Archaeological perspectives. Native American consultant, Carmen Lucas, is certain this site is an important ceremonial activity location and should be recorded using a combined effort between Native American Consultants and Archaeologist.

Site boundaries reflect the extent of observed surface deposits. We do not believe there is justification to split any of the larger sites into two or more smaller ones. Site boundaries reflect the extent of observed surface artifacts and cultural features. Although the density of surface material varies across the larger sites, based on the site definition provided above, the observed cultural material at these locations fits the criteria for a site.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 116: Please provide a discussion that explains how the applicant delimited and documented the individual trail segments in the field, and how field determinations were made with regard to associations that may exist among different trail segments and among the trail segments and other material culture resources.

Response: Initially information regarding trail locations was compiled based on examination of the aerial photos overlaid with GPS information collected in the field. Some crews recorded trail segments with the GPS unit and notes, especially if the resource was associated with a site being recorded. However, individual and independent trail segments were delineated and mapped in the office from aerial maps. It was determined that this method of data collection was ineffective and a new protocol has been created and applied to thoroughly capture all significant information about each individual trail segments.

Trails are identified as clearly defined bipedal paths that are approximately 35-50 cm wide. Trails have a surface depression of 5-10 cm and will appear tamped or cleared (cobbles and pebbles on either side of the trail that imply evidence of construction or maintenance). Trails are located on a stabilized surface (ex. typically stabilized desert pavement). Contributing elements may include stone-alignments, artifacts, and/or features along the trail, as well as archaeological sites within close proximity. The recordation of the trail will include a completed primary record, a completed linear form, photographs of the trail, and a linear GPS file. Trail alignments mapped in the field have been overlaid on historic maps and aerial photos, and compared to known historic and prehistoric routes both within and outside the proposed project area.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 117:

To enable staff to reliably identify, analyze, and develop preliminary evaluations for each of the newly found archaeological sites in the proposed project area, please revise the descriptions of these 254 resources in the Technical Report to present, in a consistent format, objective and informed archaeological site and artifact assemblage descriptions using explicit descriptive conventions, and develop a reasoned interpretation for each site.

More specifically, please revise the site descriptions in the *Report of Findings* section to include:

a. Objective, non-interpretative descriptions of the overall physical character of the surface of each archaeological site including the approximate area of the site, the presence and approximate location of any architectural ruins, archaeological features, or concentrations of material culture, the gross distribution pattern of artifacts and ecofacts across each site, and any variation in the color, texture, or composition of the sedimentary matrix for each site.
b. Descriptions of the artifact and ecofact assemblages for each site that rely on objective, non-interpretative descriptive conventions that the subject report may lay out in the introduction to the site description section or as a report glossary, that discuss artifact and ecofact frequency and the differential patterns of their distribution across each site.
c. Artifact descriptions for representative samples from each site that type out individual artifacts to a level that meaningfully informs archaeological site interpretation (For prehistoric archaeological sites, individual artifact descriptions would include, for instance, assigning lithic debitage to flake types with reference to an explicit flake typology, assigning lithic cores to core types or describing core flaking patterns, and descriptions of unique tool shapes, edge angles, and apparent patterns of retouch or use wear. For historical archaeological sites, individual artifact descriptions for ceramic sherds would include the identification of established ceramic types or descriptions of the ceramic body, glaze, mode and character of decoration, vessel portion represented, and probable vessel form. Descriptions for glass vessel fragments and sherds would include, at a minimum, the identification of glass color, inclusions in the sherd body of nineteenth century glass, sherd curvature, manufacturing clues such as seam locations, pontils, and hand appliqués, mode and character of decoration, vessel portion represented, and probable vessel form. Descriptions for tin cans would include tin can type or method of closure, tin can dimensions, and seam type

and method of seam fastening, including evidence for degree of hand manufacture.

With reference to the above descriptive data, a preliminary interpretation of the use of each archaeological site, the approximate date range of use, and the integrity of the subject deposits.

Response: Site descriptions have been revised and have been separately docketed under confidential cover as Confidential Data Response 117. Further, the technical report will be updated with these revisions and is expected to be docketed by the beginning of April, 2009.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 118: Using the *Late Prehistoric Period* section of the Technical Report as a point of departure, please provide a discussion of potential traditional use areas in or near the proposed project area. Please include considerations of:

a. The types of domestic, economic, and ritual use areas that are known for the Kamia and other Native American groups that have associations with the project area.
b. The material character of such use areas.
c. The patterns of such use areas across the local landscape, and the potential archaeological signature of such use areas.

Response: Please refer to the information provided below.

Across the local landscape, prehistoric settlement and subsistence patterns are evident in the archaeological record. Potential traditional use areas have been identified north, northeast and south of the proposed project area. The Project Area is surrounded to the west by the Fish Creek and the Coyote Mountains, to the northeast by the Superstition Mountain Range, to the east by the Chocolate Mountains and Indian Pass, and Mount Signal is located to the south. All these landforms are associated with archaeological deposits, and were predominant geographic elements of the prehistoric landscape. Several significant geoglyphs, related to Yuman origin stories, have been recorded south of the project area. The project area has the potential for a unique archaeological signature, and a signature related to the established archaeological district. The article, Desert Chronologies and the Archaic Period in the Coachella Valley (Love and Dahdul 2002), describes archaeological deposits similar to the deposits in the Project Area. The article focuses on sites identified south of Palm Springs and north of Coachella located on the northern extent of the high water mark of Lake Cahuilla. The Lake Cahuilla Recessional Shoreline District, located on the southwest shore of the Salton Sea is an additional collection of sites related to the prehistoric exploitation of Lake Cahuilla. Sites identified in the aforementioned district contain deposits similar to the deposits observed in the Project Area. However, there appears to be a difference in settlement and subsistence patterns related to the high and low water marks of the prehistoric lake.

The Diegueño and Kamia primarily occupied the area in and near the proposed Project area; other groups such as the Cahuilla, Quechan, and the Cocopah may have traditional associations with the project vicinity. A variety of archaeological evidence observed in the Project area may be related to one or more tribal subsistence and settlement patterns. It is possible that the Project area contains cultural resources that relate to surrounding archaeological districts.

The Diegueño did not have permanent settlements, but dwellings were built and used during the winter months. Diegueño structures were typically domed huts, thatched with an earth covering that provided insulation. Rock shelters or caves were sometimes used for storage, shelter, or shade during the hot summer months (Drucker 1942).

Diegueño ceramics were created with the paddle-and-anvil technique. The clay was ground and no temper was added. Included in the Diegueño ceramic assemblage are ollas, bowls, pots used for cooking, and pipes. Of notable interest are the large storage ollas, reaching 33 inches in height, which served as granaries and were “highly valued by their owners, who made every effort to preserve them and keep them serviceable” (Rogers 1973:18). Only a small percentage of ceramics created by the Diegueño were painted or incised.

Group interaction involving ceremonies, dances, and gambling games were also a large part of Diegueño life. In fact, Diegueño ties with the Kamia were so strong; it was common for them to travel to Kamia territory during the winter months to enjoy the warmer temperatures and the produce farmed by the Kamia (Gifford 1931).

The Kamia created pottery using the paddle-and-anvil technique and, according to Rogers (1973), produced the greatest variety of ceramics among Yuman bands. Included in the assemblage were ollas, jars, canteens, bowls, rattles, plates, scoops, cups, and parchers, remnants of which are identifiable within the Project area. They also created small figurines with "coffee bean" shaped eyes, which were also traded with other bands and miniature vessels that Gena Van Camp, author of "Kumeyaay Pottery," believes were potential funeral offerings (Van Camp 1979:57). Clay for ceramics was obtained from old lake bed deposits in the central region of the Colorado Desert. Some Kamia ceramics had a small amount of crushed rose quartz added to the temper, while others contained very fine inclusions. The surface color of the ceramics varies from pink, to buff, to an "oyster white" (Rogers 1973). After firing, designs were painted with red and/or black designs. The coloring was obtained from red ochre and boiled mesquite bark (Gifford 1931).

The ancestral Cahuilla lived in virtual isolation from European expansion until the middle of the nineteenth century, with indirect contact through kin relations and seasonal employment at settlements west of the mountains beginning in the late 1700s. The Cahuilla oral traditions include numerous accounts of the existence of a lake in the Salton Basin. William P. Blake was the first European to document these traditions in the mid-nineteenth century.

The Cahuilla had limited contact with the Kamia. The linguistic and cultural differences between the tribes were enough to limit the communication between the tribes. Though these cultures existed adjacent to each other and the Ancient Lakeshore, it is possible that variations in settlement and subsistence practices can be identified. Modern research conducted along the Receeding Lake Cahuilla Shoreline has exposed extensive cultural deposits associated with a lacustrine environment.

The Quechan lived in a series of settlements called *Rancherias,* which were scattered along the banks of the Colorado River. These settlements were moved seasonally, as the Colorado River would typically flood during the spring and then recede during the winter. The Quechan were primarily agriculturists, growing crops of maize, squash, and beans. After European contact, they also grew a variety of melons, wheat, and black-eyed peas. They supplemented their diet by gathering wild plants such as mesquite and screw bean pods. Fish from both the Colorado and Gila rivers was also a staple of the Quechan diet, but hunting was relatively unsuccessful due to the harsh desert climate (Bee 1983:10). The Quechan used a variety of nets and fish traps, along with cactus spine hooks and the bow and arrow, to fish during the spring and fall months when the fish were most plentiful (McGuire 1982).

Unlike their peaceful Kamia neighbors, the lower Colorado River tribes were organized militarily and warfare played a significant role in Quechan life. The Cocopah and the Maricopa were enemies of the Quechan. The Quechan would join their Mohave neighbors to the north and strike out against their collective enemies (Bee 1983:93). The Quechan most likely acted as "middlemen" who extracted a portion of trade goods in exchange for safe passage through pre-contact trade routes at the Colorado River Crossing. After European contact, this role may have increased conflict with the Spanish and other tribes, as trade with the Spanish became an economic factor.

The Quechan created pottery using the paddle-and-anvil technique and, "had a long pottery tradition inherited from the Patayan. (Moratto 1984) They made large storage vessels capable of

floating food and goods across the Colorado River" (Hayes and Bloom 2006:138). Other types of ceramics made by the Quechan included bowls, parchers, cooking pots, small figurines, and a "rare floating bowl" that was used by women to hold perishables and infants, which could be pushed ahead as they swam through the river (Campbell 1999).

The Cocopah, also part of the Yuman language family, occupied an area along the lower Colorado River and its delta, south of the Quechan and extending into northwestern Mexico (Alvarez de Williams 1983:99). Their habitat was somewhat unique, as the summer floods from the Colorado River would "convert the delta region into a land rich in flora and fauna" (Alvarez de Williams 1983:99). The Cocopah were semi-nomadic, hunter-gatherers who also used the delta region of the lower Colorado River to farm crops including beans, squash, and maize. They supplemented their crops with wild plants such as mesquite, screw bean pods, cattail reed pollen, and tule roots. Game was plentiful and the Cocopah hunted deer, wild boar, rabbits, wood rats, and beavers. They fished in the rivers using nets made from plant fibers, basketry traps, spears, and, at times, the bow and arrow.

Warfare was part of the Cocopah lifestyle. As previously mentioned, the Quechan were one of their enemies. However, unlike the Quechan, the Cocopah had a vast array of weapons, which included hardwood daggers, wooden war clubs, spears, and bows and arrows. Cocopah bows were typically five feet or more in length, painted, and the bowstring was made of three-ply, plant fibers or sinew. Arrows were made from cane or arrow weed and at times were gall-tipped for poison (Alvarez de Williams 1983:107).

The Cocopah were introduced to pottery manufacturing around AD 700 and became very skilled at creating ceramics. They created a variety of vessels used for storage and cooking using the paddle-and-anvil technique. Clay was ground and winnowed, then a temper of ground sherds was added. Firing was done in a shallow pit or open area using mesquite chips, dung, or arrow wood for fuel. The Cocopah also used stone and clamshell knives, stone metates and manos, awls made from wood and bone, and canteens made from gourd or clay for travel (Alvarez de Williams 1983:106).

Occupation of permanent settlements and exploitation of different food sources at different times of the year occurred when enough resources were present to provide year-round subsistence. Evidence for these settlements patterns can be seen in coprolite analyses, which reveal the remains of plant and animal foods available during different seasons (Moratto 1984). Trade networks between coastal peoples and the occupants of the desert interior began to develop around AD 1000. This development is apparent in the archaeological record by the exponential increase in shell beads within Colorado Desert sites (Fagan 2003).

Recent research shows that around AD 1200, the Colorado River shifted course and refilled Lake Cahuilla (Schaefer and Laylander 2007). This refilled lake provided a stable year-round water supply in the Colorado Desert. People began to repopulate the Colorado Desert, some following the river on its route from the Colorado River Valley and some were from the Mojave Desert or the mountain ranges to the west (Moratto 1984; Weide 1976). Ceramic wares, which had been introduced centuries before in other areas, were brought into this region with the influx of people. Beginning around AD 870, Patayan I ceramic types such as Colorado Beige, Colorado Red, and Black Mesa Buff appear on the shoreline of Lake Cahuilla (Schaefer and Laylander 2007). The Lower Colorado Buff wares, in common use since AD 800, show new attributes around AD 1050, such as stucco finishes, recurved jar rims, and tab handles on scoops (Moratto 1984).

Late period assemblages, beginning circa AD 1250, are typified by the profusion of the Desert Side-notched and Cottonwood arrow points, which replace the larger projectile point traditions of earlier eras (Jones et al. 2007). These projectile point types are common throughout California during this period and into the historic period (Justice 2002).

Materials used in projectile point production include chalcedony, chert, quartzite, quartz, fine-grained basalt, andesite, and obsidian. Chalcedony, chert, quartzite, fine-grained basalt and andesite are locally available. These tool stone materials are available on the surface of the project area. Obsidian was a preferred material for projectile points, and the receding shoreline of Lake Cahuilla exposed an ideal obsidian source. Obsidian Butte, located between 131 feet to 230 feet below sea level at the southern end of the Salton Sea was exposed intermittently during the Late Prehistoric period, and exploited for use in flaked stone tool manufacture. Although a local source of obsidian was available, its application to tool manufacture was supplementary and accounts for no more than 10 percent of debitage assemblages from montane and coastal southern California. Obsidian hydration dates for the source range from AD 1200 to 1800 (Laylander 1997).

In approximately AD 1400, the course of the Colorado River shifted eastward, and as Lake Cahuilla gradually dried up, native peoples were confined to an ever-decreasing fertile area (Moratto 1984). As the lake receded, surrounding areas experienced an increase in occupation as the population shifted to more abundant lands, such as the Colorado River Valley and mountains to the west of the Salton Trough (Moratto 1984; Weide 1976). The people persevered in this desert environment, as evidenced in a series of stone-lined fish traps marking the progress of the receding waterline (Moratto 1984). As subsistence resources disappeared along with the lake, people increased reliance on limited agriculture. As the aridity increased, the local inhabitants expanded their utilization of the resource base to include several hundred plants for food and medicine (Fagan 2003). Evidence of water control techniques, such as the use of wells and springs for irrigation and the construction of reservoirs and ditches, is apparent along both the New River and Colorado River (Weide 1976).

The ethnographic literature establishes that all Native American Tribes associated with the Project area were semi-nomadic hunter gatherers that cremated their dead. All of the tribes used trails for transportation, and exploited the environment similarly. Although each group had a specific approach to creating ceramics, these items were traded, along with shells, and localized meats and vegetables. Data gathered on the ceramics in the Project area show evidence of a variety of ceramic types and techniques. Prehistoric trade networks and trails in the Project area may have ultimately brought much of the surface deposits to the Project area. Other evidence infers the ritual, domestic and economic use of the Project area. Quartz smashes, killed metates, and other unique items observed in close proximity to cremations all are indicators of ritual and ceremonial use of the Project area. Trails represent both economic (trade routes) and transportation, and are associated with ritual activities. Open camp sites containing hearth features, groundstone, ceramics, and lithic tools represent domestic use, subsistence procurement and processing activities, and settlement patterns in the Project area. It is unlikely that surface evidence would directly relate the Project area to a particular tribe. Currently, it appears that the Project area was exploited primarily by the Kamia and Diegueño.

The Kamia and Diegueño occupied the project area during the late prehistoric period. Evidence of that occupation is reflected in artifacts, features, and sites recorded in the project area. Survey crews recorded cremation sites in context with what appears to be Kamia-made ceramics, open camps, and “killed metates”. Evidence of migration and/or trade is reflected in the artifacts recorded in the project area, such as a large stone pestle used for high elevation plant processing. Although fish traps are absent, it is possible to infer that the Kamia were exploiting the lacustrine environment. Survey crews recorded elements of Kamia culture such as ceramics and cremations, in association with fish bones, at Temporary Site Number EBR-019. Subsurface investigations of Temporary Site Number EBR-019 could provide additional information related to subsistence and settlement patterns of the Kamia and Diegueño.

The frequency and complexity of sites recorded in the project area increases relative to the proximity of the prehistoric Lake Cahuilla shoreline. This pattern may signify the increasing complexities of societies in direct relation to the presence of Lake Cahuilla. It is not possible, based on the surface deposits alone, to determine cultural distinctions, or interpret specific subsistence and settlement patterns related to the environment created when Ancient Lake Cahuilla was at the maximum high water mark.

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TECHNICAL AREA: CULTURAL RESOURCES

Data Request 119: Please provide a discussion, on the basis of extant literature and Native American informants, of known traditional use areas such as rock art sites, shrines, or gathering places that are in sight of the project and that may be subject to the project's visual intrusion, and a discussion of the potential presence or absence of other such areas in sight of the project.

Response: Please refer to the information provided below. A photographic log and figure have been provided under a separate cover in a confidential filing as Confidential Data Response 119.

Based on extant literature, the records search, Native American and local archaeological informants traditional use areas such ceremonial and sacred sites and geoglyphs exist in and around the project area. These locations were identified and discussed in a series of interviews with local informants in February 2009.

