

**GENESIS SOLAR ENERGY PROJECT UNIT 1
BURIED RESOURCE EVALUATION AND MITIGATION PLAN
RIVERSIDE COUNTY, CALIFORNIA**

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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
BACKGROUND	1
Genesis Solar Energy Project.....	1
Regulatory Environment.....	5
Federal Regulatory Environment.....	6
State Regulatory Environment.....	8
Buried Resource Discovery	11
Purpose of the Current Document.....	11
NATURAL SETTING.....	13
CULTURAL SETTING.....	15
Historic Ethnographic Setting.....	15
Archaeological Setting.....	15
PREVIOUS CULTURAL RESOURCES WORK CONDUCTED AT GSEP.....	19
Ethnographic Resources.....	19
Native American Heritage Commission	19
BLM Government-to-Government Consultation.....	20
Energy Commission Conditions of Certification – Ethnographic Study	21
Prehistoric Trails Network Cultural Landscape Studies	22
Unanticipated Discovery.....	23
Archaeological Resources.....	24
Pedestrian Surveys	24
Testing of Identified Sites.....	26
Data Recovery.....	27
Construction Monitoring.....	27
Construction Finds	30
Controlled Grading Program.....	32
Interpretation of Controlled Grading Results	38
FORMAL EVALUATION OF NRHP AND CRHR ELIGIBILITY UNDER SECTION 106 AND CEQA	39
Evaluation under Criterion A/1.....	39
Evaluation under Criterion D/4.....	40
Context.....	41
Analysis of Existing Data	41
Artifact Analysis	44
Additional Information	45
Phase I GPR Testing	52
Phase II GPR Survey	53
Logistics	53

OFF-SITE MITIGATION	55
Ethnographic Study.....	55
Archaeological Study.....	58
Geoarchaeological Investigations	59
Sediment Cores	59
Pedestrian Survey and Artifact Analysis	61
Assessment of Archaeological District.....	65
Public Outreach.....	66
Production of Educational Website	66
Production of Augmented Reality Application.....	66
Production of Informational Kiosk.....	67
Instructional Module of Archaeology and Language	67
Establishment of Green Energy/NEPA Scholarship.....	68
Section 106 Training, Basic and Advanced.....	68
Report Preparation	68

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1 Regional Map.....	2
2 Project Area	3
3 Monitoring Finds (through 11/18/11).....	33
4 GSEP Unit 1 Controlled Grading Program Results.....	35
5 Geoarchaeological Trenching Locations	49

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 GSEP Construction Blocks and Approximate Acreage.....	5
2 Regional Archaeological Chronology.....	16
3 Cultural Resources Monitoring Activities at GSEP.....	28
4 Results of the GSEP Controlled Grading Program.....	37

BACKGROUND

This document presents a plan for the treatment of a buried prehistoric cultural resource discovered during the construction of the Genesis Solar Energy Project. Usually, treatment plans are very technical documents. However, given the wide-spread interest in this find on the part of non-specialists additional background information and explanations of various analytical techniques has been provided.

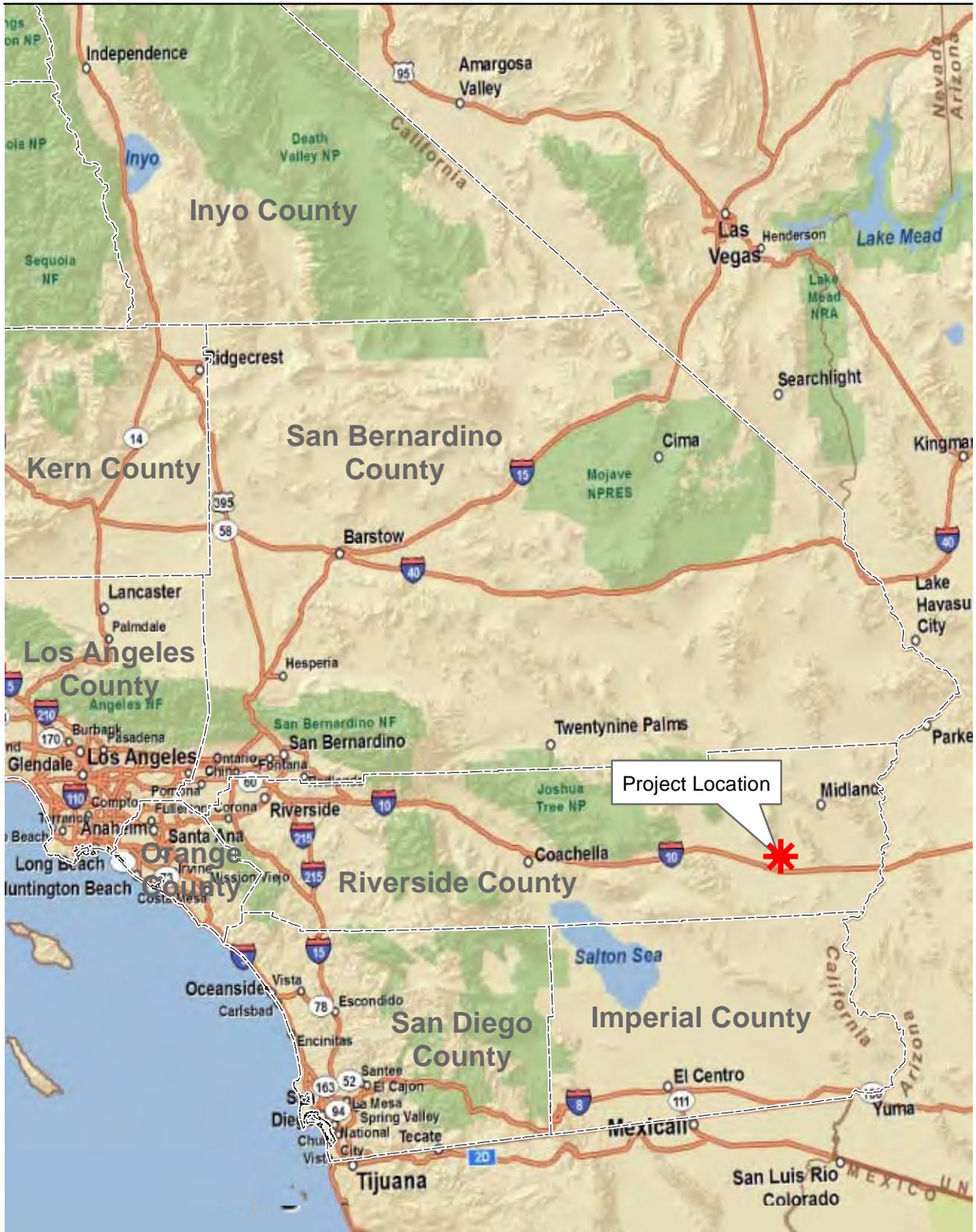
GENESIS SOLAR ENERGY PROJECT

The Genesis Solar Energy Project is licensed as a nominally rated 250-megawatt (MW) solar thermal power generating facility located in Riverside County, California, between the community of Desert Center and the City of Blythe (Figure 1). The GSEP is located on public land managed by the Bureau of Land Management (BLM). The Project Disturbance Area, which includes both permanent and temporary disturbance, is approximately 1,819.5 acres, and includes approximately 1,727 acres for the Plant Site and approximately 70 acres for the Linear Facilities. The Plant Site includes the solar arrays, power blocks, power generating equipment, support facilities, and evaporation ponds. The Linear Facilities include a transmission line and an access road, natural gas pipeline, and a main access road connecting the GSEP Plant Site to the Wiley's Well Interchange off of I-10 (Figure 2).

In August of 2009, Genesis Solar, LLC (Genesis Solar), a wholly owned subsidiary of NextEra Energy Resources, LLC, submitted an Application for Certification (AFC) to the California Energy Commission (Energy Commission) for the Genesis Solar Energy Project (GSEP). The Energy Commission certified the Project in its Final Decision dated September 29, 2010, Docket Number 09-AFC-8 (Final Decision or License).

In addition to the Energy Commission's Final Decision, the Project received its Right-of-Way (ROW) Grant from BLM in November 2010 and Notice to Proceed (NTP) to construct Phase I from both the Energy Commission and BLM in January 2011. Genesis Solar received its Final NTP from the Energy Commission and BLM for construction of the remainder of the GSEP in September 2011. In addition to the construction of the solar facility itself, the activities that will occur given this final NTP include construction of a gas pipeline, the Generation Tie (gen-tie) line from the GSEP Plant Site to the Colorado River Substation (CRS), and access/spur roads along the gen-tie line.

The GSEP project area is divided into two parts, each approximately 900 acres in size, consisting of Unit 1 to the west and Unit 2 to the east. Each unit is further divided into rectangular blocks with eight blocks in Unit 1 and 10 blocks in Unit 2 (Table 1). GSEP cut-and-fill activities began in Unit 1 of the plant site on September 6, 2011. In cut areas, the ground surface is brought to grade using belly scrapers, cutting 6 to 12 inches per pass. In fill areas, the ground surface is scarified using a tractor pulling disc blades across the surface. Graded soils from the cuts are used to bring the surface to grade in fill areas.



Source: ESRI; NextEra Genesis

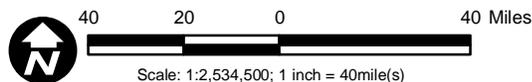
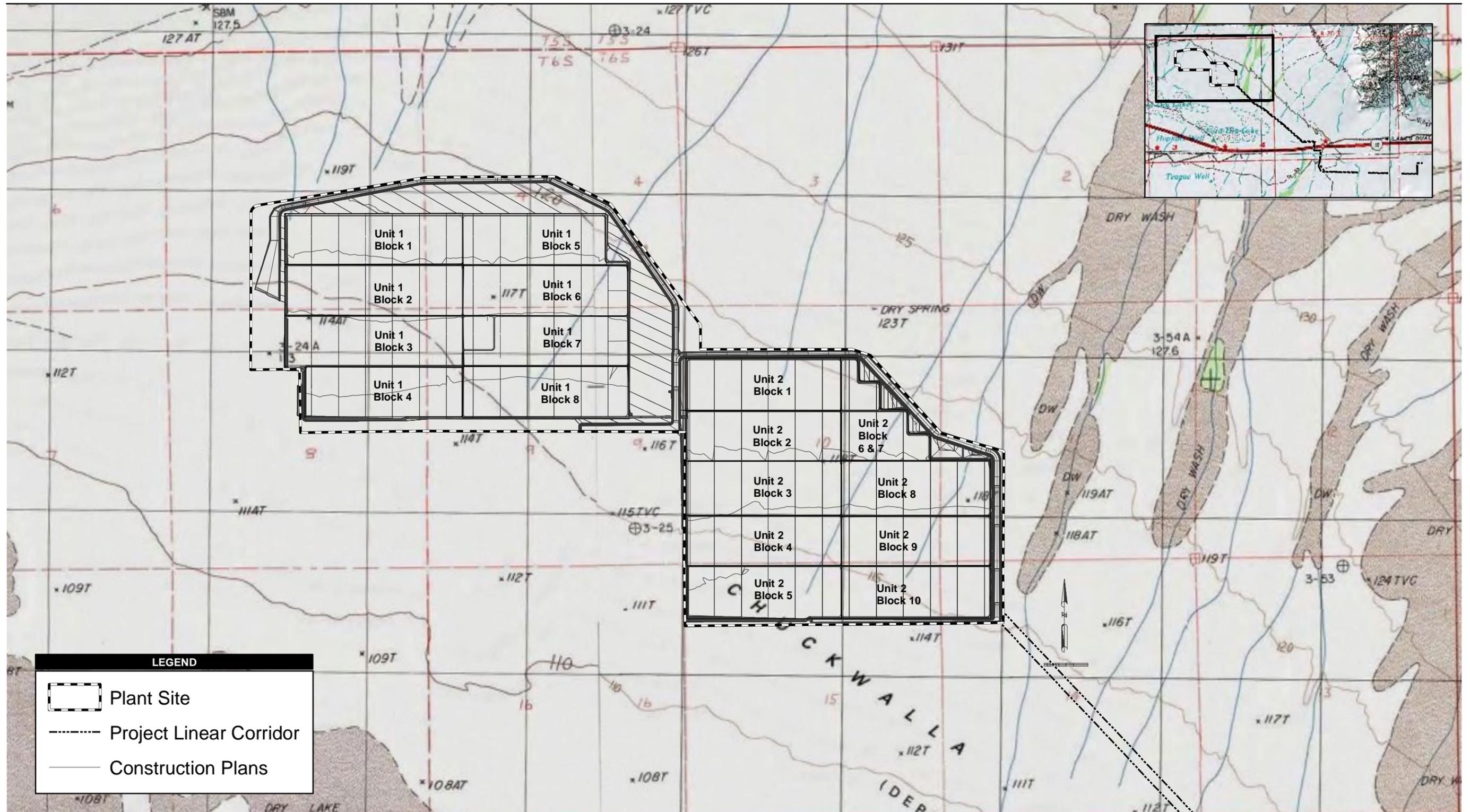


Figure 1
Regional Map



Source: NexEra Genesis, ESRI

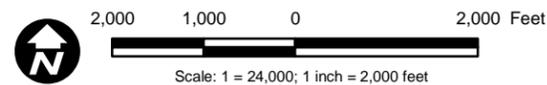


Figure 2
Project Area

Table 1. GSEP Construction Blocks and Approximate Acreage

Unit 1		Unit 2	
Construction Block	Approximate Acres	Construction Block	Approximate Acres
Block 1	88	Block 1	78
Block 2	90	Block 2	74
Block 3	85	Block 3	82
Block 4	85	Block 4	75
Block 5	72	Block 5	80
Block 6	84	Block 6	14
Block 7	80	Block 7	37
Block 8	86	Block 8	80
		Block 9	72
		Block 10	74

REGULATORY ENVIRONMENT

Numerous federal and state laws, ordinances, regulations, and standards govern the management of cultural resources. Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. State and federal laws use different terms for when identifying cultural resources that are significant or important. California state law discusses significant cultural resources as “historical resources,” whereas federal law uses the terms “historic properties” and “historic resources.”