During a meeting and conversation with Carmen Lucas of the Kawaaymii, several concerns were raised regarding impacts to specific sites in the project area. After an examination of sites EBR-19 and EBR-C, Ms. Lucas expressed her concerns that both sites are sacred and ceremonial, and will be impacted by construction and will be subject to the project's visual intrusions.

One of several concerns she communicated was the variety and physical expanse of site EBR-19. She requested a high level, intensive recording at this site, including thorough photographic documentation of ceramics and the retrieval of dates from Olivella Shell beads. She expressed interest in participating in these activities. She also would like to see the boundary of the site fenced, particularly along BLM Road 350 to avoid further detrimental impacts to the site from ORV traffic.

Ms. Lucas feels that the size, variance of colors and markings of the ceramic sherds observed on this site, in conjunction with fire affected cobbles, and burned human remains implies sacred and ceremonial activities took place at this location. She believes that the site should be preserved not just for the benefit of the Native American community, but because it contributes to our collective knowledge of American history.

Ms. Lucas would like to see Native American monitors present in the project area through the remaining stages of the project. Particularly, she would like to have representatives of the Quechan, Cocopah, Kumeyaay, and Kawaaymii gather to examine and discuss the ceremonial and sacred aspects of the project area. The aforementioned tribes all cremated their dead in a similar fashion, and all claim the project area as traditional territory. Ms. Lucas warns, "molesting or removing human remains from a site could cause illness" (personal communication with Carmen Lucas February 2009) and is opposed to capping or covering the sites.

Furthermore, Ms. Lucas is concerned that surface deposits observed with human remains are final resting places, but the locations of the cremation pits have not been identified by the survey of the project area. Collections of artifacts identified by survey crews as "collector's piles," Ms. Lucas identified as potential sacrifice piles left for the deceased.

Additionally, Ms. Lucas is concerned about the sites located in the exclusion zone of the project area and how the BLM plans to limit future impacts to these sites from frequent ORV traffic.

Ms. Lucas examined both EBR-19 and EBR-C. She feels that these and other adjacent open camp sites are likely ceremonial, highly sensitive, sacred sites. These sites will be subject to not only visual impacts, but "intangible portions of the landscape will also be impacted. The peaceful, serenity of the desert will never be the same again" (personal communication with Carmen Lucas, February 2009).

Examples of the most complex sites with the highest frequency of artifacts, features, and artifact concentrations inside the project boundary are EBR-C, EBR-18, EBR-19, EBR-213, and DRK-001. Ms. Lucas is concerned about the adequate collection of data at these locations. She communicated protective measures, including fencing site boundaries, should be taken immediately to protect the sites from future destruction caused by ORV traffic or impacts from the project. Ms. Lucas also expressed her belief that these sites are likely to contain buried deposits.

Ms. Lucas has requested a copy of the report on human remains in the project area. She would also like to see the trails in the project area avoided and believes the ancient landscape and the ancient trails are related. She is concerned that the trails will be visually and physically impacted by the project.

During a meeting with Jay von Werlhof and Steven Lucas in February 2009, several concerns were discussed concerning the project impacts to the sites located south of Interstate 8. Dr. von Werlhof's biggest concerned is that this project take into consideration not just the project area but the surrounding cultural landscape.

Dr. von Werlhof communicated that the Yuha Mesa and the Yuha Basin be acknowledged as being interrelated with the sites recorded in the project area. Through a diagram, Dr. von Werlhof explained the relationship between the project area and the adjacent locations.

BLM Road 264 parallels Interstate 8 from the town of Ocotillo east to BLM Road 274. Brian Glenn, Principal Investigator, and Elizabeth Roberts, Senior Staff Archaeologist, joined Jay and Sherilee von Werlhof and Steven Lucas on a tour of several geoglyphs and sites along the road on February 21, 2009. From the BLM kiosk on the western side of the Yuha Mesa, the tour continued to BLM Road 274 and along the BLM Road 274 corridor to examine established geoglyphs and sites along the way.

The first stop was a trail, approximately 50 cm wide running north to south. The trail is bisected to BLM Road 264. Piles of cobbles were observed on either side of the BLM road. Dr. von Werlhof reports that in its original state these cobbles were a spoked wheel geoglyph associated with the trail.

Further east along the road, the group stopped to discuss two cleared circles south of the road. Approximately 100 meters east, on the north side of the road, is a geoglyph that Mr. Lucas and Dr. von Werlhof call "heavenly snake." The imagery represents part of the Yuman origin story (von Werlhof n.d.).

Continuing east on BLM Road 264, Steven Lucas guided us to a site where six sleeping circles were evidently cleared in the surrounding desert pavement. Adjacent to the northwest of the sleeping circles is a tamped area, which Mr. Lucas said is related to dancing activities that took place in that location.

From this point, we traveled further east to the intersection with BLM Road 274, and headed south along BLM Road 274. At the Schneider Dance Circle (4-IMP-2491), Mr. Lucas joined us to examine the top of the mesa and interpret the site. The site is the largest dance circle in the Colorado Desert and it has been dated to 2,700 years before present (von Werlhof n.d.). In the spring of 2002, sixteen youths from the Manzanita band of Kumeyaay danced a renewal

performance at this site (personal communication with Steven Lucas and Jay von Werlhof 2009; von Werlhof n.d.). This site has been fenced.

Departing this site, the tour continued south along BLM Road 274 and visited a location Dr. von Werlhof referred to as the Yuha Burial. Mr. Lucas's Grandfather discovered the site. Dr. von Werlhof pointed out a cairn (burial) and an adjacent Shaman's hearth. Yuha Man was excavated here in the 1970s and assigned a radiocarbon date of at least 21,500 years before present. This date remains controversial; however, the bones have since disappeared leaving no chance for additional dating to be performed.

Continuing south along BLM Road 274, a trail was observed that parallels the road, crosses the road, and continues to the northwest. At this crossing we stopped to discuss the trail and the spirit break immediately adjacent to the BLM road. Looking north from the road, a large quartz smash stands out from the surrounding desert pavement on an eastern trending ridge encompassed to the east by a small drainage

Further south along the road, we stopped to look at the Power Geoglyph (4-IMP-4876). This site is fenced in three segments. The most prominent area of the site is the northwestern-most portion. Mr. Lucas implied that the two concentric circles with a small cairn representing Ave Kwame Mountain. The squiggly line emanating from the concentric circles and trending south represents the Colorado River. These geoglyphs represent important elements of the Kumeyaay origin story.

The last stop was the Yuha Geoglyph (4-IMP-322). We discussed the destruction and reconstruction of the site in the 1970s. We also examined two fenced geoglyphs north of the main geoglyph. This site has been fenced from BLM Road 274 to the mesa edge.

On the return trip to the BLM kiosk, Dr. von Werlhof pointed out a military occupation site overlooking the valley floor south and east of Ocotillo. The site was primarily piles of metavolcanic and granitic cobbles and historic fire rings created from locally available materials similar to what was used to create the cobble piles. The features on the site appeared to follow a specific, predetermined alignment. Dr. von Werlhof claimed that the surface integrity of the site appears much different from past visits.

As we traveled, Dr. von Werlhof reminisced about the variety of archaeology he has witnessed in the past 35 years exploring the Imperial Valley. He discussed the essential relationships between the spiritual and ceremonial world of the Yuha mesa and the sites recorded to the north, west. and east of the mesa. He expressed his concerns about limited emphasis placed on the study of this relationship. "Nine geoglyphs have been recorded on the mesa. All the (major) occupation zones are located to the north, west, and east of the mesa" (personal communication with Dr. von Werlhof 2009). He went on to explain that the mesa and the surrounding landscape including the Coyote and Fish Creek Mountains to the west, the Superstition Mountains to the north and northeast, the Chocolate Mountains and the Salton Sea to the northeast, and Signal Mountain in the south all are elements of the prehistoric landscape. These landmarks have been used to navigate the Imperial Valley for tens of thousands of years. Lake Cahuilla and Lake LeConte have come and gone, but these landmarks remain.

Only one of the Yuha Mesa geoglyphs would be potentially impacted visually. The Schneider Dance Circle is located at the apex of a mesa over looking the surrounding valley in all directions. From the top of the mesa, you can see the very top of the buildings at Plaster City. From 4-IMP-322 you can barely make out the column of smoke rising from Plaster City. It is unlikely that 38-foot tall Solar dishes would be seen from these locations. Views of the project area from the remaining sites are blocked by the undulating terrain.

Along BLM Road 264, several of the sites that were observed and discussed during the tour given by the von Werlhofs and Mr. Lucas are in direct view shed of the project area (and Interstate 8). These sites will fall into the view shed of the project area. It is unknown if these sites have been formally recorded and submitted to the Information Center. A records search of the mile buffer on the southern end of the project area produced only one site that may be "heavenly snake." None of the other locations appear to have been previously recorded. Site IMP-4381 was recorded as "Ground figure – snake and gravel berm, 1 fire ring recently used 2 fire rings." The sketch provided only appears somewhat similar to the figure on the ground. The rest of the sites contain poor location information and site descriptions.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 120: To facilitate agency and applicant discussions of the cultural resources inventory for the proposed project area, please revise either the Report of Findings or Discussions and Interpretations sections around a resource taxonomy that is made explicit in the revision. The revision should define objective criteria for each resource type in the taxonomy, and provide, in the text of the appropriate section and in tabular form, a discussion of the breakdown of the cultural resources inventory into the various resource types and into age clusters within each resource type.

Response: Objective criteria have been developed for each resource type in the taxonomy. The various resource types have been defined below. Each cultural resource locations have been identified as one of the site types defined below. The second part of the request is to present, in tabular form in the appropriate section of the report, a breakdown of the sites and their associated resource type. This portion of the data response is available in the technical report.

Isolated Find: An isolated find is defined as two or less artifacts. Artifacts (bottles, cobbles, ceramics, etc.) that are fractured into several fragments that re-fit are also considered isolates.

Object: Survey markers not associated with artifacts. An example of an object includes United States Government Land Office Survey Markers. .

Lithic Scatter: This site type includes all sites containing lithic debitage, cores, and flaked tools. Lithic scatters contain only lithics, no other types of artifacts are present.

Lithic and Ceramic Scatters: This site type includes surface deposits of lithics and ceramics, with no other associated artifact types or features.

Open Camp: An open camp consists of features and artifacts reflecting settlement or subsistence patterns. The sites may also contain features or artifacts related to ceremonial activities such as cremations. This site type is defined by the presence of one or more of the following items:

- Groundstone
- Ceramics
- Fire hearths or evidence of fire-altered rock (FAR)
- Debitage and/or stone tools
- Unique artifacts
- Cremation

Cremation: This site type contains a concentration(s) of burned bone fragments in context with burned and unburned ceramics, features, debitage, flaked stone tools, groundstone, and/or unique artifacts. EBR-C is the only “independent” cremation site.

Trails: A 35 cm to 50 cm-wide foot path that appears tamped or pushed

(constructed) in surrounding soils. This site may or may not be associated with other archaeological remains.

Geoglyph: A site containing a design purposely created on the surface. Geoglyphs may or may not be associated with other archaeological remains.

Historic Cairn: A site with a stone cairn and associated marker.

Historic Refuse Deposit: Collection of domestic, commercial, or industrial debris (cans, bottles, machinery, and appliances) that date before 1960.

Historic Structure: This site is any building constructed before 1960.

Historic Linear Site: This is a road, irrigation canal, railroad, or any other built linear resource that may or may not be associated with other historic elements.

Other sites: Individual hearths or cairns without associated artifacts.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 121: Please provide a discussion of how the applicant envisions correcting for the effect of the local environment on the degree of patination on percussion-flaked cobbles and percussion debitage as the applicant assesses which lithic scatters belong as contributing elements to the Yuha District. Does the applicant have in mind a list of diagnostic tool types that would also be a factor in the assessment of district contributors?

Response: At the time it was written and submitted the National Register of Historic Places Inventory Form and the accompany survey report titled "Archaeological Survey of the Yuha Basin, Imperial County" (von Wherlhof and von Werlhof 1977) dating of sites based on the formation of calcium carbonate on cultural materials, patanation, and the incorporation of artifacts into desert pavement were acceptable as methods of determining antiquity. However, according to some scientific studies, tool stone materials containing unstable impurities are prone to patination, and the rate of patination varies with many factors (Hurst and Kelly 1961). These factors include the texture and microstructure of the flint, its permeability, the kind, proportion and distribution of impurities, and environmental factors, such as temperature and soil chemistry. It has also been noted that the thickness of the patina varies with time. Attempt to correlate patina thickness with age have proven unsatisfactory because of other factors that have not been taken into account. The texture and microstructure of flint, its permeability, and the kind, proportion and the distributions of impurities can be evaluated by regular petrography techniques. Only after allowances have been made for these additional variables does the age-dependence of flint patination become clear. (Hurst and Kelly 1961).

Another uncertainty discussed in the text of the Yuha Basin survey documents is the lack of thorough survey and data collection taking place during the field work. "Undoubtedly there are many undiscovered sites within the perimetric area, some of which might relate to sites here reported as isolates or random. It is clear that the entire Yuha Basin needs to be fully surveyed and detailed studies made of all features and facets of cultural resources there… it is imperative that these be carried out in conjunction with studies in natural history" (von Werlhof and von Werlhof 1977).

"Using patination as an index of antiquity is not so assured. There are too many unknown factors entering this interesting process to begin with…patination is highly subject to scouring with rock sometimes losing all traces of a former varnish through sandblasting" (von Werlhof and von Werlhof 1977, pg 70). The report goes on to say "For now we have only tool types and degrees of patina build-up by which to distinguish the San Dieguito phases" (von Werlhof and von Werlhof 1977, pg 70).

In the nomination form, it is stated that "the authenticity of Malpais material is not questioned. Temporal placement of the complex, however, remains hypothetical." Under item number 8, "Residual material culture of San Dieguito paleo-Indian and other, hypothetical groups consists entirely of stone artifacts and stone features. The Yuha Basin District provides an abundance of such cultural material for research. Formal analysis of stone tools and debitage is necessary" (von Werlhof and von Werlhof 1977).

The Applicant proposes that is not possible to correct for the effect of the local environment on the degree of patination on percussion-flaked lithics based on field observations. The inclusion of lithic scatters as contributing elements of the Yuha District is based on site type and artifact morphology. The older percussion-flaked, cobble-based tools will be generally larger and less finely worked than more recent tool-kits and reflect less specialization.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 122: Please provide a discussion of the source of the criteria that the applicant cites in the Technical Report for assessing whether archaeological sites may be contributing elements to the Lake Cahuilla District. If the extant documentation for the district does not include explicit criteria for district contributors, please provide an explicit, reasoned set of criteria for assessing contributing elements of the district. The discussion of these latter criteria should explicitly incorporate reference to the historic themes that, in part, define the district.

Response: We have re-evaluated the sites in the project area and have concluded that they do not contribute to the Lake Cahuilla Recessional Shoreline Archaeological District. The recessional aspect of this district is not apparent in the current Solar Two project area. The applicant proposes creating a new prehistoric archaeological district related to the high water mark of Lake Cahuilla. The proposed "Lake Cahuilla High Water Mark Archaeological District" will include sites that are associated with the Beach Zone and Lake Basin landforms in the project area. Sites to be considered as contributing to this District will exhibit at least two of three following criteria:

1) Sites located in the Beach Zone or the Lake Basin Zone geomorphic landforms in the project area.

2) Open camp sites, reflective of subsistence gathering and processing.

3) Sites with cremations, ceremonial and /or sacred features or artifacts.

The BLM and CEC, in consultation with the SHPO will, have the final decision if this approach is viable.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 123: Please expand the discussion of the Anza Expedition of 1774 in the *Regional* Historic *Context* section of the Technical Report. The revision to the narrative should include a narrative of the expedition encounter with Native Americans at the Yuha Well, approximately three miles to the south of the project area.

Response: Spanish Period (1540-1821), describes nearly three centuries of Spanish exploration and settlement in the northern Sonoran Desert portion of New Spain, beginning with the 1542 expedition of Juan Rodriguez Cabrillo and ending with the Treaty of Córdoba that established Mexican independence. The period is dominated by Spanish attempts to link their territories in Mexico and New Mexico with their outposts in California and protect their possessions from encroachment by other world powers, such as Britain and Russia. Several expeditions were sent out, especially towards the end of the eighteenth century, to develop a trail system connecting Sonora to California. One of these expeditions, led by Captain Juan Bautista de Anza, set out in 1774 from the mission in Tubac, south of present-day Tucson, Arizona, to find an appropriate overland route to the mission at San Diego along coastal California. Traveling with a group of soldiers and two Franciscan friars, de Anza arrived in February 1774 at the confluence of the Gila and Colorado rivers, where they encountered a party of Yuma Indians, who they described as welcoming and peaceful. They spent a night at another Yuma village and continued the next day across the present-day U.S./Mexico border, arriving at a water storage basin known today as Laguna Maqauta, where they were greeted by an even larger party of Yuma. Admiring the people immensely, de Anza described them and their elaborate hair styles in his diary. In March 1774, the de Anza party camped southwest of the Yuha Well. No other specific information is available to indicate that the De Anza Party camped in the project area. They continued from there, eventually reaching the San Gabriel Mission on the coast in March 1774. Several years later, the Yuma Indians reacted to ill treatment by the Spanish and attacked settlements established by the Spanish along the Colorado River, killing many of the settlers, including one of the friars who had traveled with the de Anza expedition. By the close of the eighteenth century, no reliable overland route to the settlements along the Pacific coast had been established and the Spanish continued to rely on sea-going vessels to supply those settlements.