BLM is the lead federal agency for the undertaking for the purpose of complying with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800). The treatment of cultural resources is governed by a Programmatic Agreement (PA), which is described in detail in the GSEP Historic Properties Treatment Plan (HPTP) (Farmer and Farrell 2011a). The Energy Commission is the lead agency under the California Environmental Quality Act (CEQA). The Energy Commission has approved the construction and operation of the GSEP pursuant to Section 25519, 155 § (c) of the Warren-Alquist Act of 1974. Under this certification, the treatment of cultural resources is governed by the GSEP Cultural Resources Conditions of Certification (COCs) and the Cultural Resources Management and Mitigation Plan (CRMMP) (Farmer and Farrell 2011b).

Compliance with the PA, HPTP, the COCs, and the CRMMP with respect to cultural resources are supervised by George Kline, M.A. on the behalf of BLM and Elizabeth A. Bagwell, Ph.D. on behalf of the Energy Commission. AECOM has been contracted by Genesis Solar, LLC to provide the cultural resources compliance monitoring services required by the HPTP, the CRMMP, and CUL-8 of the COCs (Construction Monitoring Program). AECOM archaeologists Stacey Jordan, Ph.D., RPA, and Matthew Tennyson, M.A., RPA, are Energy Commission - designated Cultural Resource Specialists (CRSs) for the GSEP. Mr. Tennyson also serves as the GSEP’s designated Project Prehistoric Archaeologist and Mary Ann Vicari, M.A., is serving as the Project Geoarchaeologist (PG).

Federal Regulatory Environment

Most of the plant, the associated transmission line, and access roads will be built on BLM land. BLM granted NextEra permission (ROW grant) to use Public land managed by the BLM on November 4, 2010. To receive this permission, NextEra completed many environmental studies, including several focused on cultural resources. These studies helped them comply with federal laws, such as Section 106 of the National Historic Preservation Act.

As part of the process of complying with the legal requirements, BLM consulted with the federally recognized Tribes, the State Historic Preservation Officer, the Energy Commission, and NextEra limit the way cultural resources might be affected by construction or operation of the project. The decisions reached in these conversations were put into a legal document (the Programmatic Agreement or PA) and described in detail in a treatment plan (Historic Properties Treatment Plan or HPTP). The BLM, State Historic Preservation Officer, and NextEra signed this document, meaning that they are legally required to follow the PA and the HPTP. Because it is a federal document, the Energy Commission did not sign the PA. NextEra is also required to meet the conditions and mitigation measures identified in the Energy Commission's COCs and CRMMP.

Based on these measures, BLM and the Energy Commission gave NextEra permission to start building the plant perimeter fence and access road on December 10, 2010. On August 24, 2011, BLM and the Energy Commission gave NextEra permission to start building the rest of GSEP.

Key Federal Legislation and Regulations

The following briefly summarizes the key federal cultural resources legislation and regulations that apply to the project.

National Historic Preservation Act, Title 16 United States Code Section 470, as amended. The National Historic Preservation Act (NHPA) sets in place a program for the preservation of historic properties. Section 106 of the NHPA requires federal agencies to take in to account the effects of projects on historic properties (resources included in or eligible for the National Register of Historic Places). It also gives the Advisory Council on Historic Preservation and State Historic Preservation Office an opportunity to consult. Federal agencies issuing permits for the project, including the BLM, must comply with NHPA requirements.

36 CFR 800 – Protection of Historic Properties. These regulations issued by the Advisory Council on Historic Preservation outline how the Section 106 review process is to be carried out, specifying the actions federal agencies must take to meet their legal obligations. Included are requirements for consultation, identification and evaluation, assessment of effects, and resolution of adverse effects.

Native American Graves Protection and Repatriation Act (NAGPRA), Title 25 United States Code Sections 3001-3013. Provides for the protection of Native American graves, funerary objects, and “objects of cultural patrimony” on federal land and establishes the procedures for determining ownership for Native American human remains, funerary objects, and other sacred

objects under federal jurisdiction. For undertakings on public land managed by the BLM, adherence to NAGPRA and other applicable federal laws will be managed by BLM personnel after a coroner's determination that recovered remains are Native American.

43 CFR Part 10, NAGPRA Regulations. These regulations implement NAGPRA and deal with intentional archaeological excavations, discoveries, consultation, custody, and lineal descent and cultural affiliation.

American Indian Religious Freedom Act (AIRFA), Title 42 United States Code Section 1996. This measure establishes a national policy to protect the right of Native Americans and other indigenous groups to exercise their traditional religions. Federal agencies issuing permits for the project are required to comply with this act if Native Americans identify issues regarding their right to exercise traditional religious practices.

Section 106 Process

This project falls under Section 106, with the BLM as the lead federal agency. As part of the Section 106 review process, a federal agency must determine if resources (i.e., properties eligible for listing the National Register of Historic Places) will be affected by a project. To be eligible for the National Register of Historic Places, a resource must be significant at the local, state, or national level under one or more of the following four lettered criteria. Eligible resources are those:

- A. Associated with events that have made a significant contribution to the broad patterns of our history;
- B. Associated with the lives of persons significant in our past;
- C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
- D. that have yielded or may be likely to yield, information important in prehistory or history.

All resources or properties eligible for the National Register of Historic Places must retain integrity. This means the resource must possess the characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association.

Assessments of project impacts are based on direct and indirect physical changes to a resource that is eligible for the National Register of Historic Places. A significant impact would occur if the project:

- alters a resource or its setting in a manner that affects the qualities that make it significant. Direct impacts to archaeological resources include grading, and for built resources include removal of key elements (e.g., roof), or demolition;
- indirectly alters the setting, access to, or other elements of the resource in a manner that negatively affects the significance of the resource. Examples of indirect impacts include increased erosion at archaeological sites or visual intrusion of buildings that are left vacant; or
- disturbs any human remains, including those located outside of formal cemeteries.

The Advisory Council on Historic Preservation’s regulation 36 CFR 800.5(a)(1) defines significant impacts as “adverse effects.” Adverse effects occur when:

“...an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property’s eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.” (36 CFR 800.5[a][1])

State Regulatory Environment

The Energy Commission is the California state agency that gives licenses to build and operate thermal power plants of 50 megawatts output or larger. As part of the Energy Commission licensing application process, NextEra completed cultural resources studies for the GSEP project area analysis; that area including and surrounding the project site and transmission lines that would be directly or indirectly affected by the project. As part of its review, Energy Commission cultural resources staff; NextEra; Local, state, and federal agency representatives, and interested members of the public attended formal public meetings to identify cultural resources in the project area and discuss how they might be impacted by the construction and operation of GSEP. On September 29, 2010, the Energy Commission approved NextEra’s application to build and operate GSEP. As part of this approval, the actions that would be taken to reduce the project’s impact to cultural resources were specified (Conditions of Certification), including a requirement that NextEra provide a detailed treatment plan, including protocols for dealing with unanticipated discoveries, prior to the start of ground disturbance at the project site (Cultural Resources Management and Mitigation Plan). For further information see the California Energy Commission’s Final Decision at http://www.energy.ca.gov/sitingcases/genesis_solar/documents/index.html. Key state cultural resources legislation and regulations that apply to the project are summarized below.

Warren-Alquist State Energy Resources Conservation and Development Act Public Resources Code Section 25000 et seq. This legislation created and gives statutory authority to the California

Energy Commission. The Commission's siting process has been determined by the Secretary of the California Natural Resources Agency to be a certified regulatory program under the California Environmental Quality Act (CEQA) and the functional equivalent of preparing an Environmental Impact Report (EIR). The Energy Commission is the lead agency under CEQA for all projects it considers, and staff must meet the requirements of CEQA and the CEQA Guidelines when assessing a project's environmental impacts and their significance. However, Energy Commission staff prepares an independent Staff Assessment, rather than an EIR, to document the results of their environmental assessment.

California Code of Regulations Title 20. Public Utilities and Energy. California Energy Commission Regulations CEC-140-2008-001-REV\1. Article 6, Appendix B of this document identifies the information requirements for an AFC, including information about cultural resources in the project area.

CEQA, Pub. Res. Code 21083.2., Under CEQA a unique archaeological resource is an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one of the following criteria: (1) Contains information needed to answer important research questions and that there is a demonstrable public interest in that information; (2) Has a special and particular quality such as being the oldest or best example of its type; or (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require that reasonable efforts be taken to preserve these resources in place or provide mitigation measures.

CEQA, Pub. Res. Code 21084.1 and CEQA Guidelines, California Code of Regulations Title 14 Section 15064.5 defines a "historical resource" to include:

- resource(s) listed or eligible for listing on the California Register of Historical Resources [14 California Code of Regulations (CCR) Section 15064.5(a)(1)]
- resource(s) either listed in the National Register of Historic Places or in a "local register of historical resources" unless "the preponderance of evidence demonstrates that it is not historically or culturally significant." [14 CCR Section 15064.5(a)(2)]
- resources identified as significant in an historical resource survey meeting the requirements of section 5024.1(g) of the Public Resources Code [14 CCR Section 15065.5(a)(2)].

For listing in the CRHR, a historical resource must be significant at the local, state, or national level under one or more of the following four numbered criteria. A resource will be eligible if:

1. it is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;

2. it is associated with the lives of persons important to local, California, or national history;
3. it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; and/or
4. it has yielded or has the potential to yield information important to the prehistory or history of the local area, California, or the nation.

Under 14 CCR Section 15064.5(a)(3) the final category of “historical resources” may be determined at the discretion of the lead agency.

As with requirements for the NRHP, all resources eligible for the CRHR must retain integrity, which is the authenticity of a resource’s physical qualities that existed during the resource’s period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling and association.

14 CCR Section 15064.5(d) requires consultation with appropriate Native Americans as identified by the Native American Heritage Commission, per Public Resources Code section 5097.98 if there is the existence of, or the probable likelihood of, Native American human remains within the project area.

Public Resources Code Section 5097.98. This section discusses the procedures that need to be followed upon the discovery of Native American human remains. The NAHC, upon notification of the discovery of human remains by the County Coroner, is required to notify those persons it believes to be most likely descended from the deceased Native American. It enables the descendant to visit the site of the discovery of the Native American human remains and to recommend to the land owner (or person responsible for the excavation) the preferred means of treating, with dignity, the human remains and any associated grave goods. These procedures must be followed when remains are found on lands not managed by the federal government. For projects on public land managed by the BLM, adherence to applicable federal laws will be managed by BLM personnel after a coroner’s determination that recovered remains are Native American.

Public Resources Code Section 21084.1. This section sets forth that a project that may cause a significant adverse change in a significant historical resource is a project that may be considered to have adverse effects on the environment. Historical resources not listed on the CRHR or other local lists may still be considered historical resources at the discretion of the lead agency on the project.

BURIED RESOURCE DISCOVERY

By November 16, 2011, a widely dispersed scatter of flaked stone and ground stone (manos and metates) artifacts, buried between 1 and 3 feet beneath the surface had been identified during construction grading in the eastern half (Unit 1) of GSEP. Based on subsequent controlled grading activities to identify the horizontal extent of the distribution (discussed below), the artifact distribution covers approximately 100 acres, though the boundaries remain uncertain. The artifacts likely represent resource processing activities along the former playa shoreline of Ford Dry Lake. Based on the lack of ceramics observed, these artifacts may date to the pre-ceramic period prior to circa 1000 AD. Several sites in the near vicinity that were recorded during the Class III surveys yielded diagnostic projectile points relating to the early and middle Archaic periods.

Following the legal documents and plans described above, and after consulting with concerned Tribes, the BLM and Energy Commission told NextEra to: 1) stop construction in Blocks 1-4 of Unit 1; 2) find the boundaries of the resource both horizontally and vertically; 3) determine if the resource can be avoided by redesigning the project; 4) determine if the resource is significant and therefore requires mitigation; and 5) propose what sort of mitigation measures might be appropriate.

PURPOSE OF THE CURRENT DOCUMENT

The purpose of this evaluation and mitigation plan is to identify methods for the formal evaluation of the resource's eligibility to the NRHP and CRHR as part of the Section 106 and CEQA processes, and present mitigation alternatives should the resource be found eligible and infeasible to avoid. This plan first addresses the evaluation goals specified in Section 9.4.2 of the HPTP and Section 9.4.2 of the CRMMP, which includes recovery of the information about the resource necessary to determine whether it meets NRHP and CRHR criteria for eligibility. Specific methods for evaluation are presented below in Section V. Should the resource be found eligible to the NRHP and/or CRHR, alternative mitigation strategies are presented in Section VI.

The proposed evaluation will consist of two parts: 1) examining the existing information recovered during construction monitoring and controlled grading efforts; and 2) gathering additional information mainly related to resource integrity, as defined above in Sections I.B.1 and I.B.2. The existing data consists primarily of the types and numbers of artifacts recorded and collected during monitoring and controlled grading, and information on their spatial locations. In order to use this data to evaluate the significance of the resource under the NRHP and CRHR eligibility criteria, a statistically significant sample of the artifacts will be analyzed to assess whether the materials represent different types of artifacts that are indicative of particular time-sensitive styles or economic uses, and, if so, whether and how those differences are patterned in geographic space across the resource located in Unit 1 Blocks 2 and 3. In order to complete the evaluation of the resource, additional information is required to 1) assess the integrity of the resource and determine if it represents an intact deposit; 2) identify any physical connection between the resource and nearby NRHP-eligible sites CA-Riv-9072 and CA-Riv-9223; and 3) locate possible buried features, of which there has been no evidence to date.

The results of this evaluation utilizing the research contexts and methodologies specified in Sections 5.0 and 9.4 of the HPTP and Sections 5.0 and 9.4 of the CRMMP, will indicate whether data recovery/mitigation, including data recovery, is necessary. Given the dispersed nature of the buried resource, traditional data recovery strategies are unlikely to substantively enhance the information that has already been collected during construction monitoring and controlled grading. Therefore, in addition to an on-site mitigation strategy, an entirely off-site mitigation plan is also presented. The plan includes three parts: a -multi-year ethnographic study, exploration of the archaeology of Ford Dry Lake, and public outreach.

NATURAL SETTING

The GSEP is located in eastern Riverside County's central Chuckwalla Valley. This east-southeast-trending valley is typical of California's Mojave Desert Geomorphic Province, which is characterized by east-west-trending ranges separated by desert valleys with enclosed drainages and dry lakes. The GSEP is bordered to the north by the Palen Mountains, to the northeast by the McCoy Mountains, to the south by the Little Chuckwalla Mountains, and to the west by the Chuckwalla Mountains. The GSEP is relatively flat, with elevations of approximately 400 to 370 feet (GSEP 2009, p. 3-3) and lies near the toe of alluvial fans carrying sheet wash from the Palen Mountains and the McCoy Mountains. The rain-created sheet wash eventually reaches the Ford Dry Lake playa about one mile south of the project, but more commonly is absorbed into the ground water (GSEP 2009, 5.4-3).

The GSEP sits in the transition between the Mojave and Colorado Deserts. The dryer Mojave Desert is characterized by Joshua Tree woodland with creosote bush and white bursage dominate the dry Mojave Desert, while additional trees like palo verde, ironwood and ocotillo are also present in the Colorado Desert (West et al. 2007, p. 30). Two main vegetation types are present at GSEP, Sonoran creosote bush scrub, which are stabilized and partially stabilized sand dunes (GSEP 2009, p. 5.3-1).

Birds, reptiles and small mammals, particularly rabbits, ground squirrels, gophers, mice, and Kangaroo Rats, are present at GSEP. Larger mammals such as Coyote, Kit Fox, American Badger, Bobcat, and Mountain Lions have also been noted. Common reptiles noted in the area include snakes, chuckwalla, Desert Iguana, Mojave Fringe-toed lizard, and the Desert Tortoise. Among the birds hawks, quail, doves, burrowing owls, songbirds, and migrating waterfowl are relatively common (Bagwell and Bastian 2010).

Playa lakes, formed during the Holocene, are quite ephemeral, with life cycles of one to a few tens of years. Playa lakes deposit sediments are orange or brown in color; consist of silt and sand; do not form distinct layers; do not contain aquatic fossils; and contain saline layers. Geological bore samples from Ford Dry Lake show that it contains playa lake deposits to depths of approximately 160 meters (Tetra Tech EC, Inc 2010b). Geomorphological analyses also indicate that shorelines were present at elevations of 360, 370, 373 to 374, 377, and 380 ft above mean sea level, with the age of the shorelines decreasing sequentially from highest to lowest elevation (Kenney 2010:7).

CULTURAL SETTING

HISTORIC ETHNOGRAPHIC SETTING

Currently, it is believed that no singular historic Native American group or groups occupied or used the region in which the proposed project site is located, but instead that the area was used widely by various groups at one time or another for resource collection, travel, spiritual activities, and settlement. In maps identifying group territories, Kroeber (1925) suggests that the proposed project area is traditional Chemehuevi territory, while other documents suggest that the immediate area surrounding the proposed project site is near likely near Cahuilla and Serrano territory (Bean 1978:576). Ultimately, however, it has been concluded (Singer 1984:36-38) that the area was not clearly assigned to any Native American group on maps depicting group territories. Following Johnson and Johnstone (1957), Singer observed that the west end of the Chuckwalla Valley was near the intersecting boundaries of Cahuilla-Serrano-Chemehuevi territory. Possibly before 800 BC, the Chemehuevi may have expanded into Serrano territory, occupying the Chuckwalla Valley. No evidence suggests that the Cahuilla occupied the area. Given its east-west orientation and location in the Chuckwalla Valley, the vicinity of the project may have served as an east-west trade and travel route for many of the tribes in the region, including the Chemehuevi, Serrano, Cahuilla, Mojave, Quechan, Maricopa, and Halchidhoma.

In addition, the area experienced relative fluidity in territorial boundaries over time. This fluidity, in general, is represented in the use, abandonment, intrusion and displacement by the aforementioned ethnographic groups. Further, much of this shifting in territories and boundaries during the ethnographic period can be assigned to inter-tribal warfare. As such, the Project area, specifically the environs of Ford Dry Lake, evinces the potential use and/or occupation by some or all of these groups during various times. Further such activities may have fluctuated between territorial controls of the local resources to a joint-use model where multiple groups may have had varying levels of access to those resources.

ARCHAEOLOGICAL SETTING

Human populations have occupied the California desert for at least 10,000 years (Moratto 1984). Stratified sites that would aid in providing temporal controls and help establish a cultural chronology are virtually unknown in the study area. The earliest explorations of the Mojave and Colorado Deserts took place in the 1930s and 1940s (Campbell 1931, 1936; Campbell and Campbell 1935; Campbell et al. 1937; Rogers 1939, 1945). During this time a basic cultural-historical outline was established, which has formed the foundation for subsequent efforts (Arnold et al. 2002, pp. 46–48; Love and Dahdul 2002; Schaefer 1994; Warren 1984). However, these early attempts were based on surface scatters and inference rather than large-scale data recovery projects or regional surveys.

Numerous cultural resource management projects have resulted in dramatic increases in our understanding of the prehistory of the region. Two of the most notable synthetic works include the BLM's large-scale cultural resources inventory of the Central Mojave and Colorado Desert

Regions (Gallegos et al. 1980) and Crabtree’s (1980) overview. It was not until the late 1990s that any archaeological site was excavated and reported in the literature within 100 kilometers (km) of the GSEP project areas. Jones and Klar’s (2007) recent review of California archaeology builds from where these earlier authors left off, including the results of recent data recovery projects (Schaefer and Laylander 2007; Sutton et al. 2007). The following discussion and culture-historical sequence primarily follows the sources listed above.

Table 2. Regional Archaeological Chronology

Archaeological Period	Date Range	Characteristics
Paleo-Indian Period	about 10,000–8000 BC	Isolated fluted projectile points, assignable to the Western Clovis Tradition.
Lake Mojave Complex	about 8000—6000 BC	Stemmed Series projectile points (Lake Mojave and Silver Lake types), abundant bifaces, steep-edged unifaces, crescents, and occasional cobble tools and ground stone tools.
Pinto Complex	about 8000—3000 BC	Toolstone use focus upon materials other than obsidian and cryptocrystalline silicate (CCS). Pinto Series points are stemmed with indented bases.
Deadman Lake Complex	about 7500—5200 BC	Small-to-medium-size contracting stemmed or lozenge-shaped points, large concentrations of battered cobbles and core tools, and abundant bifaces, simple flake tools, and ground stone tools.
Possible Abandonment	about 3000 to 2000 BC	Few archaeological sites date to this period. It is possible some areas were largely abandoned during this period.
Gypsum Complex	about 2000 BC to 200 AD	Corner-notched Elko Series points, concave-base Humboldt Series points, and well-shouldered contracting-stemmed Gypsum Series points along with numerous bifaces, quartz crystals, paint, split-twig animal figurines, and rock art.
Rose Spring Complex	about 200 AD to 1000 AD	Wickiups, pit houses, and other types of structures in addition to artifact assemblages containing knives, drills, pipes, bone awls, various ground stone tools, marine shell ornaments, and large amounts of obsidian from this time.
Late Prehistoric Period	about 1000 AD to 1700 AD	Ceramic artifacts, Desert Series projectile points, shell and steatite beads, and a variety of milling tools as well as rock art, trails, and geoglyphs.

For the Chuckwalla Valley and vicinity, Singer (1984) has presented a lithic quarry-oriented prehistoric settlement model. Over 200 prehistoric sites occur in the region. Past peoples inhabiting the area appear to have been very mobile, especially during late prehistoric and early historic times. During early historic times, native peoples inhabited towns/hamlets located along the Colorado River, within the Coachella Valley, and at major desert springs/oases. The Chuckwalla Valley was a relatively closed resource exploitation zone. It served as an east-west oriented trade route/corridor between the Pacific Ocean and the Colorado River/greater Southwest. An extensive network of trails is present within the Chuckwalla Valley. Given its orientation and location, the valley may have been neutral territory (i.e., a buffer zone), unclaimed by neighboring native peoples. Quarry sites probably were “owned” by tribal groups. The distribution of particular types of toolstones may have corresponded to a group’s territorial

boundaries, and a toolstone type may not have occurred beyond the limits of a group's specific territory.

Within the Chuckwalla Valley, prehistoric sites are clustered around springs, wells, and other obvious important features/resources. Sites include villages with cemeteries, occupation sites with and without pottery, large and small concentrations of ceramic sherds and flaked stone tools, rock art sites, rock shelters with perishable items, rock rings/stone circles, geoglyphs, and cleared areas, a vast network of trails, markers and shrines, and quarry sites. Possible village locations are present at Ford Dry Lake, McCoy Spring, Palen Lake, Granite Well, and Hayfield Canyon. A cluster of temporary habitation and special activity (task) sites occurs around a quarry workshop in the Chuckwalla Valley. The Chuckwalla Valley aplite quarry workshop complex probably was used throughout the Holocene. During this period, Chuckwalla Valley most likely was occupied, abandoned, and reoccupied by a succession of ethnic groups. In the Early Holocene (i.e., Lake Mohave complex times), the area may have been relatively densely inhabited. During the Middle Holocene (i.e., Pinto and Gypsum complexes period) it may only have been sporadically visited. The subsequent Late Holocene Rose Spring and Late Prehistoric periods probably witnessed reoccupation of the valley by Yuman and Numic-speaking peoples.

PREVIOUS CULTURAL RESOURCES WORK CONDUCTED AT GSEP

Multiple cultural resources studies have been conducted at the GSEP site in order to identify the presence of any resources and propose mitigation measures for impacts that the project might have as required by both the BLM and the Energy Commission. Some of these efforts took place prior to, and were part of the decision making process for, choosing the location for the plant site, transmission lines, and access road. Others have been conducted as part of permitting requirements and during construction as unanticipated resources have been discovered. These efforts can be broken into two types, those related to ethnographic resources and those related to archaeological resources. Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. These resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these communities may define the geographic boundaries of the area that is analyzed. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures. Archaeological resources include both prehistoric period resources associated with the human occupation and use of California prior to prolonged European contact as well as historic period resources associated with Euro-American exploration and settlement and the beginning of a written historical record.

ETHNOGRAPHIC RESOURCES

This section describes how ethnographic resources have been identified and the measures that have been implemented in an attempt to mitigate direct, indirect, and cumulative impacts to those resources as a result of GSEP. In addition, guidance provided by Tribal representatives regarding the preferred treatment of a buried resource discovered during construction grading, is summarized.

Native American Heritage Commission

For GSEP, the identification of ethnographic resources began by contacting the Native American Heritage Commission (NAHC). The NAHC maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to in this document as Native American ethnographic resources. The NAHC Sacred Lands database has records for places and objects that Native Americans have advised the NAHC that they consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a Tribal group or themselves, who have expressed an interest in being contacted about development projects in specified areas. While the BLM must formally consult, government-to-government, with the federally recognized Native American tribes that have traditional cultural ties to the area in which the project is located, the Energy Commission provides information, sends notices of all public events regarding the project to all Native American groups and individuals whom the NAHC identifies as having an interest in

development in the area, whether federally recognized or not; and meets with Tribal representatives, when requested, to discuss the project and solicit input on project-related impacts to important Native American religious or cultural resources.

NextEra contacted the NAHC by email on October 17, 2007. The NAHC responded on October 19, 2007, with the information that the Sacred Lands File (SLF) database failed to indicate the presence of Native American cultural resources in the immediate GSEP vicinity. The NAHC also forwarded a list of Native American groups or individuals interested in development projects in Riverside County.

BLM Government-to-Government Consultation

On November 26, 2007, the Palm Springs-South Coast Field Office of the BLM sent letters to 28 Native American groups, including those identified by the NAHC, initiating government-to-government consultation for the proposed project. On November 23, 2009, BLM sent an additional letter to the Agua Caliente Band of Cahuilla Indians and informational copies to 12 other groups noting the *Federal Register* publication of the Notice of Intent (NOI) for the proposed project. Publication of the NOI initiated the scoping process to solicit public comments and identify issues. The letter urged any concerned Native American groups to utilize the Section 106 process to provide comments or identify specific concerns.