TECHNICAL AREA: CULTURAL RESOURCES

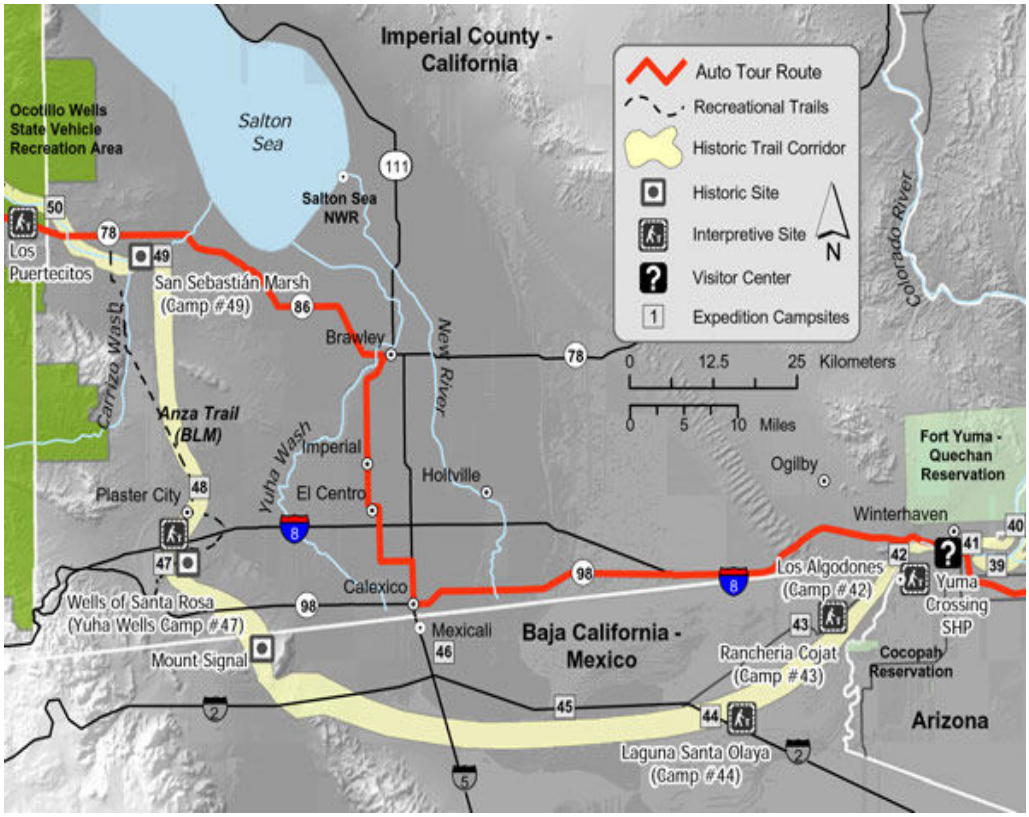
Data Request 124: Please incorporate a mention of the Anza Trail in the *Discussion of Previously* Recorded *Sites* section of the Technical Report. The mention should include text on the general character of the trail in locations where it is known, and the character of the archaeological signature of deposits that have been found in association with the trail.

Response: The corridor that makes up the Juan Bautista de Anza National Historic Trail is a 2.5 mile wide linear alignment that runs south-north through the project area. According to the National Park Service, the trail approaches the project area from the south, running past Mount Signal until it comes to Yuha Well (both of these areas are south of the project area boundary). The corridor continues north into the project area and passes generally through the Plaster City area, continuing north to the San Sebastian Marsh where the corridor turns west and into the mountains. In 1996, the National Park Service (NPS) published the *Comprehensive Management and Use Plan and Final Environmental Impact Statement: Juan Bautista De Anza National Historic Trail.* Within this document was a summary of the key stops and camping sites the expedition used. The plan lists four sites in Imperial Valley (Mission Purísima Conception; Expedition Camp # 42: Pilot Knob; Expedition Camp # 47: Wells of Santa Rosa/Yuha Well, and Expedition Camp #49: San Sebastian Marsh/San Felipe Creek). None of these sites fall within the project area. Camp # 47 sits just south of the project area boundary, while Camp # 49 is located several miles north (http://www.nps.gov/archive/juba/plan/append-B.htm) Within the project area it is known that the expedition camped in or near Arroyo Seco in the vicinity of the present-day Plaster City OHV (Off-Highway Vehicle) area (http://www.solideas. com/ DeAnza/TrailGuide/Imperial/index.html).

No archeological evidence of the de Anza expedition was located during the survey. A review of site forms on file at the San Diego Information Center found no recorded artifacts or sites within the project area. The transitory nature of the expedition, along with the harsh environment that the group passed through, ensured that few physical traces remain. As the 1996 NPS plan notes: *Little historic fabric remains from 1775-76. Even the missions which Anza visited have changed, for they were temporary structures at the time of his visits* (http://www.nps.gov/archive/juba/plan/ environment.htm). The expedition was often guided by indigenous tribal members, and used established Native American trails, paths, or sites (such as villages).. Some Native American sites such as Yuha Well (to the south of the project area) have been surveyed and recorded. It is not known if any archeological sites directly related to the de Anza expedition have been found anywhere along the length of the trail (in Mexico, Arizona, or California). The modern version of the de Anza “trail” that runs through the project area is a 2.5 mile wide corridor that follows the rough path of the expedition. While it is known that the de Anza party stopped at Camp 47: Yuha Well (south of the project area), before crossing the project area and spending a night at Camp 48, located somewhere near present day Plaster City, and then continuing on to Camp #49: San Sebastian Marsh/San Felipe Creek (north of the project area).

The historic corridor is crossed and paralleled by two designated driving routes, BLM Roads 274 and 243, both having the symbol of the Juan Bautista de Anza National Historic Trail emblazoned on road signs.

Figure 1
Juan Bautista de Anza National Historic Trail Route



TECHNICAL AREA: CULTURAL RESOURCES

Data Request 125: Please revise the evaluations of each of the built environment resources in the *Historic Built Environment Survey Results* section of the Technical Report by expanding and elaborating on the historic context for each resource and the reasons why each resource does or does not meet appropriate significance criteria and why each resource does or does not retain, as appropriate, each of the seven aspects of resource integrity. The more appropriate location in the Technical Report for the above revisions would be the *Historic Built Environment* section (p. 6-14).

Response: On February 6, 2009, Mr. Jeremy Hollins, URS Architectural Historian, completed a supplemental reconnaissance-level historic architecture survey for five previously recorded historic-period properties located within a half-mile radius from the Solar Two Project Area. These five historic-period properties were previously identified and recorded within the Solar Two Historic architecture APE by URS Architectural Historian Brian Shaw in August 2008. The properties evaluated included: CA-IMP-7834H (Portion of the Westside Main Canal), 37-025680 (Portion of San Diego and Arizona Railroad), CA-IMP-7886H (Portion of Highway 80), CA-IMP-7739H (Portion of U.S. Gypsum Rail-Line), and P-13-009303 (Plaster City Plant). Of note, the reconnaissance survey performed by Brian Shaw, occurred from public vantage points, since site access and right-of-entry were not available at the time of survey for the privately-owned properties. In areas where views of the property were obstructed (e.g., tree overgrowth), arrangements were made to access the properties or investigators utilized available information to study the property.

As part of the historic architecture survey, Mr. Hollins performed additional site-specific and general primary and secondary research at/with the Imperial County Historical Society Pioneers' Museum; El Centro Public Library; County of Imperial Planning/Building Department and Office of the Assessor; University of California, San Diego Geisel Library and Mandeville Special Collections; San Diego Public Library; Southeast Information Center and South Coastal Information Center; and numerous online resources (*e.g., Calisphere – A World of Digital Resources*, *California Historic Topographic Map Collection*). This research was conducted between April 3 and 7, 2008 and between January 29 and February 9, 2009. The purpose of the research was to develop an evaluative historic context for the five historic-period properties. The historic context identified the historic patterns and trends for each property, which investigators utilized to evaluate historical significance per the Criterion of the NRHP, CRHR, and as a historical resource for purposes of CEQA. Additionally, investigators evaluated each property's aspects or qualities of historic integrity to determine if the property has retained enough integrity to convey its significance. The descriptions, evaluations, and integrity analyses for the five previously recorded historic properties are included in attachment CUL-2 and photographs from the survey are included in attachment CUL-3, both located behind this response.

Portion of Westside Main Canal (CA-IMP-7834H)

Located within a half-mile from the eastern terminus of the Solar Two proposed water line is a portion of the historic-period linear property known as the Westside Main Canal (CA-IMP-7834H). The property was previously recorded and evaluated in 2000 by HDR, Inc. and in 1999 by Caltrans, and has been assigned NRHP Status Code 6 – Not Eligible for Listing or Designation by Caltrans. The portion of the Westside Main Canal in the Solar Two historic architecture APE is approximately one mile long and runs north-south within the Dixieland area of Imperial County.

The portion of the Westside Main Canal in the historic architecture APE is a small portion of a much larger 20-mile historic-period linear property that ultimately travels from the International Border area to the Brawley-Westmoreland area. Accordingly, formal recordation of the entire Westside Main Canal was considered unnecessary and outside of the project scope, since the project would not directly affect (e.g., alter, remove, change use or physical features, cause deterioration) the entire 20-mile historic-period property. Rather, the portion of the historic-period property within the historic architecture APE was studied within the context of the whole property only.

Property Description

Within the historic architecture APE, the Westside Main Canal is an earthen-bank irrigation canal that is approximately 25-feet wide and 10-feet deep (Portions of the canal outside of the APE feature concrete-lining). It primarily has a U-shaped form. Within the historic architecture APE, it runs perpendicular to Evan Hewes Highway (Highway 80) and a San Diego and Arizona Railroad crossing (known as Union Pacific crossing 921-452D). The banks feature earthen levees of natural vegetation, which have been reshaped and widened by modern dredging and grading activities. The portion within the historic architecture APE is gravity-fed (since no control infrastructure was identified in the vicinity). Of note, immediately south of the Evan Hewes Highway crossing is a non-historic period gas pipeline (approximately one-foot in diameter) which bisects the canal. This pipeline disrupts the feeling, setting, visual narrative, and historic viewshed of the portion of the canal within the historic architecture APE. Additionally, along the west bank are two non-historic period pumps, which are most likely used to divert water to/from nearby agricultural fields. The crossing at Evan Hewes Highway is an example of a non-historic period reinforced concrete girder bridge, characterized by a simple span, five abutments/bents (supported by five cylindrical columns), a metal guardrail, and square piers at the bridge portals. The crossing appears to be 40 years old. The crossing is in poor condition due to environmental effects (sun and heat exposure), exposed rebar, and a minimally-maintained travel surface. The crossing shows evidence of chipping, cracking, and spalling. The San Diego and Arizona Railroad crossing is also a non-historic period reinforced concrete girder bridge, and appears to be constructed within the past 30 years. The grade separation features a simple span, four abutments/bents (supported by three angular cylindrical columns), and cable-wire guardrails. The grade separation shows evidence of chipping and cracking, and shows extensive damage from insect infestation and environmental effects (sun and heat exposure). Overall, the portion of the Westside Main Canal within the historic architecture APE is in good condition, but has been affected by dredging and grading activities and non-historic period construction and features, including the pipeline and the crossings.

Historic Context - *Irrigation Canals in Imperial County and the Westside Main Canal*

In 1849, Dr. Oliver M Wozencraft, on his way to the gold fields of San Bernardino from New Orleans, traveled through the Imperial Valley and noted the region's soil fertility and potential for arability. He was likely the first person to recognize the Imperial Valley's potential for agriculture. Wozencraft believed he could construct a gravity canal from the Colorado River to the Imperial Valley, because the river was at a higher elevation than the valley (Garnholz 1991). Wozencraft's opinion of the fertile valley was reaffirmed in 1853 when Jefferson Davis, U.S. Secretary of the War Department, ordered a scientific expedition along the Colorado River for the placement of fortifications. In this expedition led by Lieutenant R. S. Williamson and Professor William Phipps Blake, the particular fertility of the alluvial soil at the southern end of the Salton Sink was noted.

Blake prophetically noted, “it is indeed a serious question, whether a canal would not cause the overflow once more of a vast surface, and refill, to a certain extent, the dry valley of the ancient lake” (Garnholz 1991). Blake’s expedition scientifically described how the Colorado River had meandered through the valley, delivered enough silt to block the mouth of the Gulf of California, and recognized that the banks of the current Colorado River course were much higher than that of Imperial Valley (Smith 1979). During the nineteenth century, the Colorado River historically flooded the valley several times, specifically in 1840, 1842, 1852, 1859, and 1867 (Garnholz 1991).

With the information gathered from the scientific expedition, Wozencraft pressed California into granting him approximately 1,600 square miles or roughly ten million square acres (which included present-day Imperial County and portions of present-day Riverside County). However, the federal government retained title to the land in this region of California and Wozencraft was unable to convince Congress, even with the results of the scientific analysis of the valley, to support his efforts. Wozencraft then approached George Chaffey to finance the project. Chaffey, who would successfully spearhead irrigation projects in San Bernardino County and Australia, was also unconvinced and noted that the “Imperial Valley was to [sic] hot for white men to prosper” (Garnholz 1991). Chaffey would later change his mind and near the end of the nineteenth century led the effort to irrigate the valley. Still undeterred, Wozencraft hired the Los Angeles County surveyor, Ebenezeer Hadley, in 1860 to draw up a plan to irrigate the valley by diverting the Colorado River through the Alamo River (Garnholz 1991). Wozencraft eventually left California for Washington, D.C. to lobby Congress. He died several years later without ever convincing Congress and never seeing his dream fulfilled. While Wozencraft failed to create an irrigation network, his efforts during the mid-nineteenth century led the way for future development efforts.

In 1896, a group of investors formed the California Development Company (CDC) and followed Wozencraft’s earlier attempts to irrigate the Imperial Valley. The group was led by Engineer Charles R. Rockwood and George Chaffey and they wanted to establish a canal, referred to as the “main channel,” constructed from the Colorado River through the Imperial Valley using an ancient overflow channel of the Colorado known as the Alamo River (Sperry 1975). Chaffey, to avoid conflict with the Mexican government over land development since the canal was to be developed almost entirely on the south side of the border, established a subsidiary to the CDC known as the Sociedad de Irrgación y Terrenos de la Baja California (Smith 1979). By 1901,portions of the Imperial Valley were irrigated and attracted many new settlers and farmers from the Midwest.

One of the main problems throughout the entire canal venture project was constant silting, which needed consistent dredging of muck. The solution was to build a wooden, although supposedly temporary, structure referred to as the “Chaffey Gate” (Sperry 1975; Tout 1932). The year the gate was constructed (1904) was one of the wetter years on record and the gate was constructed too high on the riverbank. Arguments at the time seem to suggest that Chaffey had the gate constructed correctly, but that because the water level was high at the time, the engineer in charge of the project placed several removable flashboards in the bottom of the gate, which silted over rapidly (Sperry 1975). The next few years were very dry causing the canals’ water level to drop precipitating the construction of more diversion and gates around the Chaffey gate. The year 1905, however, was extremely wet causing several flooding episodes with the fifth one completely destroying all remaining gates and dams along the canal network system. The Colorado River, originally flowing toward the Gulf of Californian, had changed its course and started flooding the Alamo River to the Salton Sink in Imperial Valley.

By 1905, over 80 miles of irrigation canals had been built, with more than 100,000 acres under cultivation. However, the design and construction of several poorly planned canals and ditches made water delivery service unreliable and inefficient. Large quantities of silt would block the canals’ intakes and reduce the amount of water reaching Imperial Valley crops. A widespread flood in the winter of 1905-1906 caused extensive damage to railroad property, farmlands, and

the newly constructed canal system. The CDC did not believe it was practical to reconstruct several of the canals, and as an alternative decided to enlarge the Westside Main Canal, which at the time was a wooden flume conveyance system located south in Mexico and known as the Encina Canal (Hupp 1999). The extension of the Westside Canal into the United States approximately 1906 was intended to alleviate irrigation problems, and spark development of the county west of the New River. By 1908, the Westside Main Canal extended into the historic architecture APE. It was constructed as an earthen canal, banked by earthen levees, approximately 25 feet wide and 10 feet deep. Throughout the early twentieth century, the general alignment of the Westside Main Canal within the historic architecture APE was not significantly altered. Based on the 1915 El Centro 15-minute USGS quadrangle maps, Albert G. Thurston's Imperial Valley Tract Map (1914), Blackburn's Map of Imperial County, California (1919, 1929, 1936, 1943, 1955 editions), the 1949 and 1976 USDA Aerial Collection, the 1957 Painted Gorge 7.5-Minute USGS quadrangle map, and the 1964 Western Portion of Blackburn's Map of Imperial County, the general course of the canal has remained consistent for most of its history.

By 1907, the Southern Pacific Railroad Company threatened a lawsuit against the CDC for flooding their railroad line along the Salton Sink. A year later, CDC reorganized and the board was taken over by Southern Pacific men, including Epes Randolph, who was the assistant to the president of the Southern Pacific (Sperry 1975). The task of returning the Colorado to its natural course heading toward the Gulf of California was such a daunting and expensive quest that the Southern Pacific eventually ended its association with the CDC. The Southern Pacific did, however, request over $3 million from the U.S. government for expenses incurred in turning the Colorado back toward the Gulf; the government awarded them $1 million 22 years later (Sperry 1975; Tout 1932). Only the construction of the Hoover Dam, (then known as the Boulder Dam) in 1935 allowed for more effective control of the Colorado River for irrigation purposes.

The Imperial Irrigation District (IID) was organized in 1911 to acquire the land rights of the California Development Company (CDC), and its Mexican subsidiary Sociedad de Irrigación y Terrenos de la Baja California, from the Southern Pacific. By the mid-1920s, IID was delivering water to over 500,000 acres of arable land (Imperial Irrigation District 1998). The Boulder Canyon Act, passed in 1928, authorized the Bureau of Reclamation to construct the Boulder Dam, completed in 1935, along the Colorado River. The Imperial Valley and IID benefited greatly as the Act and the dam provided immediate hydroelectric power to the valley. The Act also provided for the construction of the All-American Canal. In 1932, the Secretary of the Interior and IID signed an agreement to allow IID the utilization of hydroelectric power from the canal system for repaying the costs of the canal construction. The All-American Canal was begun in 1934 and the first diesel-generating plant was constructed near Brawley in 1936 (Imperial Irrigation District 1998). Subsequent hydroelectric plants were constructed in 1941. The All-American Canal was completed in 1941, and the Westside Main Canal was incorporated into the All-American Canal System upon its completion. The portions of the Westside Main Canal within Mexico were removed from the IID system.

By the 1950s, regular dredging and widening of the canals were needed to alleviate problems from silt and other build-ups. This altered the structures' profiles, depth, and width, and improvements were also made to the canals' ceramic drain tiles and ditches. By the 1960s, IID had implemented a plan to start lining its earthen canals with concrete (Hupp 1999). However, the Westside Main Canal near the historic architecture APE was never lined, despite being lined north and south of the APE. Through the 1970s, due to IIDs ongoing preventive and reactive maintenance, many original construction materials and features were replaced. These alterations have impacted the canals' historic setting, but were necessary for the agriculture industry's expansion and success (Henderson 1968).

Significance Assessment and Integrity Analysis

Based on Caltrans' earlier 1999 assessment, the Westside Main Canal, as a whole, reflects the development associated with the construction and operation of the All-American Canal between

1941 and 1950, which is primarily when the system was widened, shortened (portions in Mexico were removed from service), and modernized. The canal appears to be significant under Criterion A and C of the NRHP and Criterion 1 and 3 of the CRHR for its association with the development of irrigated commercial agriculture in the Imperial County west of the New River and as a good example of an early large-scale irrigation canal system. The possibility of significance under Criteria A and C was examined but the resource fails to meet the integrity criteria. It does not appear to be associated with the lives of significant people or appears to be likely to yield important information in prehistory or history. Therefore, it does not appear to be significant under Criterion B and D of the NRHP and Criterion 2 and 4 of the CRHR. The canal was associated only for a short period with the CDC, from 1905 to 1911, nearly ten years after the company was established. Additionally, the canal was already in operation upon the forming of the IID, and does not reflect or convey the contributions of the IID to Imperial County.

Overall though, research conducted as part of Caltrans' 1999 assessment of the system found that the canal as a whole (while significant) does not retain a sufficient amount of its historic integrity to convey its significance due to regular dredging grading, widening, and reconstruction that has occurred since the 1950s, though, an intensive survey of the entire canal has not occurred. The portion of the Westside Main Canal within the historic architecture APE also does not appear to possess sufficient integrity of workmanship, design, setting, feeling, and association (Though, it still retains sufficient historic integrity aspects of location and materials). Accordingly, it does not appear to be contributing element or significant related feature/component to the larger linear Westside Main Canal system or individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA. While still earthen, extensive dredging and grading since the 1960s has changed the basic configuration of the canal, which has impacted its design, setting, and feeling. The canal currently has a U-shaped profile, whereas historically it was trapezoidal. The addition of a non-historic period pipeline, and highway and railroad crossings over the canal in the historic architecture APE disrupt the property's integrity aspects of setting and feeling, since these elements are outside of the property's period of significance, 1941 to 1950. Accordingly, due to these alterations, the workmanship and association of the historic-period property in the APE has been lost, since there is little physical evidence of the crafts of a particular culture or people from the period of significance, and the property is not sufficiently intact to convey the direct link between significant events and the canal.

In summary, the portion of the Westside Main Canal within the historic architecture APE does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear Westside Main Canal system (if it is determined that such a resource exists). Further, the addition of a proposed water line adjacent or perpendicular to the existing Westside Main Canal would not create a new adverse effect or significant impact to the portion of the historic-period property within the historic architecture APE.

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Portion of San Diego and Arizona Railroad (37-025680)

A portion of the San Diego and Arizona Railroad (SD-AZ RR) (37-025680) is located along the northern boundary of the Solar Two Project Area. The railroad enters the historic architecture APE a half-mile west of the northwest Project Area boundary, and continues a half-mile east from the proposed waterline's eastern terminus. The property was previously recorded and evaluated in 2005 and 2000 by ASM, Affiliates and JRP Historical Consulting Services, respectively. In 2005, ASM, Affiliates recommended the site as ineligible for listing to the NRHP and, in 2000, JRP Historical Consulting Services assigned the property NRHP Status Code 6 – Not Eligible for Listing or Designation. The portion of the SD-AZ RR in the Solar Two historic architecture APE is approximately ten miles long and runs west-east within the Plaster City and Dixieland areas of Imperial County.

The portion of the SD-AZ RR in the historic architecture APE is a small portion of a much larger 150-mile historic-period linear property that ultimately travels from the San Diego to El Centro area. Accordingly, formal recordation of the entire SD-AZ RR was considered unnecessary and outside of the project scope, since the project would not directly affect (e.g., alter, remove, change use or physical features, cause deterioration) the entire 150-mile historic-period property. Rather, the portion of the historic-period property within the historic architecture APE was studied within the context of the whole property only.

Property Description

Within the historic architecture APE, the SD-AZ RR is a single-track standard gauge railroad, which sits on a bed covered with small-medium ballasts. The rails sit on creosote-soaked wood ties and are fastened via metal railroad spikes. While the ties do not appear to be significantly altered, they have been impacted by environmental effects (sun and heat exposure, moisture penetration) and wood rot.

For the most part, east of Plaster City, the railroad is at grade. This portion of the railroad is still in active use and has been modernized in some areas to include non-historic period heavier ties, rails, and tie plates. Where the railroad meets several unnamed dirt roadways at grade (east of Plaster City), there are several non-historic period grade crossings, which feature stamped concrete landings and contractor stamps that read "MAGNUM." Additionally, where the railroad bisects the Westside Main Canal, there is a non-historic period reinforced concrete girder bridge which appears to be constructed within the past 30 years. The bridge features a simple span, four abutments/bents (supported by three angular cylindrical columns), and cable-wire guardrails. The bridge shows evidence of chipping and cracking, and shows extensive damage from insect infestation and environmental effects (sun and heat exposure).

West of Plaster City (which is portion of the railroad not in use), the railroad is primarily elevated atop earthen berms and features several irregularly spaced trestles used for seasonal stream and wash crossings. These trestles seem to be replaced or altered within the past 40 years based on the visual appearance of the wooden ties. The trestles have timber stringers, and feature non-historic period open-tie decks supported by a series of rectangular posts and wooden cylindrical pilings (featuring cross-bracing members). The end abutments are constructed of stepped wooden beams.

Overall, the addition of non-historic period crossings (east of Plaster City), as well as the heavily altered elements have disrupted the feeling, setting, and visual narrative of the portion of the SD-AZ RR in the historic architecture APE. Additionally, the portion of the railroad located west of Plaster City was removed from service and abandoned in 1977 (while east of Plaster City the railroad is still used). As a result, the abandonment and discontinued use of a portion of the railroad within the historic architecture APE has caused a change in character and use to the historic-period property, which would impact and affect its historical significance. In its present state, overall effects from neglect and inactivity to the portion of the SD-AZ RR in the historic

architecture APE (especially west of Plaster City) have impacted the entire SD-AZ RR system, as a whole.

Historic Context – *SD-AZ RR*

The San Diego and Arizona Railroad was one of the last major railroads built in the United States and was completed in 1919. The railroad, constructed in the first two decades of the twentieth century, stretched eastward from San Diego to El Centro, California – fifty miles short of Arizona. The idea of building a railroad connecting San Diego directly with the eastern United States had existed since California joined the Union after the Mexican-American War. Defense and development of the Port of San Diego were cited as the primary reasons for the railroad. The Atchison, Topeka, & Santa Fe Railway built a line to San Diego from Los Angeles in 1885, but the long-sought direct link with the east was not fulfilled until 1919.

John D. Spreckles and his brother Adolph, who were sons of Clause Spreckles, the sugar millionaire of San Francisco, secretly incorporated the railroad in partnership with Edward H. Harriman, who controlled both the Southern Pacific (SP) and Central Pacific (Hanft 1984; Dodge 1956). John D. Spreckles acted as a front man for the new railroad and Edward H. Harriman of the SP was behind the scenes secretly funding the construction. Harriman sought this arrangement in order to use the more popular local figure to instill cooperation with contractors, landowners, and government officials that the railroad had to deal with. Spreckles was popular with San Diegans, while Harriman was often viewed as an outsider at best. Harriman, though, was aware of the potential of the fertile Imperial Valley and sought direct rail connections with San Diego's harbor. Irrigation and a SP branch line south into the Valley spurred the growth of agriculture in the valley in the first few years of the twentieth century (Steinheimer 1953).

Construction of the railroad began in 1907. The Mexican portion of the railroad was built from Tijuana to Tecate. In the San Diego region, branch lines ran from Coronado northeastward approximately 25 miles to Lakeside. A series of unexpected events, including natural disasters, revolution in Mexico, and the withdrawal and then reinstatement of SP funding, prolonged construction until the final segment of the line, Carriso Gorge was completed in 1919. The railroad earned the title of "impossible railroad" because of the rugged terrain in Carriso Gorge. The route through the gorge required the construction of multiple bridges and tunnels (Hanft 1984).

The portion of the SD-AZ RR within the historic architecture APE was built between 1907 and 1915, since it is evident on the 1915 El Centro 15-minute USGS quadrangle map. Throughout the early twentieth century, the general alignment of the SD-AZ RR within the historic architecture APE was not significantly altered. Based on Blackburn's Map of Imperial County, California (1919, 1929, 1936, 1943, 1955 editions), the 1949 and 1976 USDA Aerial Collection, the 1943 and 1957 Plaster City 7.5-Minute USGS quadrangle maps, the 1957 Painted Gorge 7.5-Minute USGS quadrangle map, and the 1964 Western Portion of Blackburn's Map of Imperial County, the general course of the railroad remained consistent for most of its history.

From its first days of service, highway construction and increases in automotive transport brought strong competition for the railroad's passenger service and the railroad carried freight exclusively after 1951. Landslides, flooding, and several fires on wooden trusses and in tunnels plagued the railroad and made maintenance costs too high for operation. The line was abandoned in 1977 (including portions within the historic architecture APE), with only a few segments remaining in operation (Dodge 1956).

Significance Assessment and Integrity Analysis

Within the context of railroad history in San Diego-Imperial Counties and the United States, the portion of the SD-AZ RR within the historic architecture APE does not appear to be a contributing element to the significance of the entire SD-AZ RR system, and the portion within the historic architecture APE does not appear to be individually eligible for the NRHP, CRHR, or considered a

historical resource for purposes of CEQA. Therefore, the portion of the railroad within the historic architecture APE does not appear to be historically significant.

The construction of a railroad between San Diego and El Centro does not appear to possess significance under Criterion A of the NRHP and Criterion 1 of the CRHR. The railroad's construction and operation is not considered an event which has made a significant contribution to the broad patterns of our history. The railroad faced obsolescence soon after it was constructed because of the development of highway transportation in the area. Additionally, the railroad's practicality was impacted by high costs due to flooding and landslides. After 1976, only short segments remained in operation (with approximately four-miles of the segment within the historic architecture APE removed from service). The railroad only made minor contributions to the development of San Diego and to national defense by transporting military supplies to San Diego during World War II and the Korean War. Therefore, it does not appear to be associated with significant events.

The SD-AZ RR was financed and developed by John D. Spreckles, his brother Adolph B. Spreckles, and Edward H. Harriman. These men are significant people to the history of the United States and California; however, all three are generally better known for more significant accomplishments in railroading, business, and other endeavors. Basically, the establishment of the SD-AZ RR would not be considered a significant contribution by the Spreckles' or Harriman. Harriman died shortly before construction commenced in 1909. John D. Spreckles is better known as an owner of City of San Diego railroads and newspapers, and a major developer of the city. Adolph B. Spreckles was involved in the family's sugar business and is better associated with the City of San Francisco. The SD-AZ RR is not a property which best reflects the significance and important achievements of the Spreckles' or Harriman. Therefore, the SD-AZ does not appear to possess significance under Criterion B of the NRHP and Criterion 2 of the CRHR.

The portion of the SD-AZ RR within the historic architecture APE does not embody distinctive characteristics of railroad design from the early 20th century. The railroad's historic character and features have been impacted by alterations and non-historic period elements (e.g., stamped concrete railroad grade crossings). Further, the portion within the historic architecture APE features a common and utilitarian construction (e.g., timber trestles) which is not representative of distinctive engineering qualities to be considered significant. *A Context For Common Historic Bridge Types*, prepared for the National Cooperative Highway Research Program, notes that this type of structure was common during construction of various transcontinental rail lines (Parsons Brinckerhoff 2005). Therefore, the SD-AZ does not appear to possess significance under Criterion C of the NRHP and Criterion 3 of the CRHR.

The portion of the SD-AZ RR within the historic architecture APE does not appear to be likely to yield important information in prehistory or history. Therefore, it does not appear to be significant under Criterion D of the NRHP and Criterion 4 of the CRHR.

The portion of the SD-AZ RR within the historic architecture APE does not appear to possess sufficient integrity of setting, feeling, materials, workmanship, and association to be a contributing element or significant related feature/component to the larger linear SD-AZ RR system or individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, though, it still retains its historic integrity aspects of location and design. The railroad's historic integrity aspects of setting and feeling were impacted by the addition of non-historic period elements (such as the concrete stamp crossings). Additionally, changes in the area's general character (such as the recently remodeled Plaster City plant [completed within the past 15 years]) disrupt the original and historic-period physical features which characterize the railroad within the APE. While the portion of the SD-AZ RR within the historic architecture APE has retained some historic materials and fabric (such as its railroad ties), overall the replacement and addition of certain materials from outside of the historic period (such as crossings, open-tie timber stringers) impacts the property's historic configuration and appearance. Accordingly, the loss of the property's original and historic-period setting and materials affects its ability to convey a specific historic feeling. In its current condition, the portion of the SD-AZ RR within the historic architecture APE does not exhibit signs of high workmanship, since the property does not

express ways people fashioned their environment during the railroad's period of significance. The portion within the APE is representative of common utilitarian railroad construction and engineering from any period, and does not express a vernacular method of construction or highly sophisticated configurations. There is little physical evidence of the crafts of a particular culture or people from the period of significance. Lastly, the portion of the railroad within the APE does not have any association or direct link between important events or people (such as the Spreckles' or Harriman) and the property. The portion of the property in the APE was not the location or place for any important event or activity, and is not sufficiently intact to convey any type of historic-period relationship.

In summary, the portion of the SD-AZ RR within the historic architecture APE does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear SD-AZ RR system (if it is determined that such a resource exists). Further, the addition of a solar plant to the south of the railroad or a proposed water line adjacent to the railroad would not create a new adverse effect or significant impact to the portion of the historic-period property within the historic architecture APE

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Portion of Highway 80 (CA-IMP-7886H)

A portion of Highway 80 (CA-IMP-7886H), also presently known as Evan Hewes Highway, is located along the northern boundary of the Solar Two Project Area. The highway enters the historic architecture APE a half-mile west of the northwest Project Area boundary, and continues a half-mile northeast from the proposed waterline's eastern terminus. The property was previously recorded in 2001 by ASM Affiliates, Inc. and does not appear to be evaluated for eligibility to the NRHP, CRHR, or as a historical resource for purposes of CEQA. The portion of Highway 80 in the Solar Two historic architecture APE is approximately ten miles long and runs west-east within the Plaster City and Dixieland areas of Imperial County.

The portion of Highway 80 in the historic architecture APE is a small portion of a much larger multi-state 2,725-mile historic-period linear property that ultimately travels cross-country from San Diego, California to Savannah, Georgia. Accordingly, formal recordation of the entire Highway 80 was considered unnecessary and outside of the project scope, since the project would not directly affect (e.g., alter, remove, change use or physical features, cause deterioration) the entire 2,725-mile historic-period property. Rather, the portion of the historic-period property within the historic architecture APE was studied within the context of the whole property only.

Property Description

Within the historic architecture APE, Highway 80 is primarily a two-lane built-up asphalt highway. Portions of the highway, especially within the Plaster City area, appear to be recently resurfaced and re-striped. The roadway exhibits considerable wear from environmental effects (sun/heat exposure and rainwater/flash flooding), and has been "built-up" or received new layers of asphalt within the past twenty years. Many portions are cracked, split, or fragmented, and numerous non-historic period superficial repairs have been done to the road surfaces. Several areas feature recently widened shoulders and the installation of metal guardrails. North and south of the road (just outside the shoulder) are wooden mono- and two-pole transmission corridors. Overall, the highway within the historic architecture APE is located within a rural desert environment.

There are several stream and wash crossings, which are considered related features to the portion of the asphalt highway within the historic architecture APE. The crossings are located at irregularly-spaced locations (dictated by the drainage of the area). Several of the crossings (especially east of the Plaster City Plant) appear to be replaced or improved within past thirty years, while several of the crossings feature 1949 date stamps (especially west of the Plaster City Plant). Of note, many of the 1949 dates tamps have been covered by new applications to the built-up asphalt travel surface. The 1949 crossings are examples of composite timber-concrete slab bridges, which feature concrete cast-in-place slabs supported by timber rectangular posts, stringers, and cylindrical pilings. The 1949 crossings feature wood guardrails but, in several crossings, the wood guardrails have been replaced or blocked with non-historic period metal guardrails. Several of the pilings have been shortened, evidenced by hewn marks, and may have been replaced or altered within the past 30 years. The concrete slabs are in poor condition and feature evidence of spalling, cracking, chipping, and exfoliation. The concrete has exposed rebar in certain areas, and most crossings have been impacted by graffiti, superficial repairs, corrosion, and animal waste/infestation. The end abutments are constructed of wooden posts and ties. In comparison, the non-historic period crossings appear to be examples of concrete girder or slab bridges, and feature primarily concrete construction.

East of Plaster City, immediately south of the asphalt two-lane highway (and at a lower grade along the desert floor), is a portion of the bypassed former Highway 80. The bypassed highway is also a related feature to the asphalt highway. This portion of the bypassed road is concrete, single-lane, incomplete, and has been impacted substantially by off-road vehicle use. In its present condition, it is nearly unrecognizable since it is badly separated, cracked, chipped, and discontinuous in most areas. The concrete is composed of a light aggregate while the surface has a relatively smooth finish (possibly due to its use as a roadway or from environmental effects).