Between November 2007, and December, 2009 a number of tribes—Agua Caliente Band of Cahuilla Indians, Morongo Band of Mission Indians, Cabazon Band of Mission Indians, Torres-Martinez Desert Cahuilla Indians, Pechanga Band of Luiseño Indians, Anza Cahuilla, Ramona Band of Mission Indians, Twentynine Palms Band of Mission Indians, and San Manuel Band of Mission Indians—attended meetings with BLM staff about various solar energy and transmission line projects in the region. In general, the tribes expressed concern over possible damage to cultural resources, cultural landscapes, and traditional cultural properties. In addition, they expressed interest in receiving copies of archaeological reports after cultural resources surveys of the GSEP footprint and linear facilities corridors were complete and being informed about the amount of damage to these resources that was likely to occur during project construction.

Four tribes—the Fort Yuma Quechan Tribe, the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Chemehuevi Reservation—responded to the BLM letters about GSEP. The Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Chemehuevi Reservation expressed general concerns about the potential destruction of cultural resources and traditional cultural properties.

During this initial phase of the project analysis, the Fort Yuma Quechan Tribe contacted the BLM multiple times. Their concerns were summarized in a formal letter written in response to the proposed Programmatic Environmental Impact Statement for Solar Energy Development for the six southwestern states. In this letter, they consider the area around Blythe, including the GSEP site footprint and linear facilities corridor, to be part of the Quechan Tribe's traditional land. To alleviate potential impacts to cultural resources, spiritual landscapes, or traditional cultural properties (TCPs), they requested to be consulted at the inception of a project, prior to any plans being finalized. They further requested that the clustering of these large multi-

thousand-acre projects be prohibited, that traditional areas rich in cultural resources be avoided, that projects be placed on land that has already been disturbed, and that existing buildings be favored over undisturbed land for the placement of solar panels. Finally, they emphasized their concern over indirect as well as direct impacts to cultural resources. They requested that the BLM not “focus exclusively on archaeological site impacts, while failing to fully address impacts to resources such as cultural landscapes and TCPs” (Jackson 2009, p. 3).

Energy Commission Conditions of Certification – Ethnographic Study

The Energy Commission developed COC’s to address the GSEP project’s direct, indirect, and cumulative impacts to the prehistoric and ethnographic resources described above. The BLM incorporated these conditions into their ROW Grant. CUL-1 (Prehistoric Trails Network Cultural Landscape Documentation and Possible NRHP Nomination) established a regional research project funded by NextEra and the owners of other nearby solar projects and managed by the Energy Commission. An ethnographic study was one part of this program.

Dr. Lowell Bean, Jim Toenjes, and Ginger Ridgeway developed an ethnographic context for the GSEP site and surrounding region from ethnohistoric and ethnographic records and sources (Bean et al. 2010). The team also began a place name study which intends, to the extent possible, to connect places mentioned in oral histories or traditional songs with actual physical locations. Chemehuevi/Paiute groups had use rights to territory extending into California, with boundaries west of the Tehachapis and north to Mount Whitney, as well as parts of Nevada and Arizona. Ownership was established and recorded in songs that belonged to specific individuals; the songs named the places the singers owned.

Dr. Bean and his team also conducted a small number of interviews with representatives from the Native American groups that have expressed concerns about GSEP, with the hope of understanding current traditional uses of the desert area activities such as, hunting, plant gathering, mining, and trail running. The following discussion is based upon the team’s report written for the Energy Commission (Bean et al. 2010). These interviews found that traditional religious practice among the peoples whose ancestors occupied and used the GSEP vicinity survives principally in mortuary rites. At such rites, traditional songs that describe journeys and treks that took place in “creation time” are sung. These journeys and treks involve places in the GSEP vicinity for both the Chemehuevi/Paiute and Mohave. When the songs are sung, participants in the rites re-visualize the places that are mentioned, and this re-creation of the sacred past, respondents explained, involves a memory of what they have actually seen when they have traveled through the desert. Some of the sacred places are mountains; some are stands of plants like pinyons that they, like people in the sacred past, harvest with due ritual; some are the habitats of animals like mountain sheep that have religious significance for Native Americans; and some are places that may be marked by petroglyphs or rock features. Some respondents purposely make trips into the GSEP vicinity to seek religious power. Whether they do so or not, they indicate that the destruction to the landscape, both physical and visual, by solar projects, is an unmitigable offense to the sacredness and spirituality of the landscape. For many, it presents a denial of the opportunity to engage in traditional religious activities.

Many Native Americans interviewed felt that the only appropriate mitigation would be to not proceed with the projects. In the event that this is not feasible, the following recommendations were made:

1. Native Americans from groups most concerned should be present during construction to advise with respect to mitigation of impacts on surface and subsurface cultural resources.
2. Whenever possible, Native Americans should be employed on the project, not only during the construction phase, but also for ongoing operational tasks, particularly monitoring of archaeological fieldwork and construction.
3. When impact to plant or animal communities of concern to Native Americans cannot be avoided by moving the lines (i.e. redesigning the project to avoid sensitive areas), consideration will be given to translocation, especially if the species are endangered or rare.
4. Places that are eligible for the NRHP or CRHR on the basis of ethnographic and/or historic sensitivity will be avoided or protected. If avoidance is impossible, a plan for the protection of the resource will be developed with Native American participation.
5. Sites that have a high sensitivity rating because they have religious or spiritual value to Native Americans will be avoided or protected to the extent that a site with religious or spiritual value to any other group would be avoided or protected. The Native American Religious Freedom Act of 1978, P.L. 95-341 (Federal Agencies' Task Force 1979) reaffirms that Native Americans have the same rights to religious freedom as other Americans.
6. If Native American burial or cremation sites cannot be avoided and are in danger of negative impact, Native Americans will be consulted about appropriate action, including recovery and disposition of remains.
7. An effort will be made to curate artifacts collected from the Study Area in a facility approved by Native Americans or returned to a location at or near "where they [recovered materials] live," meaning where they were originally collected.

Prehistoric Trails Network Cultural Landscape Studies

Contacts with the NAHC and government-to-government consultation with the BLM prior to project licensing by the Energy Commission or ROW approval by the BLM did not result in the identification of any specific resources which might be directly or indirectly impacted by the construction of GSEP. However, in the Energy Commission analysis (Staff Assessment), cultural resources staff designated a noncontiguous cultural landscape (historic district) that incorporates prehistoric archaeological sites associated with the Halchidhoma Trail (CA-Riv-0053T), referred to as the Prehistoric Trails Network Cultural Landscape (PTNCL) (Bagwell and Bastian 2010). This trail passes near the project site. This landscape consists of important destinations in the

Colorado Desert near Blythe, California; the network of trails that tie them together; and the features and sites associated with the trails. Six sites, located within the GSEP facility footprint and linear corridor, were identified as PTNCL contributors subject to direct impacts. Two hundred and forty-eight additional sites are located within the GSEP ethnographic area of analysis and are subject to indirect impacts.

The Energy Commission determined the PTNCL eligible for listing on the CRHR under Criteria 1 and 4. Under Criterion 1, a resource is eligible if it is associated with “events that have made a significant contribution to the broad patterns of our history”. In the context of a Native American site where its importance is not recorded in written form, National Register Bulletin 38 (NPS 1998, pp. 12–13) makes it clear that the word “our” refers to the group that finds the property significant and “history” includes both traditional oral and written history. Important events can include specific events, or repetitive trends. Places referred to in Native American oral histories and creation stories, therefore, are potentially eligible.

Native American groups in the Mojave Desert consistently accord mythological importance to springs, petroglyph sites, and particularly trails systems. Trails across the desert mark the locations of travels of ancestral groups as they migrated to the confluence of the Gila and Colorado Rivers. Trails also facilitate dream travel to these places and the times when events mentioned in story and song occurred (Cleland 2005, p. 132). The particular trail that forms the connecting link for this cultural landscape, the Halchidhoma Trail (CA-Riv-0053T), is well known from multiple historical and ethnographic sources. It was an essential trade, transportation, and ritual route for Native American peoples and early European visitors in the Colorado Desert during prehistoric and historic times. This route was an essential connection between the Pacific Coast and the Southwestern deserts of Arizona and New Mexico.

Energy Commission considers the resources that make up the PTNCL to be significant under CRHR Criterion 1, for their ties to important events in American history. However, most property types associated with the PTNCL exist today as archaeological resources, such as petroglyphs, pot drops, cleared circles, and webs of intersecting trails. These sites are also considered register-eligible under Criterion 4 for their ability to yield information important in history and prehistory.

Six sites, located within the GSEP facility footprint and linear corridor, are PTNCL contributors which were subject to direct impacts. The remaining 248 sites are located within the GSEP ethnographic area of analysis and are expected to be subject to indirect impacts. All of these sites are eligible for listing in the CRHR as contributors to the PTNCL. The largest of these sites, and the prehistoric focus of the entire region, is McCoy Spring National Register District (CA-RIV-0132). The site is located on the west side of the McCoy Mountains approximately 5 miles from the Wiley’s Well Road Rest Area. This resource is already listed on the NRHP and the CRHR.

Unanticipated Discovery

As described in detail below, on November 16, 2011 a buried cultural resource was observed by Cultural Resources Monitors and Native American Monitors during the grading of Genesis Unit 1 Blocks 1-3. Section 9.3 of the HPTP and Section 9.3 of the CRMMP (Plan of Discovery

Procedures) call for representatives from BLM, Energy Commission, State Historic Preservation Officer (SHPO), Native American tribes, and the GSEP CRS to review and discuss any proposed evaluation if an unanticipated cultural resource is identified during construction. This section summarizes feedback provided by Native American tribes to BLM during formal government-to-government consultation as well as other comments provided by Tribal representatives during meetings and site visits related to this discovery.

The BLM conducted formal government-to-government consultation regarding this unanticipated discovery with the Colorado River Indian Tribes (CRIT) Tribal Council on January 12, 2012; the Ft. Mojave Tribe on January 13, 2012; and the Fort Yuma Quechan Tribal Council on January 31, 2012. Tribal representatives from various groups have attended multiple site visits and meetings regarding this resource between November 2011 and April 2012. Overall, Tribal representatives have reported that they consider this buried discovery to be both an ethnographic resource and an archaeological resource which is primarily important for its religious and spiritual values. The preferred treatment of the discovery is avoidance. Further, considering the importance of the discovery as an ethnographic resource, Tribal representatives consider the most appropriate method for evaluating its eligibility for listing on the NRHP and CRHR to be an ethnographic study. The archaeological or information values of the discovery were of interest, but the extensive ground disturbing techniques required to collect this information would compromise spiritual and religious values. The ethnographic study will emphasize interviews with local Tribal members focused specifically on Ford Dry Lake and its immediate vicinity. Tribal representatives also note that an ethnographic study will have been conducted during the resource identification phase, approximately around the same time as the initial pedestrian archaeological surveys which took place in 2007. When asked about possible mitigation measures appropriate to treat impacts to this discovery, Tribal representatives have emphasized compensatory off-site mitigation measures including: 1) ethnographic studies, 2) funding for a curation facility in eastern Riverside County, and 3) beginning and advanced Section 106 training for Tribal representatives.

ARCHAEOLOGICAL RESOURCES

Cultural resources studies of archaeological resources located within the GSEP project area include pedestrian surveys, archaeological testing programs, data recovery, artifact collection associated with construction monitoring, and controlled grading associated with the discovery of a large buried prehistoric resource. These studies have addressed both historic and prehistoric archaeological resources; however, only those related to prehistoric resources are summarized here.

Pedestrian Surveys

The archaeologists for NextEra (Tetra Tech and/or AECOM) undertook multiple distinct intensive pedestrian archaeological surveys of the GSEP site footprint and linear facilities corridor alternatives. In total, Tetra Tech surveyed a total of 5,430.3 acres for the GSEP project. The total number of acres surveyed by AECOM is 82.6.

The initial survey was a BLM Class II Sampling Field Inventory, which was conducted to facilitate decision-making regarding the placement of the project footprint. During the Class II survey, 20 percent of a 9,480-acre project area was surveyed. To identify locations to survey, this area was divided into 40-acre parcels along eighth-section lines. Forty-eight 40-acre parcels were then randomly selected from a total sample universe of 237 using a random numbers table. In total, 1,896 acres were surveyed. The field work was conducted between November 2007 and January 2008. A total of 53 archaeological sites were discovered in the course of the Class II inventory: 46 are prehistoric, 5 are historic (exclusively refuse deposits), and 2 are dual-component (having both prehistoric and historic elements).

The second survey was an intensive BLM Class III survey of the 2,494-acre proposed project facility site plus a perimeter buffer of 200 feet as part of BLM's and the Energy Commission's CEQA/NEPA/Section 106 review of the Project. The field work was conducted between March and April, 2009. Sites that had been recorded in this area during the initial Class II survey were briefly revisited during the Class III survey and updated if necessary. Of the 21 sites identified, 5 are historic, 15 are prehistoric, and 1 is dual component (historic/prehistoric).

The third pedestrian survey was an intensive BLM Class III survey of the proposed linear facilities corridor as part of BLM's and the Energy Commission's CEQA/NEPA/Section 106 review of the Project. Survey coverage included the proposed linear alignment, plus 75 feet to either side of the center line of the routes. A total of 449.5 acres were surveyed. The fieldwork was conducted in June of 2009. Of the seven sites identified, three are historic, three are prehistoric, and one is dual component (historic/prehistoric).

The fourth pedestrian survey was an intensive BLM Class III survey of a number of linear facilities corridor alternatives as part of BLM's and the Energy Commission's CEQA/NEPA/Section 106 review of the Project. Survey coverage included the corridor alternatives, plus 75 feet to either side of the center line of the routes. A total of 590.8 acres were surveyed. The fieldwork was conducted in January and February of 2010. Of the 20 sites identified, 12 are historic, seven are prehistoric, and one is dual component (historic/prehistoric).

NextEra filed an amendment with the Energy Commission on April 13, 2012 to modify the alignment of the gen-tie line and natural gas pipeline. AECOM conducted two addendum intensive BLM Class III surveys for transmission line realignments and adjustments. The first survey was conducted in August of 2011 and included a total of 4.98 acres near the proposed Colorado River Substation. No cultural resources were identified (Tennyson 2011). AECOM also conducted an additional Class III survey of a transmission line and utilities corridor re-route in March 2012 (Option B). A total of 77.6 acres were surveyed and four previously unidentified sites were recorded. Of the sites identified two were prehistoric and two were dual component.

Overall, 105 archaeological resources have been identified during pedestrian surveys associated with GSEP. Of these resources 25 were historic, 73 were prehistoric, and 7 were dual component. Forty-three resources—24 within the site footprint and 19 within the linear corridor— had the potential to be directly impacted by construction. Some of these have since been avoided, particularly along the transmission and utilities corridor. The four sites recently

identified by AECOM as of April 2012 have not been evaluated, and it is uncertain if they will be subject to direct impacts.

Broadly speaking, prehistoric cultural resources in the GSEP vicinity can be characterized as sparse artifact scatters and possible temporary campsites. Ethnographic sources suggest that portions of the Mojave Desert distant from water sources were primarily used for travel and ritual activities rather than for the collection of resources (Cleland 2005). These activities are associated with trails, trail-associated ceramic scatters, and petroglyphs. The sparse artifact scatters are primarily prehistoric flakes and cores. These tend to blend into the prehistoric isolates, which are also predominantly lithics, forming a landscape with regular but diffuse evidence of prehistoric human activities. These activities appear to be related to stone tool manufacturing and maintenance, possibly tied to the collection of wild resources, particularly along the margins of Ford Dry Lake.

Testing of Identified Sites

In October and December 2010, BLM directed Tetra Tech to undertake a limited testing program at eight sites (CA-RIV-9084, CA-RIV-9209, CA-RIV-9215, CA-RIV-9216, CA-RIV-9220, CA-RIV-9223, CA-RIV-9227, and CA-RIV-9072). The program was developed to confirm eligibility for the NRHP for these sites and to collect data to aid in the preparation of a Historical Properties Treatment Plan for the Project. Following BLM guidelines, the program was limited to the excavation of shovel test pits (STPs) that were 30 centimeters (cm) in diameter, placed in systematic arrays on the sites. The number of STPs used on each site did not exceed the four cubic meter and 25% surface area restrictions called for in the BLM guidelines. In addition, all artifacts encountered in the course of the work were analyzed in the field and no collections made. STPs were terminated at depths between 30 and 50 cm when the sterile Pleistocene alluvium was reached. The results of this program suggested that there are no buried deposits at any of the tested sites. BLM determined that seven of these sites were not eligible for listing on the NRHP; as such no further field testing was required by BLM. Site CA-RIV-9072, in contrast, was determined to be eligible for the NRHP. During the Energy Commission certification process these sites were assumed eligible for the CRHR, and conditions of certification were written requiring additional data collection. The data recovery is described in the next section.

In January 2011 the BLM directed Tetra Tech to undertake a limited testing program of 14 prehistoric artifact scatters. These sites included: CA-RIV-9047, CA-RIV-9048, CA-RIV-9051, CA-RIV-9206, CA-RIV-9207, CA-RIV-9208, CA-RIV-9210, CA-RIV-9212, CA-RIV-9217, CA-RIV-9218, CA-RIV-9219, CA-RIV-9221, CA-RIV-9256, and CA-RIV-9257. During the Energy Commission certification process, these sites were determined to be ineligible for the CRHR. However, Archaic period artifacts were found at some of these sites and, therefore, BLM determined that a limited testing program would be appropriate.

The goals and the methods used for this program were identical to those described above. The results of this program suggested that there are no buried deposits at any of the tested sites. The BLM determined five of these sites to be eligible for the NRHP due to their clear association with the Archaic period and the lack of information from this period in the region. Further data

recovery was therefore required. The BLM determined that the remaining nine artifact scatters were not eligible for the NRHP, and further field efforts were not required.

In general, this testing program indicates that prehistoric cultural resources within GSEP consist of places which were visited regularly for short periods over thousands of years, most likely to collect and process wild resources.

Data Recovery

Prehistoric sites directly impacted by GSEP have been subjected to data recovery in several phases. This work has been guided by the BLM HPTP, and the Energy Commission COC's and CRMMP. Broadly speaking, fieldwork consisted of the piece-plotting and collection of all artifacts located on the surface of each site using sub-meter accurate GPS unit. Tetra Tech completed this work at site CA-RIV-9227 in January of 2011 and at sites CA-RIV-9072, CA-RIV-9084, CA-RIV-9209, CA-RIV-9215, CA-RIV-9216, CA-RIV-9220, and CA-RIV-9223 in April 2011.

In August of 2011, AECOM conducted a secondary data recovery effort at CA-RIV-9072 (only the portion within the project site) as well as at the four Archaic period sites (CA-RIV-9047, CA-RIV-9212, CA-RIV-9215, CA-RIV-9220). Additional data recovery in the portion of CA-RIV-9072 which is outside of the GSEP project site is planned for the future. This work will consist of detailed mapping of artifacts and features, if present, as well as the in-field analysis of a sample of the artifacts. No ground-disturbing activities are planned for this portion of the site.

Since GSEP construction began in the fall of 2011, AECOM has been monitoring all project-related ground disturbance. Frequently, as ground disturbance takes place at site locations additional artifacts are found. These artifacts have been plotted and collected and the site boundaries of existing sites have been modified as necessary.

As required by the BLM and the Energy Commission, all artifacts that will of have been collected as part of data recovery or construction monitoring will be analyzed and the results presented in the final cultural resources report.

Construction Monitoring

Personnel

As prescribed by CUL-8 of the COCs (Construction Monitoring Program), Sections 8.1 through 8.4 of the HPTP, and Sections 8.1 through 8.4 of the CRMMP, Cultural Resources Monitors (CRMs) have been present during all ground-disturbing activities of all native soil. GSEP cut-and-fill activities began in Unit 1 on September 6, 2011. From September 2011 to March 2012, there have been between one and 25 CRMs at the GSEP based on varying levels and location of construction activity, as required by CUL-8 of the COCs (Construction Monitoring Program), Section 8.1 of the HPTP, and Section 8.1 of the CRMMP. In the same time frame between one to ten Native American monitors from the Soboba Band of Luiseño Indians have been on-site for all ground-disturbing activities where CRMs are present (see Table 3).

Table 3. Cultural Resources Monitoring Activities at GSEP

Month/Year	Construction areas	Construction Tasks	Number of Cultural Monitors	Major events for the month
January 2011	Access Road	grading, fence installation	**	
February 2011	Access Road	cut and fill activities	unknown number of CRM, 1 NAM	
March 2011	No information	no ground disturbing activities	**	Monitoring suspended on the 9th of March 2011
April 2011	East half of site	marking of cultural sites prior to mowing, site mowing, no ground disturbance	**	
May 2011	West half of site	mowing activities, UXO survey	1 CRM	UXO Survey
June 2011	Access Road; Eastern half of plant site; Well Pad 0; Well Pad 1; Well Pad 2; Unit 1; Unit 2	cut and fill activities, scarification and soil preparation, drilling activities	1 CRM, 1 to 3 NAM	Sites CON-H-1 and CON-H-2 first identified
July 2011	Unit 2; Northern Fenceline; Unit 1, near southern fenceline; Kit Fox Den 11 and 15; Access Road	cut and fill activities, scarification and soil preparation, drilling, kit fox den collapse	1 CRM, 1 to 2 NAM	
August 2011	Assembly building; Unit 2; Well pad 1; Well Pad 0; E Caisson Test Area; Common Area; NW Well Pad 2; perimeter fence; Centerline Road	cut and fill activities, scarification and soil preparation, EOD Survey, caisson drilling, and trenching activities	1 CRM, 1 to 2 NAM	EOD Survey took place.
September 2011	Assembly building; Unit 2; Well pad 1; Well Pad 0; E Caisson Test Area; Common Area; NW Well Pad 2; perimeter fence; Centerline Road	cut and fill activities, scarification and soil preparation, EOD Survey, caisson drilling, and trenching activities	1 to 3 CRM, 1 to 3 NAM	EOD Survey took place.

Month/Year	Construction areas	Construction Tasks	Number of Cultural Monitors	Major events for the month
October 2011	Unit 1, Blocks 1, 3, 4, 5, 6, and 7, Common Area and Contour Area; Well Pad 0; Assembly Building; Den 8	cut and fill activities, scarification and soil preparation, and various trenching activities	4 to 5 CRM, 3 NAM	
November 2011	Unit 1 Block 1, 2, 3, and 4	cut and fill activities, scarification and soil preparation	6 CRM, 2 to 4 NAM	The potential feature (GEN-SB-129), located in Unit 1, Block 2, was left <i>in situ</i> and flagged for avoidance
December 2011	Unit 1, Blocks 1, 2, 4, 5, 6, 7, and 8; Unit 2, Blocks 1, 3, 4, 5, 6, 7, 8, 9, and 10	cut and fill activities, scarification and soil preparation, caisson drilling, and drilling for temporary power lines	6 CRM, 3 to 6 NAM	Unit 1, Blocks 1, 2, 3, and 4 have been made exclusion zones
January 2012	Unit 1, Blocks 5 and 8; Unit 2, Blocks 1, 2, 3, 4, 5, 8, 9, and 10	cut and fill activities, scarification and soil preparation, caisson drilling, and drilling for temporary power lines	7 to 10 CRM, 4 to 8 NAM	Additional mitigation is required on site CA-RIV-9212. A plan is currently being prepared. The exclusion zones for CON-H-1 and CON-H-2 remain in place until a testing plan is submitted and approved.
February 2012	Unit 1, Blocks 1, 5, 6, and 7; Unit 2, Blocks 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10, Channels C and D	cut and fill activities, scarification and soil preparation, caisson drilling, and various trenching activities on site	13 to 25 CRM, 4 to 9 NAM	Mitigation at CA-RIV-9212, Testing at CON-H-1 and CON-H-2, CRMs also monitored during implementation of the Controlled Grading Plan (Kline 2012), which took place in portions of Unit 1, Blocks 2, 3, and 4
March 2012	Unit 1, Blocks 1, 2, 4, 5, 6, and 7, Contour Area 1 and Common Area; Unit 2, Blocks 1, 2, 3, 4, 6, 7, 8, 9, and 10, Channels C and D	cut and fill activities, scarification and soil preparation, caisson drilling, and various trenching activities on site	14 to 17 CRM, 5 to 10 NAM	Unit 1 block 1,4, and eastern portions of block 2 and 3 were cleared for construction activities, The exclusion zones for the western portions of Unit 1 block 2 and 3 and diffuser in western portion of Unit 1 remain in place

** No information available

The GSEP CRMs have observed ground-intrusive construction activities and inspected cleared ground and excavation trenches for signs of previously undiscovered archaeological resources. When the CRM discovers any archaeological finds during construction, they have the authority to temporarily halt construction and must notify the CRS, BLM, and Energy Commission Compliance Project Manager (CPM) of any new archaeological sites finds, in accordance with Energy Commission COC's CUL-5 and, CUL-8 (Farmer and Farrell 2011b) and Section 8 of the HPTP (Farmer and Farrell 2011a). Isolated artifacts are recorded, measurements and photos are taken, the artifact's location is recorded with a sub-meter GPS and collected for transport to

AECOM for further analysis. A new DPR 523A form is created for any isolated finds; also an updated DPR continuation form is created for any previously recorded sites containing new artifacts. All forms for a single month are compiled and distributed to the BLM and Energy Commission with the GSEP Monthly Compliance Report submitted to the Energy Commission.

The CRMs prepare a daily monitoring log which provides a brief description of the field conditions, construction progress and activities, non-compliance activities, and record of any finds of archaeological material. The daily monitoring logs are forwarded to the Energy Commission and the BLM daily. As of the week of December 12, 2011, all daily logs have also been sent to representatives of the tribes contacted listed in Appendix I of the GSEP Programmatic Agreement and a list of contacts provided by George Kline of the BLM. All monitoring logs are compiled and incorporated in to the Monthly Compliance Report for the GSEP.

Construction Finds

Monitoring at the GSEP began in January 2011. Between January and September 1, 2011, Energy Commission records indicate that 24 artifacts, including 4 prehistoric artifacts have been identified during monitoring. Artifacts recovered have included 2 flakes, one scraper, and a core was found on the surface during preliminary construction-related activities (i.e., assembly building construction, kit fox den collapsing, and channel grading). As construction activities have increased, additional CRMs have been deployed to monitor those activities. Between September 1, 2011 and March 30, 2012 a total of 550 prehistoric artifacts have been recovered from both Unit 1 and Unit 2 of the GSEP during construction monitoring. Artifacts recovered include groundstone, cores, scrappers, hammerstone, and flakes all of which were found during construction related activities.