Overall, the addition of non-historic materials and elements, as well as the property's poor physical condition, has disrupted the feeling, setting, and visual narrative of the portion of Highway 80 in the historic architecture APE. Additionally, the portion of the concrete single-lane highway removed from service and presently abandoned has caused a change in character and use to this portion of the historic-period property, which would impact and affect its historical significance. In its present state, overall effects from neglect and non-historic period alterations to the portion of the Highway 80 in the historic architecture APE have impacted the entire Highway 80 system, as a whole.

Historic Context – *Highway 80 in Imperial County*

Highway 80 within Imperial County is part of a larger transcontinental auto route, which stretched along the southern and southwestern United States from Georgia to California. Though portions of the route existed prior to the 1920s, it was officially commissioned in 1926 as Highway 80. The transcontinental route was an amalgamation of two of the original nine transcontinental routes, comprised of portions of the Bankhead Highway (running partially from Washington, D.C to San Diego, California) and the Old Spanish Trail (which went from St. Augustine, Florida to San Diego) (Finley 1997). Throughout the United States, the route had various monikers, including the "Coast-to-Coast Highway," "Ocean-to-Ocean Highway," "All-Year Southern Route," and "Scenic Sunshine Route," which expounded on the roadway's favorable weather and travel conditions. A portion of the highway was also known as the Dixie Overland Highway, since the highway paralleled the original Dixie Overland trail from Savannah, Georgia to Sweetwater, Texas and from El Paso, Texas to San Diego, California (Research failed to indicate an association between the naming of the townsite of Dixieland and this route's nickname). Ultimately, several southern states conceived the idea of the Dixie Overland route by 1914, and by 1917 the route was envisioned to reach Phoenix, Yuma, San Diego, and Los Angeles (Weingroff 2009).

Prior to its designation as part of Highway 80, the roadway (featuring a similar alignment as its present configuration) existed as the main east-west linear route through southeast California. Its was first developed in 1912 when Tom Morgan, future president of the Pickwick Stage Lines, purchased a vehicle and first started transporting passengers to Imperial Valley. Others followed Morgan's lead and he soon established United Stages. At the time, a similar development took place in San Diego where tickets were sold for passenger service across San Diego's mountainous terrain and into Imperial Valley. These tickets were sold at a Pickwick Cigar stand. Soon the two companies consolidated and extended their operations. This was the beginning of a twentieth century auto route between San Diego and Imperial Valley. At the time, the area near Coyote Wells (located west of the historic architecture APE) was described as "hazardous," since only "two ruts through deep sand" existed as the travel path (Henderson 1968).

By 1913, both the local government and Auto Club of Southern California attempted to develop the eastern and western portions of the road in Imperial County. That year, the Auto Club of Southern California had a convention to consider a practical road from El Centro to Yuma for the eastern portion of the roadway. The decision was made to construct a wood plank road across the region's sand dunes, and San Diego would furnish the lumber while the Imperial County provided food, freight, and haulage. By 1916, the first plank road was replaced with a solid plank fastened to heavy cross ties covered with asphalt and sand. The following year, portions of the road were replaced again. The journey across the desert dunes was considered dangerous, and many motorists traveled as part of a caravan typically loaded with provisions, water, extra tools, shovels, and firearms. By 1926, the majority of the planks were permanently removed and replaced with an oil surfaced road (Henderson 1968).

Also in 1913, to construct the western portion of the roadway, Imperial County placed $20,000 in a special road fund for construction west of Dixieland (which includes the portion within the historic architecture APE). By 1917, the last batch of concrete was poured for this portion of the highway. Of note, the bypassed concrete single-lane portion of Highway 80 located immediately

south of the present-day asphalt two-lane Highway 80 is most likely the 1913-1917 concrete roadway described above.

In April of 1913, construction began on a new grade near Mountain Springs (in San Diego County), which provided (at the time) the most direct route between San Diego and Imperial Counties. The completion of the Mountain Springs portion eliminated the need to transverse the dangerous Devil's Canyon route and increased transportation between the two counties. Col. Ed Fletcher, a noted San Diego water and land developer, was the biggest booster for this segment of the roadway. Fletcher was also partially responsible for the completion of the bridge across the Colorado River (in 1915) connecting Imperial County and Arizona, eliminating the need for a ferry (Henderson 1968; Fletcher 1952). Eventually, in 1925, the San Diego to Yuma roadway celebrated its completion, and Fletcher presided over the opening ceremony as a reward for his efforts to complete the road (Tout 1931).

In 1921, the Imperial County Good Roads Association was formed to support further road paving and improvements. In 1929, the State Highway voted to begin "full-width paving" in several areas of the county, including three miles west of Coyote Wells; and, Dixieland to Seeley. These are areas located near the historic architecture APE. Research failed to indicate when the asphalt two-lane portion of Highway 80 was completed (and when exactly the concrete single-lane portion was bypassed); however, other investigators have concluded the 1930s (ASM Affiliates, Inc. 2001). On the 1936 edition *Blackburn's Map of Imperial County*, two roadways are seen north of the SD-AZ RR, which suggests the asphalt two-lane road was completed by that date. The asphalt roadway may have received improvements in 1941 and, certainly, by at least 1949 (evidenced by the date stamps) (Southern California Rancher 1964). Before the 1970s, the portion of the roadway within the historic architecture APE was renamed Evan Hewes Highway after the former executive of the IID. In 1972, Interstate 8 was completed and Highway 80 was abandoned as a practical east-west route. Consequently, the roadway (both the asphalt and concrete segments) within the historic architecture APE has deteriorated drastically and do not appear to receive regular maintenance.

The portion of Highway 80 within the historic architecture APE is first fully depicted on the USGS 1917-1918 *Relief Map of the Western Part of the Salton Sea, California Showing Desert Watering Places* and is labeled the Jacumba-El Centro road An incomplete portion of the roadway seems to be present on the 1915 El Centro 15-minute USGS quadrangle map. Since the entire highway in the historic architecture APE was not paved until 1917, this may explain why the roadway is not depicted as complete in this map. It is later seen in Blackburn's Map of Imperial County, California (1919, 1929, 1936, 1943, 1955 editions), the 1949 and 1976 USDA Aerial Collection, the 1943 and 1957 Plaster City 7.5-Minute USGS quadrangle maps, the 1957 Painted Gorge 7.5-Minute USGS quadrangle map, and the 1964 Western Portion of Blackburn's Map of Imperial County . (Of note, it is shown as State Highway 80 on these maps.) Overall, the general course of the roadway remained consistent for most of its history.

Significance Assessment and Integrity Analysis

Within the context of roadways in Imperial County and the United States, the portion of Highway 80 within the historic architecture APE does not appear to be a contributing element to the significance of the entire Highway 80 system, and the portion within the historic architecture APE does not appear to be individually eligible for the NRHP, CRHR, or considered a historical resource for purposes of CEQA. Therefore, the portion of the highway within the historic architecture APE does not appear to be considered historically significant.

By 1917, the concrete single-lane portion of the highway within the historic architecture APE was completed. However, when the highway was formally commissioned in 1926, it was predominately comprised of existing roadways and transcontinental routes. In the 1930s, the asphalt portion of the roadway was completed. None of these appear to be events which have made a significant contribution to the broad patterns of history either individually or as part of the whole history of Route 80. Further, the concrete single-lane portion of the highway within the historic architecture APE was only in use for approximately twenty years and the asphalt two lane

portion within the historic architecture APE was only in use (as part of a major transcontinental roadway) for approximately thirty years (before replacement by Interstate 8). Overall, the construction of the roadway are not events which reflect the important land use activities, traditional cultural activities, and development that has characterized (and is important) to Imperial County. Therefore, Highway 80 does not appear to possess significance under Criterion A of the NRHP and Criterion 1 of the CRHR.

Highway 80 was partially financed and vigorously supported by Col. Ed Fletcher. Fletcher is a significant person to the history of the United States and California; however, he is better known for more significant accomplishments in land and water development, local politics, and civic leadership. Basically, the establishment of Highway 80 within the historic architecture APE (and as a whole) does not reflect the most significant contributions of Fletcher. Fletcher is well-known for his role in planning and developing portions of San Diego County including Del Mar, Grossmont, Mt. Helix, Cuyamaca Lake, and Pine Hills. He also actively purchased coastal lands as part of the South Coast Land Company. Fletcher then helped develop several water systems in San Diego, which are still actively used today. These systems include Cuyamaca Water System, Volcan Water System, Lake Henshaw Dam, San Dieguito Water System, Lake Hodges Dam, and the Santa Fe Irrigation District. Fletcher was also active in authoring the law creating the San Diego County Water Authority, served as a director for the 1915-1916 and 1935-1936 expositions at Balboa Park, and served on the committee which acquired the lands for the Naval Training Station in San Diego (Heilbron 1936; Fletcher 1952). Based on these accomplishments, it does not appear that the portion of the highway within the historic architecture APE (or Highway 80 as a whole) is property which illustrates or reflects the important achievements associated with Fletcher's life. Therefore, Highway 80 does not appear to possess significance under Criterion B of the NRHP and Criterion 2 of the CRHR.

The portion of Highway 80 within the historic architecture APE does not embody distinctive characteristics of highway design from the early 20th century. The railroad's historic character and features have been impacted by alterations and non-historic period elements (e.g., new built-up asphalt surfaces, widened shoulders, metal guardrails, crossings). Further, the portion within the historic architecture APE features a common and utilitarian construction (e.g., built-up asphalt) which is not representative of distinctive engineering qualities to be considered significant. The concrete portion of the highway is nearly unrecognizable since it is incomplete and has been impacted from off-road vehicle use and damage from cracking, chipping, and exfoliation. Therefore, the portion of Highway 80 within the historic architecture APE does not appear to possess significance under Criterion C of the NRHP and Criterion 3 of the CRHR.

The portion of Highway 80 within the historic architecture APE does not appear to be likely to yield important information in prehistory or history. Therefore, it does not appear to be significant under Criterion D of the NRHP and Criterion 4 of the CRHR.

The portion of Highway 80 within the historic architecture APE does not appear to possess sufficient integrity of setting, feeling, materials, workmanship, and association to be considered eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA (Though, it still retains its historic integrity aspects of location and design). The highway's historic integrity aspects of setting and feeling were impacted by the addition of non-historic period elements (such as new built-up asphalt surfaces, widened shoulders, metal guardrails, improved crossings). Additionally, changes in the area's general character (such as the recently remodeled Plaster City Plant [completed within the past 15 years]) disrupt the original and historic-period physical features which characterize the highway within the APE. While the portion of the highway within the historic architecture APE has retained some historic materials and fabric (e.g., 1949 crossings, concrete portion of the highway), overall the replacement and addition of certain materials from outside of the historic period impacts the property's historic configuration and appearance. Accordingly, the loss of the property's original and historic-period setting and materials affects its ability to convey a specific historic feeling. In its current condition, the portion of the highway within the historic architecture APE does not exhibit signs of high workmanship, since the property does not express ways people fashioned their environment during the early twentieth century. The portion within the APE is representative of common utilitarian highway

construction and engineering from any period, and does not express a vernacular method of construction or highly sophisticated configurations. There is little physical evidence of the crafts of a particular culture or people from the period of significance. Lastly, the portion of the highway within the APE does not have any association or direct link between important events or people (such as Fletcher) and the property. The portion of the property in the APE was not the location or place for any important event or activity, and is not sufficiently intact to convey any type of historic-period relationship.

In summary, the portion of the highway within the historic architecture APE does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear Highway 80 system (if it is determined that such a resource exists). Further, the addition of a waterline or solar plant south of the highway would not create a new adverse effect or significant impact to the portion of the historic-period property within the historic architecture APE

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Portion of U.S. Gypsum Rail-Line (CA-IMP-7739H)

A portion of the narrow gauge U.S. Gypsum Rail-Line (USGRL) (CA-IMP-7739H) is located immediately north of the northern Solar Two Project Area boundary. The portion of the railroad within the historic architecture APE is a half-mile long and travels north-south within the Plaster City area of Imperial County. The property was previously recorded in 2002 by RECON and does not appear to be evaluated for eligibility to the NRHP, CRHR, or as a historical resource for purposes of CEQA.

The portion of USGRL in the historic architecture APE is a small portion of a much larger 27-mile historic-period linear property that ultimately travels from the Plaster City Plant north to the Split Mountain Gypsum Mine in the Fish Creek Mountains. Accordingly, formal recordation of the entire railroad was considered unnecessary and outside of the project scope, since the project would not directly affect (e.g., alter, remove, change use or physical features, cause deterioration) the entire 27-mile historic-period property. Rather, the portion of the historic-period property within the historic architecture APE was studied within the context of the whole property only.

Property Description

Within the historic architecture APE, the USGRL is a single-track narrow gauge railroad, which sits on a bed covered with small ballasts. The portion of the USGRL within the historic architecture APE is at grade. The rails sit on creosote-soaked wood ties and are fastened via metal railroad spikes. While the ties do not appear to be significantly altered, they have been impacted by environmental effects (sun and heat exposure, moisture penetration) and wood rot. It appears many of the tie plates and joint bars have been replaced. The rails do not appear to be the original rail lines from 1921, and were replaced several times, including 1956 and within the past 40 years, in order to support heavier loads (Brueckman 1970). Toward the southern portion of the property within the historic architecture APE (near the actual Plaster City Plant), the narrow gauge spurs into the SD-AZ RR and travels eastward towards El Centro (the western portion of the SD-AZ RR is not in operation). The narrow gauge rail line within the historic architecture APE is surrounded by non-historic period buildings (including a four-story monumental-scale processing barn and conveyor/elevator that is adjacent to the rail's southern terminus), which disrupts the historic feeling, setting, and visual narrative for this portion of the USGRL.

By 1970, a new truck road was constructed to the mine, which made the USGRL obsolete and it went out of operation (Brueckman 1970). As a result, the abandonment and discontinued use of a portion of the railroad within the historic architecture APE has caused a change in character and use to the historic-period property, which would impact and affect its historical significance. In its present state, overall effects from neglect and inactivity to the portion of the USGRL in the historic architecture APE have impacted the entire USGRL system, as a whole.

Historic Context – *Plaster City Plant and Narrow Gauge USGRL*

The narrow gauge USGRL is associated with the Plaster City Plant, which is located at the southern terminus of the USGRL. The USGRL and plant were planned and built between 1920 and 1921 by a group of investors led by Samuel Dunaway, an El Centro druggist for 18 years. The other investors included Sam Mack of Imperial, Walter Hamilton of the IID, and L.E. Cooley who was the school superintendent (in addition to several unknown silent partners from Bakersfield). They formed the Imperial Gypsum and Oil Company to tap a massive 25-million ton deposit gypsum laden holding along the western edge of Imperial County at Split Mountain in the Fish Creek Mountains. Originally, the company hoped to also extract oil from the area, but this was never accomplished (Geologists initially believed the area's surface structure would yield oil). The company completed the railroad to bring crushed gypsum from the mountains to a crusher plant at Plaster City, then known as either Dunaway or Maria. Initially, the company was able to ship 300 tons daily to Los Angeles Blue Diamond Material Company at $3.50 per ton and the company had an initial worth of about one and a half million dollars. The railway was originally built by Mexican laborers for thirty cents an hour in the sweltering month of August and the first delivery took several days to travel the 27-mile course from the mine to the crusher plant

(Brueckman 1970; Brown and Dunaway, 1958; Hillinger, *Los Angeles Times*, ND: Foley 1995; Tout 1932; Freeman, *San Diego Union*, 1965).

Shortly after operations commenced, financial trouble beset the company and the Imperial Gypsum and Oil Company was sold in 1924 to the Pacific Portland Cement Company. The Pacific Portland Cement Company replaced the crusher plant with a larger facility, and the area became informally known as Plaster City. In the 1940s, the plant produced various types of concrete blocks, including half-hi and slump shaped blocks Before the Pacific Portland Cement Company assumed control of the mine, Dunaway's operations were based out of tents and few (if any) permanent structures were erected by him (Henderson, 1968).

In 1947, the U.S. Gypsum Company acquired the plant and the USGRL. At the time, the U.S. Gypsum Company was expanding its western holdings, and acquired or developed plants also in Nevada and Utah. At Plaster City, immediately the U.S. Gypsum Company made plans to modernize the plant, and company executive A.R. Rump was sent from Chicago to direct the new construction. Some of the improvements made by the U.S. Gypsum Company included a 900-foot belt, three separate DC drives, and two kilns. Construction was completed by February 1948, and the company's annual directors' meeting was held at the Plaster City plant shortly after (Foley 1995). The U.S. Gypsum Company improved operations, eventually running three trains a day and reducing the trip to only 55 minutes through improved engines. During the 1940s through the 1960s, the plant primarily produced plaster board, sacked lath, and plaster for agricultural uses (Brueckman 1970; Brown and Dunaway, ND; Hillinger, *Los Angeles Times*, ND; Freeman, *San Diego Union*, 1965). Later, the plant produced drywall and wallboards for home construction, or sent gypsum to a stucco plant in Los Angeles. By 1970, a new truck road was constructed to the mine, which made the USGRL obsolete and it went out of operation (Brueckman 1970). Within the past 15 years, the plant was completely remodeled, including the removal of numerous historic-period buildings, the addition of monumental-scale construction, and major changes to the plant's circulation network and spatial relationships.

The portion of the USGRL within the historic architecture APE is seen on Blackburn's Map of Imperial County, California (1929, 1936, 1943, 1955 editions), the 1949 and 1976 USDA Aerial Collection, the 1943 and 1957 Plaster City 7.5-Minute USGS quadrangle maps, the 1957 Painted Gorge 7.5-Minute USGS quadrangle map, and the 1964 Western Portion of Blackburn's Map of Imperial County. Overall, the general course of the railway remained consistent for most of its history.