During the course of construction monitoring in mid-November 2011, AECOM staff identified a large, diffuse scatter of artifacts of unknown dimensions. It is not currently known if this scatter represents an archaeological site or a series of diffuse isolates. Using methods written in Section 9 of the HPTP, Section 9 of the CRMMP (Mitigation Plan/Plan of Discovery of Cultural Resources), and the COCs (CUL-9: Authority to Halt Construction; Treatment of Discoveries), the purpose of this document is to present a plan for an archaeological effort to identify the horizontal and vertical limits of this unexpected discovery. Once these limits are determined, the significance of this resource may need to be evaluated as stipulated by Section 106 of the NHPA and its implementing regulations (e.g., its eligibility for listing in the National Register of Historic Places [NRHP]). Section 9.3 of the HPTP and Section 9.3 of the CRMMP (Plan of Discovery Procedures) call for representatives from BLM, Energy Commission, State Historic Preservation Officer (SHPO), Native American tribes, and the CRS to review and discuss any proposed evaluation if an archaeological site is identified.

Construction monitoring took place in Unit 1, Blocks 1 and 2 beginning in October 2011. During that time, CRMs identified a total of 35 artifacts in Unit 1, Block 1 and 66 artifacts in Unit 1, Block 2 (a total of 101 artifacts). Of the 101 artifacts recovered in Blocks 1 and 2 of Unit 1, there were 52 recovered from the western portion of Block 2 on November 16 and 17, 2011. Two to three CRMs monitored construction activities in this area, in accordance with the COCs (CUL-8:

Construction Monitoring Program), Section 8.1 of the HPTP, and Section 8.1 of the CRMMP. While the number of artifacts recorded increased (suggesting a higher artifact density in Unit 1, Blocks 1 and 2 compared to previously monitored sections of the GSEP), most of these finds were recorded as isolates per Section 9.3 of the HPTP and Section 9.3 of the CRMMP. The HPTP and CRMMP define an isolate as:

... the presence of fewer than three artifacts. An isolate does not constitute a site. Isolated finds are *a priori* considered ineligible for inclusion on the NRHP and/or CRHR, unless the artifact itself is of exceptional significance (Farmer and Farrell 2011a:9-3; Farmer and Farrell 2011b:9-3).

Artifacts identified in Unit 1, Block 2 include lithics, metates, manos, cores, and a stone pendant that was taken to the AECOM office in San Diego. The number of artifacts identified makes it unclear whether the artifacts represent widely dispersed isolates or a diffuse cultural resource of unknown dimensions and depth. In general, the resources have been identified between 1 and 3 ft below the surface, but definite depths, accurate to the centimeter, have not been determined. Efforts were made to ascertain the depths of the artifacts against grade markers in the construction area, but recording depths accurate to the centimeter-level cannot be obtained without the use of advanced survey equipment such as a total station. The purpose of this document is to present a plan for a geoarchaeological effort to identify the horizontal and vertical limits of these observed artifacts, as required in Section 9.3 of the HPTP, Section 9.3 of the CRMMP, and CUL-9 of the COCs (Authority to Halt Construction; Treatment of Discoveries). Once this plan is implemented and completed, a report detailing the findings of the trenching and controlled grading activities will be prepared and submitted to BLM and Energy Commission. The report will include methods employed, results, and recommendations for any further work required based on trenching and grading results. If the resources are determined to compose a site, additional fieldwork may be required to evaluate the site and mitigate any effects construction of the GSEP may have.

Because of the number of isolates identified during cut-and-fill activities in Blocks 1 and 2 of Unit 1 BLM archaeologist George Kline visited the GSEP site on November 17, 2011. Mr. Kline held a meeting with GSEP representative Jessica Auck, CRMs, and Native American monitors to plan immediate changes to the scraping/grading methods in order to minimize the depth of the soil removal. Construction-related grading in the western portion of Block 2 was altered so that a smaller layer of sediment, approximately 4 to 6 in., was removed during each pass. In addition, following the meeting, artifacts identified during scraping and grading activities were staked *in situ* with lath, flagged, and avoided on the next pass in order to facilitate a better view of the distribution of artifacts. After several passes revealed a distribution of artifacts, Mr. Kline decided the artifacts could potentially represent a site versus a concentration of isolates. Work was stopped in the area around the artifacts, as called for in CUL-9 of the COCs (Authority to Halt Construction; Treatment of Discoveries). The distribution of artifacts identified in Unit 1 as of November 18 is depicted in Figure 3.

Controlled Grading Program

Goals

In February 2012, BLM designed a controlled grading plan in an attempt to determine the horizontal and vertical boundaries of the artifact distribution in the western portions of blocks 2,3, and 4 of Unit 1. Data from controlled grading can be useful in discerning any patterns or relationships between artifacts. While controlled grading is not useful for understanding the stratigraphy of an area, it has the potential to be a useful tool for understanding the relationship between artifacts and features within a known stratigraphic sequence (see EDAW 2003; Maxon 2002a, 2002b). The BLM issued a Notice to Proceed for controlled grading activities on February 24, 2012 and the Energy Commission issued its Limited Notice to Proceed via e-mail on February 27, 2012 (Veerkamp 2012). Genesis Solar implemented the plan on February 28, 2012.

Methods

Nine controlled grading areas (CGs) were placed within Unit 1 Blocks 2-4 (Figure 4). Each CG measured 5 meters wide and 100 meters long. A road grader was used to remove approximately 2.5-centimeter layers of soil at a time until a site (three or more artifacts within 30 m) was found or the sedimentary strata were reached that were naturally deposited before the widely accepted dates of human occupation of North America.

All controlled grading areas were monitored by Energy Commission-approved cultural resources monitors (CRMs) and Native American monitors from the Soboba Band of Luiseño Indians. During implementation of the Plan, daily results were sent via e-mail to the BLM and Energy Commission staff. Per the Plan, grading at CG locations was terminated at the direction of the BLM archaeologist upon either (a) the identification of three or more artifacts within 30 m (98.42 ft) of each other or any exceptional individual artifact (b) exposure of Qoaf alluvium. For the purposes of directing controlled grading activities, isolates (defined as fewer than three artifacts within 30 m [98.54 ft] of each other) identified in a CG location were considered as not contributing to or assisting in the definition of the provisional boundary per the BLM archaeologist.

The horizontal and vertical location of each identified artifact was recorded using a total station unit and an electronic theodolite combined with an electronic distance meter, which can read slope distances between the instrument and a specific point (in this case an individual artifact) to provide horizontal and vertical locational data accurate to within centimeters. In addition, a datum for each CG was calibrated off of a single datum point, a USGS survey marker, and ongoing data analysis will allow additional mapping of the CGs relative to this datum.

Results

Of the nine CG locations, five of the CG locations were moved based on the results or previously graded CGs (see Figure 4). CG-1, CG-2, and CG-4 were the first CGs excavated. CG-2 and CG-4 were placed in an attempt to identify a boundary to the resource in Blocks 2 and 3 of Unit 1. Results of the CG excavations are summarized in Table 4.

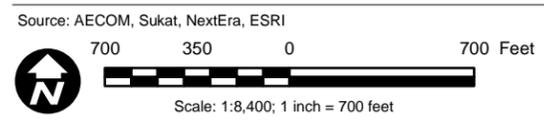
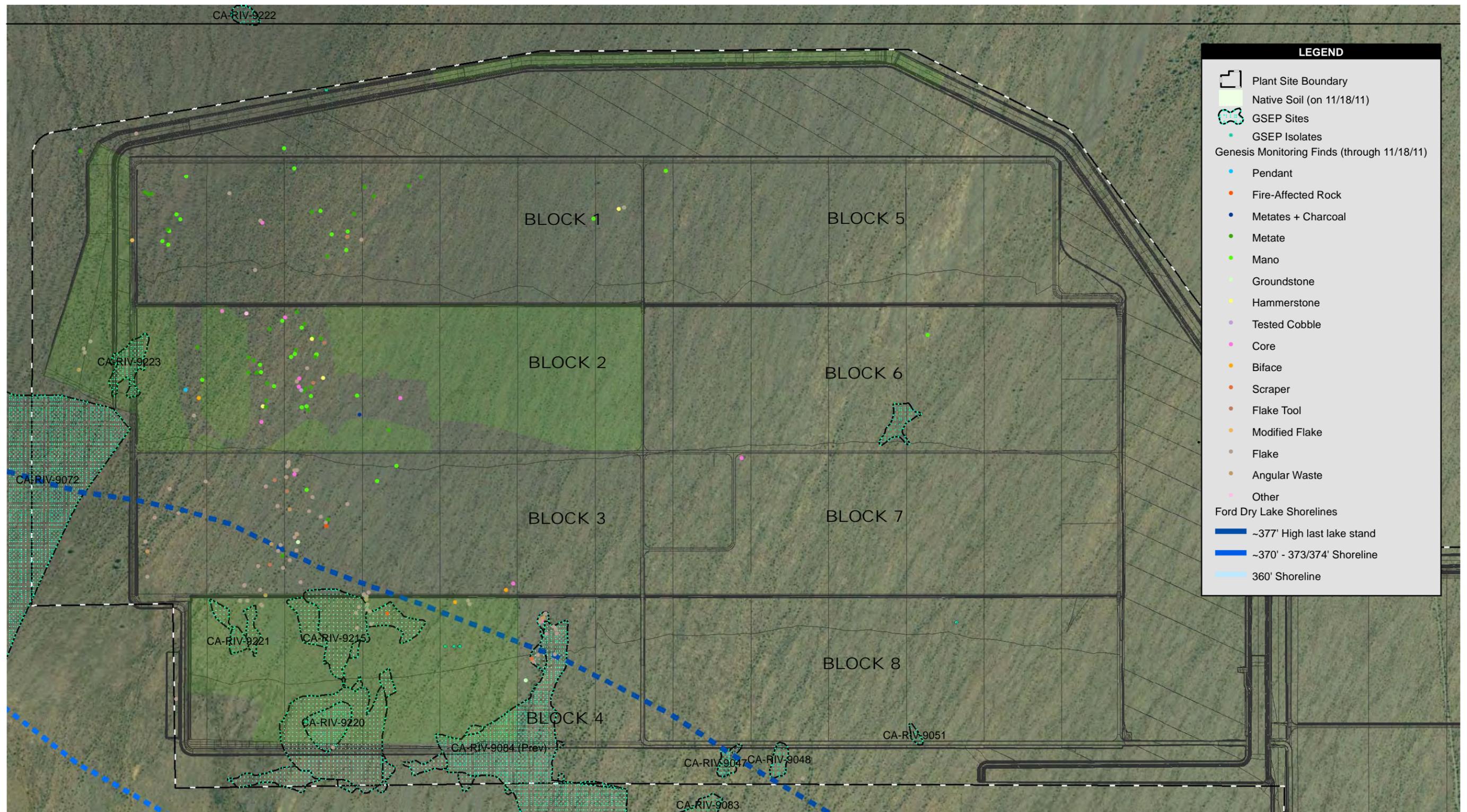


Figure 3
Monitoring Finds (through 11/18/11)

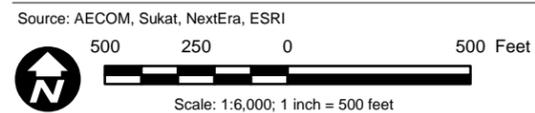
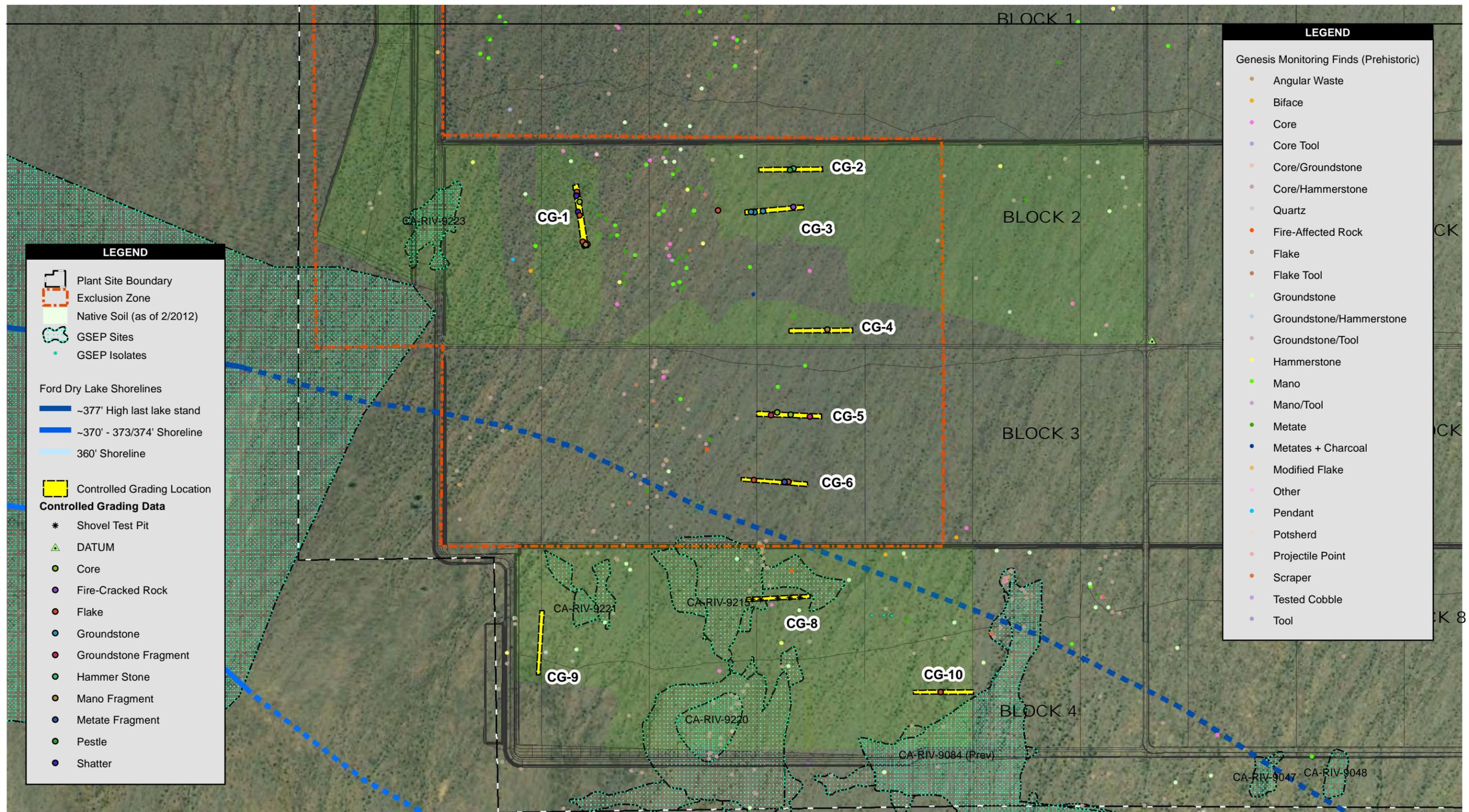


Figure 4
GSEP Unit 1 Controlled Grading Program Results

Table 4. Results of the GSEP Controlled Grading Program

Controlled grading unit	Current status	Artifacts present	Depth/ Pass	Moved from original location	Date completed
CG-1	Shut down per BLM, encountered site	11 artifacts/ 1 mano, 1 metate, 4 flakes, 2 cores, 3 shatter	9 passes	no	2/28/2012
CG-2	Shut down per BLM, encountered site	1 mano, 1 pestal, 1 hammerstone	33 passes	no	3/1/2012
CG-3	Encountered site	site- 3 gst, 1 isolate	2 feet/ 25 passes	yes	2/29/2012
CG-4	Completed, encountered Qoaf	1 mano (isolate)	2.5 feet/ 45 passes	no	2/28/2012
CG-5	shut down per BLM, site found in Qoaf	1 flakestone, 1 core, 2 metates	10 passes	yes	2/29/2012
CG-6	Completed, encountered site	2 groundstone, 3 flakestone	8 passes	yes	3/1/2012
CG-7	Canceled- Per BLM				3/3/2012
CG-8	Shut down per BLM	No cultural resources	12 passes	yes	3/3/2012
CG-9	Shut down per BLM	No cultural resources	5 passes	yes	3/3/2012
CG-10	Completed	2 flakes (2 isolates)	35 passes	no	3/1/2012

Artifacts associated with the resource were found between 0.3 and 2.2 feet below the pre-construction ground surface and do not appear to extend beyond the eastern boundary of Blocks 2-4. However, the exact horizontal limits of the resource, particularly its relationship to sites CA-Riv-9072 and CA-Riv-9223, remain unclear. No features or soil changes attributable to human use or occupation were identified.

Based on the observed distribution of artifacts from the controlled grading locations, a provisional site boundary was identified by BLM on a conference call between BLM, Energy Commission, NextEra and AECOM on March 5, 2012. This boundary consists of a line drawn along the border between Blocks 1 and 2 at the north; continuing 30 m (98.42 ft) east of the easternmost artifacts identified in CG-2, -3, -5 and -6; and a line 30 m (98.42 ft) south of the easternmost artifacts identified in CG-6 and proceeding westward 30 m (98.42 ft) north of the inferred 377' last high lake stand of Ford Dry Lake (see Figure 4).

Within this boundary, artifact types appear to be horizontally distributed in the same manner as observed during construction monitoring efforts, namely a diffuse scatter of flaked and ground lithic material occurring generally in low densities across the units in question. No features, midden deposits or dense subsurface deposits of cultural material were observed during the controlled grading program. While the data suggests that buried artifacts exist and the BLM identified a resource in Blocks 2 and 3 of Unit 1, the grading program did not reveal sufficient data to make a recommendation regarding NRHP or CRHR eligibility of the resource.

Interpretation of Controlled Grading Results

Archaeological staff from the BLM, Colorado River Indian Tribes (CRIT), the Energy Commission, and NextEra met on March 21, 2012 to discuss the results of the controlled grading program and to develop purely archaeological strategies to evaluate and mitigate for the potential loss of the information values of the resource. Major points are summarized below.

- 1) There was general agreement that while the arbitrary definition of a site (3 artifacts within 30m) outlined in both treatment plans (HPTP and CRMMP) was useful during the archaeological surveys prior to construction, it is not a useful definition for this particular resource.
- 2) In addition, there was agreement that the large size and diffuse nature of the resource severely limits the possible archaeological techniques which could be used to evaluate and mitigate it. The group recommended that despite its diffuse nature, this buried artifact scatter will be evaluated, mitigated, and managed as a single resource. Further, the group recommended that the evaluation of the resource should proceed despite the lack of clearly defined boundaries.
- 3) Finally, the group agreed on some archaeological methods which could be implemented to evaluate and mitigate the resource. For on-site resource evaluation, geoarchaeological trenching was proposed as a method to evaluate the integrity of the resource and ground penetrating radar was proposed to identify possible buried features. Additional controlled grading was proposed for on-site mitigation if the resource was determined to be eligible for the NRHP and the CRHR.

These and other techniques are described in detail in the following sections.

FORMAL EVALUATION OF NRHP AND CRHR ELIGIBILITY UNDER SECTION 106 AND CEQA

A plan for evaluating the buried resource in Unit 1 is presented below. As described previously, the resource will be evaluated using all four Criteria. However, information collected during monitoring and the controlled grading program allows us to refine our efforts. This resource does not appear to be associated with a particular historically important individual. Therefore, the resource does not appear to be eligible for listing on the NRHP and CRHR under Criterion B/2. The resource is a sparse artifact scatter created by the collection and processing of resources over thousands of years. Although the size of the scatter is large, the site was formed using site formation processes which are common to most archaeological sites. Therefore the resource does not appear to embody a distinctive type, period, or method of construction, and is not eligible for listing on the NRHP and CRHR under Criterion C/3. Given the nature of the resource, the following plan emphasizes evaluation under Criterion A/1 and D/4.

EVALUATION UNDER CRITERION A/1

As described above in Sections I.B.1 and I.B.2, criterion A/1 affords significance to cultural resources that are associated with events that have made a significant contribution to the broad patterns of American history. A property can be associated with two types of events: 1) a specific event marking an important moment in American prehistory or history, and 2) a pattern of events or a historic trend that made a significant contribution to the development of a community, a State, or the nation. Prehistoric archaeological sites are more likely to be associated with a pattern of events, for example a site where prehistoric Native Americans annually gathered for seasonally available resources and for social interaction. Properties may also have significance under Criterion A if they are associated with events, or series of events, significant to the cultural traditions of a community. A natural feature such as a mountain or lake associated in oral historical accounts with the founding of an Indian tribe would be eligible under Criterion A (National Park Service 1995).

To evaluate the resource under this criterion, the resource will first be classified as to its property type. Second, the historic context the resource represents will be determined. According to National Register Bulletin 15 (National Park Service 1995), the following five things must be determined during this step:

- The facet of prehistory of the local area that the resource represents;
- Whether that fact of prehistory is significant;
- Whether the resource is a type of property that has relevance and importance in illustrating the historic context;
- How the resource illustrates that history; and
- Whether the resource possesses the physical features necessary to convey the aspect of prehistory with which it is associated.

Finally, the integrity of the resource will be considered, where integrity is defined as the ability of the resource to convey its significance. In general, seven aspects of integrity must be considered: location, design, setting, materials, workmanship, feeling, and association. For prehistoric sites and districts, like this resource, some of these aspects are more important than others to convey its significance. For example, setting, feeling, and association would likely be most relevant for the evaluation of the resource. The general steps in assessing integrity include:

- Define the essential physical features that must be present for a property to represent its significance;
- Determine whether the essential physical features are visible enough to convey their significance;
- Determine whether the property needs to be compared with similar properties;
- Determine, based on the significance and essential physical features, which aspects of integrity are particularly vital to the property being nominated and if they are present.

For properties like the resource, archaeological materials must generally be in an overall good condition with excellent preservation of features, artifacts, and spatial relationships to the extent that these remains are able to convey important associations with events or persons. Also, the area would have a potential to yield specific data that addresses important research questions.

Although Tribal representatives have requested an ethnography focused on the buried resource be completed prior to evaluating the resource, sufficient information already exists to make an eligibility determination under Criterion A/1. AECOM ethnographer Stephan Weidlich will examine information collected from consultation with Native American stakeholders, archaeological information collected as part of the GSEP environmental permitting process, and previously published ethnographic and/or archaeological data. He will write a document which synthesizes this information and he will use it to support an eligibility recommendation under Criterion A/1. This effort is expected to take three to four weeks to complete.

EVALUATION UNDER CRITERION D/4

Evaluation of a resource for the NRHP under Criterion D and for the CRHR under Criterion 4 is generally concerned with the data potential associated with a particular resource. According to the *Guidelines for Evaluating and Registering Archaeological Properties* Bulletin (Little et al 2000) the five steps for an evaluation under Criterion D are:

- Identify the property's data set(s) or categories of archeological, historical, or ecological information.
- Identify the historic context(s), that is, the appropriate historical and archeological framework in which to evaluate the property.
- Identify the important research question(s) that the property's data sets can be expected to address.

- Taking archeological integrity into consideration, evaluate the data sets in terms of their potential and known ability to answer research questions.
- Identify the important information that an archeological study of the property has yielded or is likely to yield.

Evaluation of the site under Criterion D/4 would involve analysis of the assemblage that has already been collected to determine if the frequency, type, and features of the assemblage suggest that the historic contexts can be readily identified and determine if important information is likely to be gained from additional archaeological studies (i.e. data recovery, offsite mitigation efforts, etc.).

In addition, LIDAR (Light Detection and Ranging) information will be analyzed. LIDAR uses light rays to map physical features with very high resolution, and has the potential to reveal subtle variances in the ground surface which may indicate cultural resources. Geoarchaeological trenching will also be used to assess the depositional structure and integrity of the resource.

Context

The evaluation of the resources under criterion D/4 will focus on their potential to provide information on prehistoric use of the Ford Dry Lake basin. Specifically, the setting of these resources near what is believed to be the high shoreline of Ford Dry Lake provides an opportunity to assess prehistoric adaptations to desert lacustrine environments. While such adaptations to the pluvial lakes of the terminal Pleistocene and early Holocene in the Mojave Desert have been relatively extensively researched, adaptations to later, more ephemeral lakestands in smaller basins such as Ford Dry Lake are less well known. In marginal environments such as the California deserts, the effects of both short and long-term environmental shifts may be especially profound, resulting in wide fluctuations in the availability of food, water, and other resources important to humans. Desert lake basins, in particular, may provide abundant resources during wetter intervals, but very few when dry; and the ways in humans adjusted to these varying conditions is an important area of research. This research, however, has been impeded by poor resolution of both the archaeological and environmental records.

The evaluations under criterion D/4 will focus on analysis of existing information that has been collected from the sites, as well as the development of additional data based on geoarchaeological trenching and ground-penetrating radar.

Analysis of Existing Data

Material recovered during monitoring and controlled grading in Unit 1 consists of flaked lithics and groundstone artifacts, as well as a few ceramic sherds. Systematic analysis of a sample of these artifacts may reveal patterns relevant to use of Ford Dry Lake during the Archaic and Late Periods. A sample of the artifacts collected during the controlled grading and monitoring will be analyzed and investigated for their potential to provide information important to prehistory (i.e., NRHP Criterion D and CRHR Criterion 4). A complete analysis will be conducted during

the off-site mitigation investigations (see below). To date, analysis has been limited to preliminary identification and cataloging as construction has progressed.

Analysis of the artifacts collected to date from the western portion of Unit 1 have the potential to address several research topics relating to human land use of the Colorado and Mojave Deserts. The discussion below incorporates and supplements research questions developed for the GSEP and listed in Section 5.0 of the CRMMP and Section 5.0 of the HPTP (Farmer and Farrell 2011a, Farmer and Farrell 2011b). Key research themes include the following:

- *Chronology*: Can the archaeological sites in the study area be assigned to specific time periods? While no materials suitable for radiocarbon dating have been obtained, certain artifact forms can provide at least a general timeframe for some archaeological deposits. The use of pottery, for example, is limited to the Late Prehistoric period, and analysis of the flaked stone tool collection may reveal types of projectile points or other tools that have chronological implications.
- *Frequency and Duration of Occupations*: How often, and for how long, did prehistoric groups occupy the Ford Dry Lake basin? Because the sites under consideration are associated primarily with the high shoreline of the lake, the analysis will focus on the relative stability of occupations associated with the maximum lakestands. Occupations at lower elevations closer to the current playa margin would be addressed during off-site mitigation investigations (see below). Key data sets relating to this issue include the following:
 - *Artifact Density and Diversity*: Archaeological deposits containing many artifacts of various types are generally interpreted to represent more stable occupations, since longer periods of occupation tend to result in more artifacts being discarded. Such occupations tend to have a higher diversity of artifacts as well, reflecting the wider range of activities at longer-term settlements.
 - *Features*: The presence of features such as hearths or roasting pits within artifact scatters is consistent with domestic activities associated with prehistoric camps. Where these features have been dispersed, their presence may still be indicated by fire-affected rock.
 - *Portability*: Based on their dimensions and material type, groundstone artifacts may be classified into portable and non-portable forms. This is particularly true for metates (grinding slabs), in that thinner specimens are easily transported while thicker specimens that cannot be easily carried may have been cached at sites for later use. The latter scenario suggests both occupational stability and a more regularized and planned use of the landscape.
 - *Site Structure*: Sites that exhibit internal structure, such as specialized activity areas, may represent more stable occupations.