<u>Significance Assessment and Integrity Analysis</u>

Within the context of industrial history in Imperial County and the United States, the portion of the USGRL within the historic architecture APE does not appear to be a contributing element to the significance of the entire USGRL system, and the portion within the historic architecture APE does not appear to be individually eligible for the NRHP, CRHR, or considered a historical resource for purposes of CEQA. Therefore, the portion of the railway within the historic architecture APE does not appear to be considered historically significant.

The construction and operation of a narrow-gauge railroad from the Split Mountain Gypsum Mine to Plaster City to facilitate a new mining industry does not appear to possess significance under Criterion A of the NRHP and Criterion 1 of the CRHR. While the railroad is associated with the mining efforts of the Imperial Gypsum and Oil Company, this company only existed for two short years, and their existence did not make a significant contribution to Imperial County's past and never led to an important event. The establishment of the railway (and processing plant and mine) were not representative or associated with a pattern of events, repeated activities, or historic trends. No events are associated with the properties which embody the gradual rise or prominence of Imperial County and its businesses. Imperial County is known nation-wide for its development regarding irrigation agriculture, and not gypsum mining. Additionally, the railway and plant do not have a *specific* association with any historic events associated with the transnational (Pacific) Portland Cement Company and the U.S. Gypsum Company; rather, these companies already existed prior to assuming control of Plaster City and used their new acquisition to simply

further their business vision. By the 1970s, a new truck road decreased the viability and important of the narrow gauge railroad. In summary, the portion of the railway within the historic architecture APE does not appear to be associated with significant events.
The construction of a narrow-gauge railway from the Split Mountain Gypsum Mine to Plaster City is related to Sam Dunaway, who helped establish the Imperial Gypsum and Oil Company. Sam Dunaway was known primarily as Imperial County's first druggist. He held this position between 1907 and 1925, and (due to the remoteness of the area at the time) Dunaway often acted as a doctor and sheriff. He was considered a pioneering El Centro merchant and his store was located at Fifth and Market. In 1925, following the failure of the Imperial Gypsum and Oil Company, Dunaway moved to San Diego and established a new pharmacy. Dunaway's 18-year role as a local druggist and business owner exceeds his two-year stint as a gypsum industrialist. Basically, the establishment and operation of the USGRL within the historic architecture APE (and as a whole) does not reflect the most significant contributions and achievements of Dunaway, and properties associated with his life as a druggist would be considered more important. Therefore, the portion of the railway in the historic architecture APE does not appear to possess significance under Criterion B of the NRHP and Criterion 2 of the CRHR.

The portion of the USGRL within the historic architecture APE does not embody distinctive characteristics of railroad design from the early 20th century. The railroad's historic character and features have been impacted by alterations and non-historic period elements (e.g., replaced rails, nearby monumental-scale buildings). Further, the portion within the historic architecture APE features a common and utilitarian construction which is not representative of distinctive engineering qualities to be considered significant. The abandonment of the line within the historic architecture APE (in favor of a truck road) has lead to a change in character and has accelerated deterioration and disrepair to the line which impacts its visual appearance and narrative. Therefore, the railway does not appear to possess significance under Criterion C of the NRHP and Criterion 3 of the CRHR.

The portion of the USGRL within the historic architecture APE does not appear to be likely to yield important information in prehistory or history. Therefore, it does not appear to be significant under Criterion D of the NRHP and Criterion 4 of the CRHR.

The portion of the USGRL within the historic architecture APE does not appear to possess sufficient integrity of setting, feeling, materials, workmanship, and association to be a contributing element or significant related feature/component to the larger linear USGRL system or individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA (Though, it still retains its historic integrity aspects of location and design). The railroad's historic integrity aspects of setting and feeling were impacted by the addition of non-historic period elements (such as the improved rails). Additionally, changes in the area's general character (such as the recently remodeled Plaster City plant [completed within the past 10 years]) disrupt the original and historic-period physical features which characterize the railroad within the APE. While the portion of the USGRL within the historic architecture APE has retained some historic materials and fabric (such as its railroad ties), the replacement and addition of certain materials from outside of the historic period (such as the rails, tie plates, joint bars) impacts the property's historic configuration and appearance. Accordingly, the loss of the property's original and historic-period setting and materials affects its ability to convey a specific historic feeling. In its current condition, the portion of the USGRL within the historic architecture APE does not exhibit signs of high workmanship, since the property does not express ways people fashioned their environment during the railroad's period of significance. The portion within the APE is representative of common utilitarian railroad construction and engineering from any period, and does not express a vernacular method of construction or highly sophisticated configurations. There is little physical evidence of the crafts of a particular culture or people from the period of significance. Lastly, the portion of the railroad within the APE does not have any association or direct link between important events or people (such as Dunaway) and the property. The portion of the property in the APE was not the location or place for any important event or activity, and is not sufficiently intact to convey any type of historic-period relationship.

In summary, the portion of the USGRL within the historic architecture APE does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA, and does not appear to be contributing element or significant related feature/component to the larger linear USGRL system (if it is determined that such a resource exists). Further, the addition of a solar plant and water line to the south would not create a new adverse effect or significant impact to the portion of the historic-period property within the historic architecture APE

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Plaster City (P-13-009303)

The Plaster City Plant (P-13-009303) is located immediately north of the northern Solar Two Project Area boundary. The plant within the historic architecture APE is a collection of industrial buildings and structures, which span approximately 160-acres north and south of Highway 80. The buildings and structures are arranged along an east-west axis within the Plaster City area of Imperial County. The property was previously recorded in 2007 by Jeanette A. McKenna and does not appear to be evaluated for eligibility to the NRHP, CRHR, or as a historical resource for purposes of CEQA. Of note, access within the plant was limited due to safety requirements and right-of-entry was not available. Therefore, survey activities occurred from public vantage points, which made it difficult to inventory and identify every building and structure.

Property Description

The Plaster City Plant is divided by Highway 80 into two different portions. The portion north of the highway has a lesser density, contains the plant's administrative spaces, parking/staging areas, and a non-historic period processing barn. The portion south of the highway has a greater concentration of buildings and structures and is where the majority of the plant's industrial actions take place. The buildings and structures appear to have an axial plan, but they do not appear to be arranged in a visual hierarchy or have a specific datum; rather, buildings and structures were sited near one another based primarily on their functions. This causes the scale of the property to waver between human and monumental, as buildings and structures of different massing, forms, and size are located near one another. The plant has a non-original perimeter fence along its boundaries. The plant is primarily covered with pavement, hardscape, and gravel. The original plan and layout of the plant is not necessarily visible or extant due to several episodes of infill construction that occurred from the 1940s to the present. The recent construction was intended to modernize operations, but disrupted the visual feel and narrative of the plant.

On the south portion of the plant, the majority of the buildings and structures evident from the highway are non-historic period properties and are examples of unadorned two-to four-story metal-framed prefabricated or tilt-up warehouses and cylindrical storage containers. They were completed within the past 15 to 20 years. Most non-historic period industrial buildings and structures in this area feature exposed superstructures, skeletal systems, exterior staircases and circulation networks, low-quality sheathing and cladding (fluted metal panels), and exposed ventilation systems. Along the east end of the plant's southern portion is a historic-period two-story warehouse which appears to be from the late 1940s. This building is metal-framed, has a rectangular form, slight gabled roof, multi-pane metal sash industrial style windows, and garage bays with non-historic period roll-up doors. The SD-AZ RR bisects this portion of the plant.

The north portion of the plant (on the north side of Highway 80) is characterized by two (permanent) buildings: the administrative building and the non-historic period four-story storage barn. On the north portion of the plant is the administrative building, which is a heavily altered modest and non-distinctive Contemporary style building. The administrative building is wood-framed with a non-historic coarse stucco exterior, and non-historic period metal and plastic sliding windows. The administrative building consists of a two-story main portion with a half-gabled roof, flanked by two one-story gabled wings. The main portion is characterized by an overhanging roof and two metal cylindrical columns. It appears the main portion of the building may be from the 1940s and the flanking wings may be later additions completed within the past 40 years. The façade features eight window and door bays, with the majority having wide-stile glass doors, and the west and east elevations feature pilasters which frame exit doors. The administrative building is setback from the highway behind a landscaped parade ground with flagpole. The administrative building is surrounded by non-historic period trailers and modular buildings, which are also used to handle the plant's administrative functions. East of the administrative building is a large non-historic period four-story processing barn. The barn is used to store the raw materials obtained from the gypsum mine, and is constructed from prefabricated fluted metal panels and thick poured-in-place concrete, and has a steeply-pitched irregular gabled roof. The east elevation features two open garage bays and an exterior staircase to access a control tower

along the roof ridge. On the south elevation are two large cylindrical storage tanks capped with a gabled corrugated metal tank house. The barn may have replaced an earlier building, which served a similar function, since the tracks for the USGRL wind around the south and east boundaries of the barn (and would have facilitated loading/unloading materials).

Overall, the majority of the buildings and structures at the plant are from outside of the historic period and as a whole does not convey the historic feeling, setting, or visual appearance of the plant. The plant has been heavily altered since its initial construction and the plant no longer resembles its appearance and form from its original period of construction. Its original appearance and arrangement can not be easily determined, and it appears to be a modest example of a large industrial plant which has been consistently modernized to efficiently accomplish its objectives.

Historic Context – *Plaster City Plant and Narrow Gauge USGRL*

The Plaster City Plant (in addition to the USGRL) were planned and built between 1920 and 1921 by a group of investors led by Samuel Dunaway, an El Centro druggist for 18 years. The other investors included Sam Mack of Imperial, Walter Hamilton of the IID, and L.E. Cooley who was the school superintendent (in addition to several unknown silent partners from Bakersfield). They formed the Imperial Gypsum and Oil Company to tap a massive 25-million ton deposit gypsum laden holding along the western edge of Imperial County at Split Mountain in the Fish Creek Mountains. Originally, the company hoped to also extract oil from the area, but this was never accomplished (Geologists initially believed the area's surface structure would yield oil). The company did complete the railroad to bring crushed gypsum from the mountains to a crusher plant at Plaster City, then known as Dunaway or Maria. Initially, the company was able to ship 300 tons daily to Los Angeles Blue Diamond Material Company at $3.50 per ton and the company had an initial worth of about one and a half million dollars. The railway was originally built by Mexican laborers for thirty cents an hour in the sweltering month of August and the first delivery took several days to travel the 27-mile course from the mine to the crusher plant (Brueckman 1970; Brown and Dunaway, 1958; Hillinger, *Los Angeles Times*, ND: Foley 1995; Tout 1932; Freeman, *San Diego Union*, 1965).

Shortly after operations commenced, financial trouble beset the company and the Imperial Gypsum and Oil Company was sold in 1924 to the Pacific Portland Cement Company. The area then became "informally" known as Plaster City. The Pacific Portland Cement Company replaced the crusher plant with a larger facility. In the 1940s, the plant produced various types of concrete blocks, including half-hi and slump shaped blocks Before the Pacific Portland Cement Company assumed control of the mine, Dunaway's operations were based out of tents and few (if any) permanent structures were erected by him.

In 1947, the U.S. Gypsum Company acquired the plant and the USGRL. At the time, the U.S. Gypsum Company was expanding its western holdings, and acquired or developed plants also in Nevada and Utah. At Plaster City, immediately the U.S. Gypsum Company made plans to modernize the plant, and company executive A.R. Rump was sent from Chicago to direct the new construction. Some of the improvements made by the U.S. Gypsum Company included a 900-foot belt, three separate DC drives, and two kilns. Construction was completed by February 1948, and the company's annual directors' meeting was held at the Plaster City plant shortly after (Foley 1995). The U.S. Gypsum Company improved operations, eventually running three trains a day and reducing the trip to only 55 minutes through improved engines. During the 1940s through the 1960s, the plant primarily produced plaster board, sacked lath, and plaster for agricultural uses (Brueckman 1970; Brown and Dunaway, ND; Hillinger, *Los Angeles Times*, ND; Freeman, *San Diego Union*, 1965). Later, the plant produced drywall and wallboards for home construction, or sent gypsum to a stucco plant in Los Angeles. By 1970, a new truck road was constructed to the mine, which made the USGRL obsolete and it went out of operation (Brueckman 1970). Within the past 15 years, the plant was completely remodeled, including the removal of numerous historic-period buildings, the addition of monumental-scale construction, and major changes to the plant's circulation network and spatial relationships.

The Plaster City Plant is first seen on Blackburn's Map of Imperial County, California (1929, 1936, 1943, 1955 editions), the 1949 and 1976 USDA Aerial Collection, the 1943 and 1957 Plaster City 7.5-Minute USGS quadrangle maps, the 1957 Painted Gorge 7.5-Minute USGS quadrangle map, and the 1964 Western Portion of Blackburn's Map of Imperial County. Of note, between the 1943, 1957, and 1976 maps and photographs, the footprint, form, and number of buildings at the plant vary considerably which indicate the plant was improved constantly throughout its history.

Significance Assessment and Integrity Analysis

Within the context of industrial history in Imperial County and the United States, the Plaster City Plant does not appear to be individually eligible for the NRHP, CRHR, or considered a historical resource for purposes of CEQA.

The development and operation of a new mining and processing facility does not appear to possess significance under Criterion A of the NRHP and Criterion 1 of the CRHR. The plant, consisting primarily of recently constructed buildings does not represent or illustrate the two year history of the Imperial Gypsum and Oil Company from the early 1920s. Also, the plant does not have any *specific* association with any historic events associated with the transnational (Pacific) Portland Cement Company and the U.S. Gypsum Company; rather, these companies already existed prior to assuming control of Plaster City and used their new acquisition to simply further their business vision. Overall, the establishment and operation of the plant is not representative or associated with a pattern of events, repeated activities, or historic trends. No events are associated with the property which embodies the gradual rise or prominence of Imperial County and its businesses. In summary, the plant does not appear to be associated with significant events.

The Plaster City Plant's history is related to Sam Dunaway, who helped establish the Imperial Gypsum and Oil Company. Sam Dunaway was known primarily as Imperial County's druggist. He held this position between 1907 and 1925, and (due to the remoteness of the area at the time) Dunaway often acted as a doctor and sheriff. He was considered a pioneering El Centro merchant and his store was located at Fifth and Market. In 1925, following the failure of the Imperial Gypsum and Oil Company, Dunaway moved to San Diego and established a new pharmacy. Dunaway's 18-year role as a local druggist and business owner exceeds his two-year as a gypsum industrialist. Basically, the establishment and operation of the plant does not reflect the most significant contributions and achievements of Dunaway, and properties associated with his life as a druggist would be considered more important. The plant is also loosely associated with former U.S. Gypsum executive A.R. Rupp, who supervised the plant's expansion in 1947 and 1948, but the property certainly does not illustrate his achievements within the gypsum industry. Therefore, the plant does not appear to possess significance under Criterion B of the NRHP and Criterion 2 of the CRHR.

The plant does not embody distinctive characteristics of industrial design from the early 20th century. The majority of the buildings and structures at the plant are from outside of the historic period and (as a whole) do not convey the historic feeling, setting, or visual appearance of the plant. The plant has been heavily altered since its initial construction and the plant no longer resembles its appearance and form from its original period of construction. Its original appearance and arrangement can not be easily determined, and it appears to be a modest example of a large industrial plant which has been consistently modernized to efficiently accomplish its objectives. Therefore, the Plaster City Plant does not appear to possess significance under Criterion C of the NRHP and Criterion 3 of the CRHR.

The Plaster City Plant does not appear to be likely to yield important information in prehistory or history. Therefore, it does not appear to be significant under Criterion D of the NRHP and Criterion 4 of the CRHR.

The Plaster City Plant does not appear to possess sufficient integrity of location, setting, design, feeling, materials, workmanship, and association to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA. The plant's historic integrity was irreversibly impacted by the removal of the original and historic-period buildings and structures. The property has few original and historic-period physical features which characterize the plant. The loss of the property's original and historic-period setting and materials affects its ability to convey a specific historic feeling

In summary, the Plaster City Plant does not appear to be individually eligible for listing to the NRHP, CRHR, or considered a historical resource for purposes of CEQA. Further, the addition of a solar plant and water line to the south would not create a new adverse effect or significant impact to the Plaster City Plant within the historic architecture APE

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Westside Main Canal, Evan Hewes Crossing, View to the Northeast

Westside Main Canal, SD-AZ RR Crossing, View to the North

Westside Main Canal, View to the South

SD-AZ RR, View to the East

SD-AZ RR, View to the West

SD-AZ RR Trestle, View to the South

SD-AZ RR Trestle, View to the East

SD-AZ RR Trestle, View to the Southeast

Single-Lane Concrete Portion of Highway 80, View to the West

Single-Lane Concrete Portion of Highway 80, View to the West

1949 Composite Timber-Concrete Slab Bridge, View to the Northeast

1949 Composite Timber-Concrete Slab Bridge, View to the South

USGRL, View to the North

USGRL, View to the West

USGRL, View to the Northwest

Plaster City Plant, View to the North-Northwest

Plaster City Plant, View to the East

Plaster City Plant, View to the South-Southwest

Plaster City Plant, View to the West

Plaster City Plant, View to the East

Plaster City Plant, View to the West

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 126: Please provide a discussion about the feasibility of developing evaluation programs for individual archaeological site types with reference to the taxonomy that the applicant will develop in response to Data Request 120 above, and provide, for further discussion, a working outline of the evaluation programs that the applicant envisions being appropriate to the cultural resources inventory for the proposed project area.

Response: It is feasible that an evaluation program could be developed for any of the site types that have been identified in the response to Data Request 120. Such an evaluation program would be based on assessment under National Register of Historic Places criteria. For most of the archaeological resources it is anticipated that their data potential would be a major consideration in their evaluation. The evaluation program would include a testing plan that presents pertinent regional research questions. Based on field investigations, analysis, archival research, and consultation, an assessment of the degree to which the resources potentially affected by the project could address these topics would be provided. Due to the concerns expressed to date by members of the Native American community, it is anticipated that evaluation efforts will also incorporate Native American input

Site complexity is typically one of the factors considered in evaluating resources. However, incremental information is available from a range of site types. One approach that is proposed is the use of the California Archaeological Resources Identification and Data Acquisition Program (CARIDAP): Sparse Lithic Scatters to address low density lithic scatters with little potential for subsurface deposits.

Sites not meeting the CARIDAP criteria may meet criteria of the Yuha Basin Discontiguous Archaeological District. Resources that are recommended for existing and proposed districts are evaluated based on the potential of the resource to contribute additional information to the district. Resources recommended to the Yuha Basin Discontiguous Archaeological District may contribute additional information related to research questions proposed for the District. The distinguishing criteria are the indicators of San Dieguito I occupation include sites with a basic flake and cobble technology, which includes artifacts such as choppers, side scrapers, cores, large percussion flaked bifaces, and bifacially flaked cobbles without any ceramics or late or intermediate age projectile points.

Resources recommended to the proposed Lake Cahuilla High Water Mark District will contribute to the study of the settlement and subsistence patterns of prehistoric inhabitants of Lake Cahuilla. The distinguishing criteria of the sites recommended to the proposed district include:

1) Sites located in the Beach Zone or the Lake Basin Zone geomorphic landforms in the project area.

2) Open camp sites, reflective of subsistence gathering and processing.

3) Sites with cremations, ceremonial and/or sacred features or artifacts.

Sites in proposed districts

Evaluation measures envisioned for the different site types identified in the taxonomy developed in response to Data request 120 are outlined in the following. Whether potentially contributing to a district, or not, all sites will be evaluated for their individual eligibility in accordance with the following outline.

Lithic Scatter: A 15% random sample of these sites will be tested to confirm that they do not possess subsurface manifestations. Sites for which this is verified would then be subjected to analysis by means for the CARIDAP protocols for sparse lithic scatters.

Open Camp: These sites offer the potential to provide information on settlement, subsistence, chronology, and technology of prehistoric occupants of the area. These types of sites would be subjected to testing to assess the presence of buried deposits.

Cremation: Site or portions of sites containing cremation remains would be avoided due to the extreme sensitivity of this resource type.

Trails: Any proposals for treatment of adverse effects to the trails in the Project area must be conducted by the BLM in consultation with the SHPO and Native American tribes that ascribe significance to these resources. It is particularly important to involve the Native American tribes in these discussions because of likelihood that many these trails figured prominently in the belief systems of these people or their ancestors.

Geoglyph: The BLM in consultation with the SHPO and Native American tribes that ascribe significance to these resources will establish the eligibility of this site type through these consultations. It is particularly important to involve the Native American tribes in these discussions because of likelihood that many these features figured prominently in the belief systems of these people or their ancestors.

Historic Cairn: Little, if any, information can be gained through additional direct study of sites of this type beyond which has already been obtained through their recordation. However, additional historic research into these sites could be useful in identifying any associations with significant events or people.

Historic Refuse Deposit: More thorough examination, both in the field and through additional historic research, of the historic refuse deposits should be conducted that would inventory the contents to determine presence of interpretable material culture that would identify components that would be attributable to activities beyond basic subsistence. For example, can artifacts be identified that would relate to domestic activities rather than industrial activities such as gravel quarrying? The scatters could potentially provide information on the material left behind by resident versus itinerant populations. If the scatters represent deposits left by a transient population can a difference between the material cultural left by highway travelers be discriminated from that left by railroad travelers?

Historic Linear Site: Little, if any, information can be gained through additional direct study of sites of this type beyond which has already been obtained through their recordation. However, additional historic research into these sites could be useful in identifying any associations with significant events or people.

Other sites: Little, if any, information can be gained through additional direct study of cairns beyond which has already been obtained through their recordation. However, additional research and consultation with Native Americans concerning these sites could be useful in identifying any associations with significant events or people. Isolated hearth features would be tested to establish the integrity of their deposits, which could then be used to gather data concerning chronology and subsistence activities.

Ceramics: Little, if any, information can be gained through additional direct study of sites of this type beyond which has already been obtained through their recordation. As sample of ceramics of each type from all of the ceramic containing sites should be collected and preserved to assist with any future typological, chronological, or clay source studies.

TECHNICAL AREA: CULTURAL RESOURCES

Data Request 127: Please provide, for further discussion, a proposed schedule for the evaluation of the 317 cultural resources in the project area that is explicit about the evaluation efforts that the applicant envisions accomplishing prior to certification and those that the applicant envisions deferring until after certification.

Response: The following timeline outlines those tasks that are anticipated to be completed prior to certification:

April 2009 – develop evaluation plan and submit to BLM for review and authorization.

May 2009 – BLM review of evaluation plan and issuance of fieldwork authorization.

June-August 2009 – mobilize and execute evaluation program.

September-October 2009 – conduct laboratory analyses and prepare evaluation report with recommendations for sites needing further treatment.

The following list those tasks that are anticipated to be completed after certification with an indefinite schedule at this time:

Prepare treatment plan and MOA.

BLM and SHPO review of treatment plan.

Mobilize and execute treatment program.

Prepare treatment report.

TECHNICAL AREA: POWER PLANT EFFICIENCY

Data Request 24: Please provide information on how much hydrogen would be required to initially fill all 30,000 Stirling engines, as well as the project hydrogen supply and storage system.

Data Request 25: Please provide information on how much hydrogen would be required annually to replenish leakage.

Data Request 26: Please describe the source of hydrogen for the project, including a description of the process employed and the consumption of natural gas and/or electricity by that process.

Response: Hydrogen Supply, Storage and Distribution

SES Two described the hydrogen use, supply and storage in the AFC, filed June 30, 2008. The hydrogen system was described as a k-bottle of hydrogen on each Power Conversion Unit (PCU). One hydrogen gas cylinder would contain approximately 195 cubic feet of hydrogen, used to replenish lost hydrogen gas within the gas circuit. Each k-bottle was to be supported from the base of the PCU boom. Each PCU's k-bottle would need to be removed and replaced two times per year. Although this maintenance activity would have been performed by qualified contractors, it has been determined that this method of providing hydrogen to the PCUs would have been expensive, inefficient and environmentally unsatisfactory.

The Applicant, SES Solar Two, LLC has reconsidered the plan for providing hydrogen to the PCUs, and has adopted a hydrogen gas supply, storage and distribution system that will be more efficient, less expensive and involve fewer environmental impacts.

The hydrogen gas supply will come from two redundant hydrogen generators, each capable of producing 1,000 standard cubic feet per hour (scfh), requiring 146 watts/scf and 2.58 cubic inches of water/scf/hour of operation. Approximately 184 gallons of water per day will be required for these generators. Reclaim water will be provided from the Seeley County Water District. Water is required to feed the electrolyzer. The electrolyzer will eliminate any impurities, prior to processing. The annual power consumption to meet the hydrogen production needs is 100.64 KWH, or 36.64 MW per year.

The hydrogen generator will run 24/7, or as needed, to provide the needed H2 gas to support sun catcher's H2 needs. Power consumption could be 24/7, based on the need of the hydrogen generators. However, these generators will normally be operated at off-peak electric hours using grid power When running the unit at night, unit power will be provided from the grid.

Hydrogen generator requires 100 KWH to run; it will take 4 SunCatchers to support it if run during daylight hours. It will not diminish electrical delivery to SDG&E. H2 will not be generated from natural gas. The hydrogen gas will be stored in a steel tank. The storage tank will be capable of storing approximately two day supply of hydrogen gas.

Hydrogen from the storage tank will be piped through a stainless steel piping system to 87 individual compressor groups. Each compressor group will be electrically operated and consist of a compressor, delivering gas at approximately 2,900 psig, and a high pressure supply tank.

Initially, it will take 14 scf of H2 to charge the Stirling engine. Each Stirling engine is estimated to lose about 200 scf per year. Each high pressure supply tank will supply hydrogen gas to 360 SunCatchers or Power Converter Units (PCU). Each hydrogen high pressure surge tank group will supply 12 SunCatchers with hydrogen gas. Low pressure gas supply tanks will be installed with each compressor group to recover hydrogen gas when the SunCatchers are not in-service. This will reduce hydrogen leaks through fittings and seals on the Stirling engine. In the event that both hydrogen generators fail, an unloading station designed to receive and transfer hydrogen gas to the storage tank will be installed to allow for the delivery of hydrogen gas to the site by an outside supplier. The H2 gas storage tank will provide a few days of H2 supply as a back-up system. SES will complete all scheduled maintenance to the H2 generator, when H2 gas supply is adequate.

Please refer to attachment PPE-1 for an explanatory figure.

Data Requests

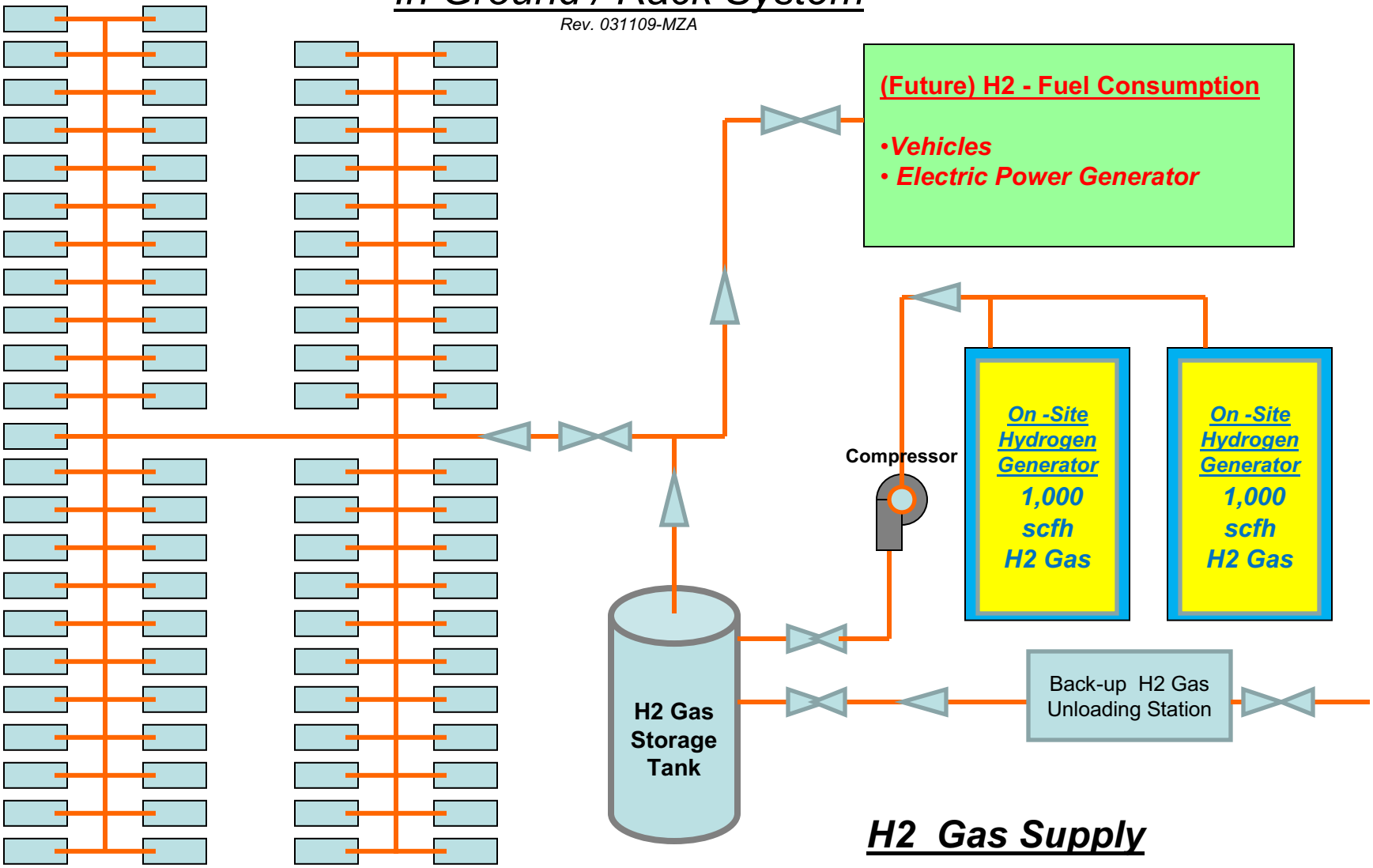
On November 14, 2008 Staff issued its first set of data requests. On December 8, 2008, the applicant (SES Solar Two) responded to these requests. The information provided in this response will revise the Applicant's responses to data requests 24, 25 and 26.

Environmental Impacts

The above-described hydrogen system will eliminate truck delivery and maintenance vehicles. Also, there will be no natural gas combustion in making the H2.

Hydrogen Gas Supply & Distribution
In Ground / Rack System

Rev. 031109-MZA



87 Compressor Groups for the whole site

H2 Distribution

1. H2 gas storage tank approximately two day supply, 33,000 scf capacity.
2. Estimated H2 loss is about 195 scf/ PCU / year, or 6.08 Mscf / year

TECHNICAL AREA: SOIL AND WATER RESOURCES

Data Request 31: Please provide a draft Erosion and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet local requirements, and identify all monitoring and maintenance activities. The draft plan shall be consistent with the grading and drainage plan and may incorporate by reference any storm water pollution prevention plan developed in conjunction with any NPDES permit.

Response: The DESCP will be submitted following the submission of additional information relating to the Applicant's new primary source of water (expected 2nd quarter, 2009).

TECHNICAL AREA: SOIL AND WATER RESOURCES

Data Request 32: Please provide a draft Storm Water Pollution Prevention Plan (SWPPP) consistent with the requirements for a NPDES General Permit for construction and operation of the site and associated linear facilities. This plan may be combined with the DESCP or modified to include those elements identified for a DESCP.

Response: The SWPPP will be combined with the DESCP and will be submitted following the submission of additional information relating to the Applicant's new primary source of water (expected 2nd quarter, 2009).

TECHNICAL AREA: SOIL AND WATER RESOURCES

Data Request 33: Please provide a description of the methodology, sequence, schedule, and estimated average and maximum water use for SunCatcher mirror washing operations.

Response: SunCatcher mirror washing protocol as currently envisioned consists of an average of 9 washes per year – 8 high-pressure spray washes with demineralized water and one scrubbing, using soft mechanical mops, this latter wash occurring in the late Spring months prior to the peak power demand summer months. Each spray wash will consume approximately 14 gallons of water per dish and take approximately 10 minutes. Including travel time between dishes, work breaks, etc., a single washing crew of 1 to 2 people (the AFC assumes 2) can wash an average of 4 dishes per hour or 32 dishes per eight-hour shift. There will be 35 washing teams per shift for one shift per day, resulting in a complete washing of all 30,000 SunCatchers a month (about 28 days per month). Total water consumption for a normal washing of all 30,000 dishes would be 420,000 gallons or about 1.3 acre-feet of water. The scrub wash will take approximately three times as much water and time. These water consumption figures, of course, are for water that has been pre-filtered for demineralization, a process that consumes in bypass and filter flushing operations approximately 28% of the filtered water. The average consumption, then, of raw water for mirror washing is approximately 1.65 acre-feet of water, and the scrubbing wash will consume about 5 acre-feet of water. Total projected raw water consumption for mirror washing per year is about 18.2 acre-feet of water. (The remaining water usage described in the AFC is for dust control, potable drinking water, sanitary water, etc.)

It is likely that some areas of the total solar field (particularly in the outer perimeter areas) will experience a higher rate of soiling than the other areas (which are shielded by the other SunCatchers). For this reason, it is likely that some dishes will be washed more than 9 times a year, whereas others will be washed less frequently. We will use the efficiency trend data in the SCADA system to determine when it is economically justified to dispatch a washing team to a SunCatcher for a routine high-pressure spray wash.

While the protocol described above is the current planned procedure, SES continues to test and explore other alternative approaches to maximize the SunCatcher power production while minimizing water usage.

TECHNICAL AREA: SOIL AND WATER RESOURCES

Data Request 36: Please provide a water balance flow diagram that shows the correct balance.

Response: A revised water balance flow diagram will be revised and submitted following the submission of additional information relating to the Applicant's new primary source of water (expected 2nd quarter, 2009).

TECHNICAL AREA: SOIL AND WATER RESOURCES

Data Request 37: Please discuss in detail the reliability of IID for providing the required water and the historical performance of the Westside Main Canal. This detailed discussion should include:

a. The amount of IID water that can be obtained reliably on a month-to-month and year-to-year basis.

b. Citations from the IID, and other water agency planning documents to support the reliability discussed above.

c. The effect of the following on the available water supply over the life of the project: (1) single dry and multiple dry years; and (2) increased water supply demand as the region's population and economy grow.

Data Request 38: Since the project has only one source of water with no backup supply, please discuss the dependability of the water source. The discussion should include:

a. The available historical data for any interruptions to the proposed water supply or delivery reductions that have been required over the last 10 years.

b. A copy of a draft water supply agreement showing:

c. The agreed upon term of delivery;

d. The volume of water to be delivered;

e. A description of what, if any, reductions in delivery the applicant will be required to take in dry or drought years, or other reasons beyond the applicant's control; and

f. A description of what, if any, other activities may be undertaken if water delivery from IID is reduced or temporarily halted.

Response: In the first set of data requests (numbers 37 and 38), the CEC and BLM asked for additional information on the reliability of the Solar Two water supply from the Imperial Irrigation District and the source of back-up water in the event that there are future interruptions in primary water. In considering the responses to these questions, SES requested additional time to undertake an in-depth evaluation of the Solar Two water supply options in terms of reliability, cost, and environmental impact. These options, individually or in combination, would need to provide an annual average of approximately 46 gallons per minute (gpm) or 74 acre feet per year (afy) during construction (assuming constant pumpage during construction) and an average of 23.3 gpm or 32.7 afy during operation.

For this evaluation, SES considered five supply options:
1. Imperial Irrigation District (surface water)
2. Palo Verde Water District (surface water)
3. Imperial Valley Groundwater Basin (ground water)
4. Seeley Waste Water Treatment Facility (reclaimed water)

5. El Centro Waste Water Treatment Facility (reclaimed water)

These options are described below.

Imperial Irrigation District – SES submitted the Solar Two AFC with a letter of intent from the Imperial Irrigation District to provide water to the project. After receiving the letter, SES eliminated the eastern portion of the site from development because of the presence of significant archaeological resources. As a result of this action, the Solar Two site was no longer within the District boundaries and IID subsequently determined that it was not able to serve the project. This option is no longer available.

Palo Verde Water District - The Palo Verde Water District expressed possible interest in providing water to the project. The source of the water would be from the Colorado River and delivered to the project site through existing canals and through a new pipeline. Transport of the water would require wheeling agreements with two other water districts. All of the water used by the Solar Two project would have been fully offset. This water would, however, be delivered outside of the District's boundaries and result in the same service complications as experienced with the Imperial Irrigation District. It would further raise concerns regarding conformance with the CEC's water policy. This option was not explored further.

Imperial Valley Ground Water – As discussed in the water section of the Application for Certification (page 5.5-2), the Imperial Valley Ground Water Basin underlies the eastern portion of the project site. This water has high concentrations of total dissolved solids and is considered unsuitable for domestic or irrigation use without treatment.

SES' consultant, URS Corporation, installed a test well on the eastern part of the site in January 2009. The purpose of the test well was to evaluate the hydrogeologic parameters of the shallow aquifer beneath the site. The groundwater test well was installed within the Imperial Valley Groundwater Basin.

Results of the site test well indicated the following:

- Total dissolved solids (TDS) concentrations are up to 20,600 ppm;
- Groundwater level is likely over 90 feet below the ground surface (at the test well);
- Subsurface strata are primarily fine-grained.

The primary geologic units observed on the site are Lake Bed deposits (Ql), Young Alluvium (Qal), Colluvium (Qc), Older Alluvium (Qoa), and the Palm Springs Formation (QPlps). The test well drilled for the project encountered Palm Springs Formation from the ground surface to the total depth of the well. The materials encountered within the test well generally consisted of silty fine sandstone and siltstone with variable clay content. Numerous hard and/or cemented sandstone and siltstone layers up to approximately 6 inches thick were encountered over the total depth of the boring.

Groundwater levels within the eastern part of the site are likely 50 to 100 feet below ground surface (bgs). Depth to groundwater within the test well was likely over 90 feet below ground surface (bgs). Based on initial URS geotechnical investigations at other site areas indicated groundwater was encountered in

borings along Dunaway Road at a depth of about 45 feet bgs. Groundwater was also encountered in a boring drilled near the United States Gypsum Company (USG) property, at a depth of about 50 feet bgs, although it is expected that groundwater in that area may be influenced by wastewater ponds that previously operated on that property.

Results of the water quality analyses for the test well indicated that TDS in the groundwater samples were up to 20,000 ppm (mg/L), indicating poor water quality conditions, unsuitable for most uses without significant treatment. Table 1 below presents the results of the water quality testing for the test well. Calscience Environmental Laboratories, Inc. (Calscience) a state-certified laboratory located in Garden Grove, California conducted the chemical analyses of the groundwater samples collected from the test well.

Projected long term sustained pumping rates within this area are relatively low (on the order of 1 to 10 gpm), which would require multiple wells (including backup wells) to meet the project's water demands (approximately 23.5 gpm annual average). The number of required wells would depend on production well depths. By itself, groundwater from this source would likely be insufficient to meet construction water requirements without installation of a number of supply wells.

TABLE 1. GROUNDWATER ANALYTICAL RESULTS - TEST WELL

(analytes reported in mg/l, unless noted otherwise)

Analyte	Concentration	Primary/ Secondary MCL	Analyte	Concentration	Primary/ Secondary MCL
Title 22 Metals:			**Anions:**		
Antimony	<0.0150	0.006	Fluoride	29	2.0
Arsenic	<0.0100	0.05	Chloride	6300	NE
Barium	0.0481	1.0	Nitrate (as N)	<0.50	10
Beryllium	<0.00100	0.004	o-Phosphate (as P)	<0.50	NE
Cadmium	<0.00500	0.005	Total Alkalinity (as $CaCO_3$)	124	NE
Chromium	<0.00500	0.05	Bicarbonate (as $CaCO_3$)	124	NE
Copper	<0.00500	1.0	Carbonate (as $CaCO_3$)	<1.0	NE
Lead	<0.0100	0.015	Hydroxide (as $CaCO_3$)	<1.0	NE
Mercury	<0.000500	0.002	**General Water Quality Parameters:**		
Nickel	<0.00500	0.1	SC (umhos/cm)	**18000**	900*
Selenium	<0.0150	0.05	TDS	**20,600**	500*
Silver	<0.00500		TSS	6.0	NE
Thallium	<0.0150	0.002	pH (unitless)	7.02	NE

Analyte	Concentration	Primary/ Secondary MCL
Vanadium	<0.00500	
Zinc	<0.0100	5.0
Base Cations:		
Calcium	350	NE
Magnesium	137	NE
Sodium	5940	NE
Potassium	36.0	NE
Other Metals:		
Aluminum	<0.0500	1.0*
Iron	0.125	0.3*
Manganese	**0.133**	0.05*
Silicon	6.48	NE
Silica	13.9	NE

Analyte	Concentration	Primary/ Secondary MCL
Total P	<0.10	NE
TOC	<0.50	NE
Carbon Dioxide	9.2	NE
Other Priority Pollutants:		
VOCs (ug/l)		
SVOCs (ug/l)	ND	---
OCPs (ug/l)	ND	---
PCBs (ug/l)	ND	---
Chlorinated Herbicides (ug/l)	ND	---
Total Cyanide	<0.050	NE
Asbestos		7
Radionuclides (pCi/L):		
Gross Alpha		15
Gross Beta		50
Sr90		8
Radium 226		5
Tritium		20000
Uranium		20
Ra-228		2

Notes:
NE: None Established.
ND: None detected; see lab report for detection limits for specific compounds.
MCL: Maximum Containment Level.
MCL is primary, unless indicated with an asterisk (*).
The symbol "<" (less than) indicates the constituent was not detected above the analytical detection limit specified.

Another hydrogeologic study was performed for the United States Gypsum Company (USG) as part of the Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) for an expansion project. The study involved research and modeling of groundwater wells west of the site near Ocotillo. The USG EIS/EIR indicates that the Ocotillo wells drilled in alluvium typically exhibit high permeability, low drawdown and quick recovery upon the cessation of pumping. Wells within the Palm Springs and Imperial Formations exhibit lower yields, more significant drawdown, slow recovery and relatively poor water quality.

In summary, based upon information obtained from the site test well and the USG EIS/EIR, groundwater wells drilled within the Palm Springs formation at the site will have low yields and exhibit poor water quality (extremely high TDS levels).

If water from the Imperial Valley Ground water Basin were used for the project, bottled water would be brought in for human consumption.

Although this water source is located on site, it presents a number of concerns including the adequacy of supply to meet construction needs and cost of treatment and disposal because of its low quality. It could serve as an emergency back-up supply if required in the future but is not being considered further at this time as a primary watersource.

Seeley Wastewater Treatment Facility – The Seeley Wastewater Treatment Facility (SWTF) is located at 1898 West Main Street in Seeley, California, approximately 12 miles east of the project site. It is operated by the Seeley County Water District (SCWD). Currently the facility produces secondary treated water at the rate of 139 gallons per minute or 224 acre feet per year.

According to the Facility's current National Pollutant Discharge Elimination System (NPDES) Permit:

"The treatment system consists of a lift station, a drum screen, a bar screen, a "Clemson" aerated pond treatment system with surface aerators, pressure sand filters, and an ultraviolet (UV) disinfection system. The facility's "Clemson" system consists of five aerated ponds operated in series.

Bio-solids are removed by draining the last two ponds, removing the sludge and storing it in the out of service treatment ponds of the replaced treatment system, prior to removal.

Wastewater is discharged from Discharge Point 001…to the New River, a water of the United States, tributary to the Salton Sea, and within the Salton Sea Transboundary Watershed." (Waste Discharge Requirements For The Seeley County Water District, Seeley County Wastewater Treatment Plant, California Regional Water Quality Control Board, Colorado River Basin Region, 2007).

SES would finance an upgrade to the existing facility to allow it to meet Title 22 water quality standards and fund the training of operators for the new facility. The Seeley County Water District (SCWD) would provide as much water as needed to SES, up to the maximum influent of the wastewater treatment plant. The current influent flow rate is approximately 200,000 gallons per day, or 224 acre-feet per year. Any surplus water, not needed by SES, will be used by SCWD.

According to David Dale, engineer to SCWD (March 9, 2009), the treatment facility has been very reliable and produced about 200,000 gallons of reclaimed water a day regardless of water supply conditions in the area.

To access the water, SES would construct approximately 12 miles of pipeline from the wastewater facility to the Solar Two project site. The pipeline would be located in the right-of-way along Evan Hewes Highway.

The reclaimed water used at the Solar Two site would be further treated using reverse osmosis and/or demineralization depending on the use.

Under this option, bottled water would be brought in for human consumption.

El Centro Wastewater Treatment Facility and Potable Water Supply – The El Centro Wastewater Treatment Plant is located at 2255 La Brucherie Road in El Centro. It is operated by the Public Works Department of the City of El Centro

and is approximately 20 miles east of the project site. Preliminary discussions with the Public Works Department indicated they were willing to provide water to the project. Its location, however, would require construction of a longer pipeline or use of trucks. Another option explored was the use of potable water trucked in from the City of El Centro water supply system for emergency backup purposes only.
A summary and comparison of these water supply options is shown in Table 2.

TABLE 2. WATER SUPPLY OPTION COMPARISON

Option	Description	Type and Amount Available	Reliability of Supply	Environmental Concerns	Comment
Imperial Irrigation District	Water from Colorado River piped to site	Fresh water	Reliable	Conflict with CEC water policy, would be fully mitigated	No longer available because project is located outside district boundaries.
Palo Verde Water District	Water from Colorado River wheeled to area and piped to site	Fresh water	Reliable supply but would require transport through facilities owned by other water districts	Conflict with CEC water policy, would be fully mitigated	Option eliminated because of challenges associated with transport through facilities owned by multiple water districts
Imperial Valley Groundwater Basin	Wells located on eastern portion of project site	Poor quality groundwater; required annual average flow of 23 gpm available only from multiple onsite wells	Not sufficient supply to meet construction needs; sufficient flow to serve as back-up during operation (further assessment required)	Potential impacts from evaporation pond; mitigate with pond design and screening	Eliminated as primary option because of cost associated with water treatment and low groundwater pumping flow rates. Possible back-up supply during operation

Option	Description	Type and Amount Available	Reliability of Supply	Environmental Concerns	Comment
Seeley Wastewater Treatment Facility	Upgrade existing treatment facility; pipe water about 12 miles to project site along Evan Hewes Highway; unused water discharged as before	Reclaimed water	Reliable	Consistent with CEC water policy; beneficial impact from improved discharge water quality; minimal impacts associated with pipeline construction	New preferred construction and operation supply
El Centro Potable and/or Wastewater Treatment Facility	Requires trucking to site or about an 20 mile pipeline	Freshwater or Reclaimed water	Reliable	Consistent with CEC water policy for reclaimed water only; Air emissions associated with trucking water to the site	Possible emergency back-up option

Preferred Option - After evaluating the currently available water supply options, SES is proposing to use reclaimed water from SWTF as the source of water for the project. SES will finance upgrades to the existing treatment plant so its effluent meets Title 22 requirements. In exchange, SES will have access to approximately 200,000 gallons of reclaimed water per day (140 gpm) for up to 45.9 acre feet per year for use in all construction and operation activities except for potable water. A letter of agreement (will serve letter) between the Seeley County Water District (SCWD) and SES is provided as attachment SWR-1.

The SCWD has identified four options for upgrading the treatment facility to meet Title 22 requirements and will make an on-site evaluation with their engineers and SES in April before identifying the preferred option. The final upgrade will result in reclaimed water that meets the following Title 22 water quality treatment requirements. Because the project includes processes that will include mist or spray applications, it is currently anticipated that tertiary treatment will be needed for use at the project site that will include the following Title 22 requirements:

> "Disinfected tertiary recycled water" means a filtered and subsequently disinfected wastewater that meets the following criteria:
>
> (a) The filtered wastewater has been disinfected by either:
>
> (1) A chlorine disinfection process following filtration that provides a CT (the product of total chlorine residual and modal

> contact time measured at the same point) value of not less than 450 milligram-minutes per liter at all times with a modal contact time of at least 90 minutes, based on peak dry weather design flow; or
>
> (2) A disinfection process that, when combined with the filtration process, has been demonstrated to inactivate and/or remove 99.999 percent of the plaque forming units of F-specific bacteriophage MS2, or polio virus in the wastewater. A virus that is at least as resistant to disinfection as polio virus may be used for purposes of the demonstration.
>
> (b) The median concentration of total coliform bacteria measured in the disinfected effluent does not exceed an MPN of 2.2 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed and the number of total coliform bacteri7a does not exceed an MPN of 23 per 100 milliliters in more than one sample in any 30 day period. No sample shall exceed an MPN of 240 total coliform bacteria per 100 milliliters.

Once the water is delivered to the project site it will be stored and further treated to meets specific needs. The raw water from SWTF will be temporarily held in dual 175,000 gallon onsite raw water tanks, and then distributed for dust control and to the water treatment prefiltration and Reverse Osmosis unit, as well as distribution for fire system control, and eventual mirror washing and reuse as applicable.

In terms of system reliability, one onsite raw water tank have the capacity to store up to 175,000 gallons, which would provide water supply for over 6 days at maximum daily water use rates (39.2 gpm for 12 hours of operation per day) assuming the storage tanks are full (including the fire system control tank). This should provide adequate time for routine and non-routine maintenance and repairs to the wastewater treatment facility and water transmission pipe system. Also, as stated previously, according to David Dale, engineer to the Seeley County Water District (March 9, 2009), the treatment facility has been very reliable and produced about 200,000 gallons of reclaimed water a day regardless of water supply conditions in the area. Additionally, the annual average required water usage (23.3 gpm) is well below the typical daily treatment at the SWTF.

SES will provide the CEC and BLM with further details in April 2009 on the upgrade to the SCWD treatment facility, pipeline needed to transport the reclaimed water to the project site, additional on-site treatment facilities, and waste discharge and disposal facilities. SES will also provide all necessary environmental surveys, impact assessment, and proposed mitigation measures for these facilities as well as a letter of agreement for use of the proposed right-of-way to install the water pipe when available. After this information is submitted, SES will provide a DESCP/SWPP as well as a revised water balance flow diagram.

SEELEY COUNTY WATER DISTRICT
P.O. Box 161 Seeley CA 92273
Tele (760) 352-6612
Fax (760) 352-0589

March 11, 2009

Kevin Harper
Project Manager
2920 E Camelback Rd., Suite 150 Phoenix, AZ 85016

Dear Mr. Harper:

This letter is to confirm that Seeley County Water District (SCWD) will furnish recycled water (Title 22) to SES Solar Two, LLC upon execution of an agreement and completion of the following requirements to the satisfaction of SCWD:

1. The construction of the secondary treatment facilities necessary to achieve the required water quality standards, pump station and ancillary components are to be paid for by SES Solar Two, LLC.

2. SCWD, in cooperation with SES Solar Two, LLC, will have the plans prepared, bid and constructed. During the design phase SES SOLAR TWO, LLC will be consulted regarding alternatives. Final alternatives will be approved by SCWD and SES Solar Two, LLC. Costs of engineering, bidding and construction, construction management to be paid by SES Solar Two, LLC. A deposit will be necessary to begin the design. The deposit will be the full amount for engineering fees and bidding costs. A check in the full amount of the lowest bid, plus construction management fees will need to be deposited in SCWD account prior to award of the construction contract.

3. SCWD will provide an operator to run the plant. SES Solar Two, LLC will pay for any repairs that become necessary for the upgraded secondary treatment facilities. SES Solar Two, LLC will also bear the costs of any additional chemicals required for the secondary system. SCWD will continue to pay for repairs and maintenance of the existing plant. SES Solar Two, LLC will pay for any training necessary for the operators to operate the upgraded secondary plant.

4. The upgraded secondary treatment plant will become the property of SCWD. Water will be provided to SES Solar Two, LLC as long as the secondary system is operational for a time period to be determined by SES Solar Two, LLC.

5. The pump station and the upgraded secondary plant will be located within the SCWD

plant boundary. Both shall operate on a separate electrical meter, paid by SES Solar Two, LLC. Any repairs to and maintenance of the pump station will be paid for by SES Solar Two, LLC.

6. SCWD will agree to provide up to 200,000 treated gallons per day (Title 22 water) to SES Solar Two, LLC.

7. SCWD might want to explore sharing the Title 22 water with SES Solar Two, LLC in the future, if there is excess water not used by SES Solar Two, LLC. The secondary treated water would be used by SCWD for irrigation of the nearby park. If this becomes the case, SCWD will be responsible for its share of pumping and maintenance costs, based on usage.

This will serve letter is contingent upon the execution of an agreement between SCWD and SES Solar Two, LLC. We look forward to working with Stirling Energy Systems. If you have any questions or concerns, please contact me.

Sincerely,

Rocky Vandergriff
Board President, SCWD

TECHNICAL AREA: VISUAL RESOURCES

Data Request 44: Please provide a draft landscaping plan.

Response: A Draft Landscape Concept Plan has been developed and is docketed under separate cover.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
For the SES SOLAR TWO PROJECT

Docket No. 08-AFC-5

PROOF OF SERVICE
(Revised 2/25/09)

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DECLARATION OF SERVICE

I, Angela Leiba, declare that on March 20, 2009, I served and filed copies of the attached Response to CEC and BLM Data Requests. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[www.energy.ca.gov/sitingcases/solartwo]**. The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(***Check all that Apply***)

FOR SERVICE TO ALL OTHER PARTIES:

_**X**___sent electronically to all email addresses on the Proof of Service list;

_**X**___by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

__**X**___sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

_____depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-5
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original Signed By:
Angela Leiba