- *Subsistence*: What kinds of plants and animals were used for food by prehistoric groups in this area? Are any differences in diet discernible at the sites associated with the high shoreline vs. the current playa margin? Currently, animal bone is lacking from the assemblages that can provide direct information on hunting. Groundstone implements, however, can provide important data on the use of plant resources. Recent refinements in the recovery of pollen and phytoliths from groundstone, for example, suggest that a relatively robust sample can be obtained from a variety of contexts within the study area. Key data sets include the following:
 - *Subsistence-related Artifacts*: A general sense of the kinds of foods that were emphasized at specific sites can be provided by artifacts that were directly related to the procurement and processing of subsistence resources. For example, assemblages dominated by groundstone implements may reflect an emphasis on the gathering of plant foods, while projectile points suggest hunting activity.
 - *Pollen and Phytoliths*: More direct evidence of subsistence can be obtained from the removal in the laboratory of pollen and phytoliths from groundstone implements. Where these can be separated from ambient pollen adhering to the artifact, they can disclose specific species of plants being processed.
 - *Protein Residue*: Artifacts used to hunt or process animals for food may retain residues of blood proteins. Analysis of these can identify the animals being hunted to at least the family level.

- *External Relations and Exchange*: Because population densities in the Mojave and Colorado Deserts overall were relatively low, prehistoric groups moved through wide areas, as attested by the extensive network of prehistoric trails throughout the region. Because trade and long-distance travel was an element of broader social relations, the magnitude and direction of the movement of people and commodities, as well as any changes over time, is important to assess. The present sample contains the following data relating to this issue:
 - *Flaked Stone Raw Material*: Preliminary examination of the flaked stone collection suggests that most items are of raw materials that were available in the immediate area. However, some specimens may be present that indicate either trade or long-distance procurement. Examples could include wonderstone, from the west side of the Imperial Valley, or obsidian from the Coso source near the Owens Valley.
 - *Ceramics*: Clays and tempers used in ceramics can be identified with respect to their geological origin. Tizon Brown Ware, for example, was typically transported from the Peninsular Ranges to the west, while Lower Colorado River Buff Wares are made from clays characteristic of the Colorado River.

Artifact Analysis

The analysis of the sample of artifacts recovered during the monitoring and controlled grading and will apply a variety of techniques designed to provide data relevant to the research questions discussed above. It will focus primarily on materials that have been collected from the Genesis monitoring and grading, as well as selected materials from sites identified during the off-site pedestrian survey.

- *Flaked Stone:* The sample of flaked stone artifacts collected during the Genesis monitoring and controlled grading will be analyzed to determine material type and basic technological profiles. The identification of material type will use the general categories currently applied to flaked stone in the Ford Dry Lake basin, such as chert, basalt, chalcedony, and jasper. These will be compared to known sources in the vicinity to provide data on the degree to which local vs. more distant sources of flaked stone were utilized. Technological analysis of the flaked stone materials is expected to be limited because smaller items are unlikely to have been collected during the monitoring and controlled grading. Nevertheless, the analysis may suggest whether the processing of flaked stone within the project area focused on the production of finished tools or the initial reduction of cores. The analysis of the flaked stone artifacts will be conducted by Theodore Cooley of AECOM.
- *Groundstone:* Analysis of groundstone implements will be directed at assessing artifact type, material, and size, as well as on any residues of pollen or other microscopic plant remains that could indicate the kinds of plant resources being processed. The analyzed sample will include the groundstone implements recovered from the monitoring and controlled grading, as well as selected groundstone artifacts from sites discovered during the off-site survey. Each groundstone implement will be measured as appropriate for length, width, and thickness, and material type will be determined. This analysis will be conducted by Theodore Cooley and Matthew Tennyson of AECOM.
- *Pollen, Starch, and Phytoliths:* Additionally, at least 20 groundstone implements will be placed in plastic bags and submitted to PaleoResearch Inc. of Golden, Colorado (PRI) to identify pollen, starch, and phytoliths that represent subsistence resources being processed. Selection of these items will include specimens from the Genesis project area as well as specimens collected at sites near the playa margin, in order to assess subsistence patterns under different lakeshore conditions. At the laboratory, pressurized air and appropriate washing of reverse osmosis de-ionized water will be used to remove extraneous pollen. The remaining pollen, phytoliths, and starches will then be identified and counted to determined subsistence resources.
- *Protein Residue:* Additional information relating to subsistence will be provided by protein residue analysis of selected artifacts. Up to 10 flaked stone tools recovered from the monitoring and controlled grading will be submitted to PRI to identify protein residues adhering to the artifact. The extracted residues will be tested against prepared animal sera to identify positive reactions. Positive reactions usually produce identifications to the family level of the animals being hunted or butchered.

- *Ceramics:* Ceramics recovered from the monitoring and controlled grading, as well as selected specimens from the surface of sites identified during the off-site pedestrian survey will be submitted to a ceramics specialist for typological analysis. On a general level, the analysis will be directed at identifying vessel form as well as ware (i.e., Tizon Brown Ware, Lower Colorado River Buff Ware). Additional attributes may identify a fuller range of types from the Colorado River area. As appropriate, petrographic analysis of selected samples will be conducted to possibly identify sherds manufactured in the immediate vicinity.

LIDAR Analysis

LIDAR (Light Detection and Ranging) data has been generated for the GSEP as part of its permitting process. LIDAR is a remote sensing technology that can be useful in creating spatially accurate maps that have the potential to reveal surface indications of archaeological deposits that are undetected by conventional discovery techniques (see Harmon et al. 2006). Data gathered for the GSEP can be analyzed and may be useful to determine if cultural features (i.e., intact buried resources) and geologic features (i.e. remnant shorelines for Ford Dry Lake) are present within or near the GSEP.

LIDAR data may be analyzed in a micro-topographic scale that may demonstrate minute changes in elevation changes indicative of buried features, which have to date not been observed during monitoring activities. If LIDAR data suggest that buried deposits exist within the GSEP, they may inform where additional remotes sensing techniques can be useful during a potential mitigation program under Criterion D for the Project (Fennell 2010; Harmon et al. 2006; Jaillet 2011; Jalliet-Wentling 2012 Kvamme et al. 2006).

Data obtained during analysis of the assemblage collected during monitoring will be used to evaluate whether evidence exists to suggest that additional information important to prehistory can be obtained from additional archaeological work conducted on site (i.e. onsite mitigation in the form of data recovery) or off-site mitigation (special studies on lithics and groundstone collected during monitoring activities). The analysis of the resources and review of the LIDAR data will be used evaluate the site for potential inclusion to the NRHP under Criterion D and the CRHR under Criterion 4, which correlates to a resource's potential to yield information that is important to prehistory. A recommendation for inclusion to the NRHP and/or CRHR will also include information from geoarchaeological trenching discussed below, which will relay pertinent information regarding the site's integrity.

Additional Information

In order to fully evaluate NRHP eligibility of the resource under Criterion D, two additional analyses will be conducted in Unit 1. Geoarchaeological trenching will be performed to establish integrity of the resource, specifically to determine the potential for intact, subsurface cultural features and buried occupation surfaces. Trenching will also characterize the site's depositional history, and reveal which portions of the site are most likely to contain stratified cultural deposits. GPR analyses will be performed to identify subsurface cultural features not previously exposed by controlled grading or excavation. Thermal features in particular are an invaluable source of subsistence remains (faunal and macrobotanical) and dateable organics. A sample of

any cultural features identified during geophysical survey will be excavated to recover these datasets, which can answer research questions under the domains of chronology, subsistence, site structure and function.

Geoarchaeological Trenching

In order to evaluate the integrity of the resource, multiple backhoe trenches will be excavated. Trenching affords the exposure of large subsurface profiles that facilitate more precise documentation of buried cultural materials in sedimentary context; that is, how artifacts and features relate to the natural stratigraphy. Ideally, archaeological materials are confined to discrete cultural strata that can be distinguished from the surrounding sterile matrix. However, archaeological contexts are often disturbed as the result of post-depositional processes (e.g., erosion, bioturbation, physical and chemical weathering of the soil), which cause mixing of cultural and sterile deposits, intrusion of artifacts into sterile strata, obliteration of features, and loss of stratigraphic definition. These processes generally manifest with great intra-site variability according to factors such as underlying geologic parent material, vegetation, and slope; therefore, even sites subjected to intense post-depositional disturbance have the potential to contain portions of intact stratigraphy. The identification of intact subsurface archaeological contexts can be achieved by documenting 1) the appearance and occurrence of all sedimentary deposits present; 2) the degree to which deposits have been weathered in-situ to form soils; and 3) the stratigraphic relationships between sedimentary deposits, soils, and cultural materials.

A trenching program will be undertaken to fully characterize the Unit 1 resource within its geologic context and account for the various processes (both depositional and post-depositional) affecting its integrity. By exposing subsurface stratigraphy in the vicinity of CA-RIV-9072 and CA-RIV-9223, trenching will also address how the Unit 1 resource relates to these two NRHP- and CRHR-eligible prehistoric sites. Finally, by establishing the location of the ancient Ford Dry lake highstand shoreline, trenching will yield paleoenvironmental data relevant to the interpretation of the Unit 1 resource as a possible lakeshore complex. This information regarding: 1) the integrity of the resource, 2) the physical connection between the resource and nearby NRHP-eligible sites CA-RIV-9072 and CA-RIV-9223, will be used to complete NRHP evaluation of the resource.

Summary of Site Stratigraphy

A geomorphological report was generated during the permitting phase of the Project (Kenney 2010). While this was not a geoarchaeological report, it did present the overall geomorphic context of the general site area. The Quaternary alluvial deposit (Qal), occurring at an average thickness of 1 ft (30 cm) across the site, is characterized by varying degrees of soil development and contains soils dating from 1-3 thousand years ago (kya) and 7-8 kya. This deposit, consisting of fine to coarse brown sand with small gravels, has the highest potential to contain subsurface cultural resources. The Qal deposit is overlain in places by relict sand sheet and degraded coppice dunes (Qsr), consisting of fine brown sand with coarse sand and gravel desert pavement surfaces with soil horizons dating 1-7 kya. Qsr deposits are generally 4-8 in (10-20 cm) thick. At elevations above 374', Qal deposits are typically underlain by older Pleistocene alluvial fan deposits (Qoaf) extending at least 1.5 ft (45 cm) in depth, and containing soil horizons dating from 12-20 kya. At elevations below 374', Qal deposits are often underlain by Ford Dry Lake

playa deposits (Q1) of varying thicknesses, characterized by light yellowish brown fine to medium sandy silt with iron oxide staining. These deposits can be observed in the southwest portion of project footprint. The oldest Pleistocene shoreline is inferred to follow the 377' contour, which transects the southwestern portion of Unit 1 (following Kenney 2010).

Trenching Program

A trenching program will be conducted to evaluate integrity of the cultural resource encountered in Blocks 2 and 3 of Unit 1. Trenches will be excavated in nine locations which together form two linear, perpendicular transects across the revised exclusion area (Figure 5), defined on the basis of controlled grading results in Unit 1. The trenching strategy will be flexible in nature, with final locations subject to amendment based on findings. These two linear transects, each consisting of a series of individual trenches, will yield a high-resolution representative cross-section of site stratigraphy. Each trench will measure 30 meters in length, three feet in width, and will not exceed four feet in depth.

A northeast/southwest-running trenching alignment will capture longitudinal stratigraphic variability represented in Block 2, as well as relate the Unit 1 cultural resource to CA-RIV-9072, a large prehistoric site located immediately west of the project area. A perpendicular northwest/southeast-running trench alignment will be implemented to characterize stratigraphic variability in Blocks 2 and 3, and to relate the Unit 1 cultural resource to the highest lake stand of Dry Ford Lake. Longitudinal trenches are oriented northeast/southwest to maximize exposure of a representative soil catena across the alluvial fan slope. All Block 2 trenches are located in preserved areas containing native soils; Block 3 trenching will necessitate excavation of overburden to reach underlying native soils.

Trenching of these locations will accomplish three primary objectives relevant to establishing relative integrity and environmental context of the Unit 1 cultural resource: 1) characterizing stratigraphy relative to vertical distribution of artifacts in Unit 1, contextualizing subsurface cultural materials relative to Qal deposits, and identifying intact cultural features and/or paleosols; 2) correlating stratigraphy between the Unit 1 cultural resource in Unit 1 and adjacent eligible sites CA-RIV-9072 and -9223 to determine if Unit 1 has a higher potential for buried cultural strata; and 3) defining the location of the Ford Dry Lake high stand shoreline in relation to the Unit 1 cultural resource.

Goal 1

Two linear trench alignments are proposed to characterize stratigraphic variability along the northwest/southeast and northeast/southwest axes of Blocks 2 and 3 and to identify intact cultural deposits in the Unit 1 resource. Of specific interest here is the identification and mapping of the Quaternary alluvial deposit (Qal) determined to have the highest potential to contain subsurface cultural resources (Kenney 2010). The Qal unit, occurring at an average thickness of 1 ft (30 cm) across the site, is characterized by varying degrees of pedogenic (soil) development and contains soils dating from 1-3 kya and 7-8 kya. While conducting a site visit to Block 2, the NextEra project geoarchaeologist observed a high degree of variability in both the thickness and degree of soil development within the Qal deposit, likely tied to differences in slope and drainage conditions.

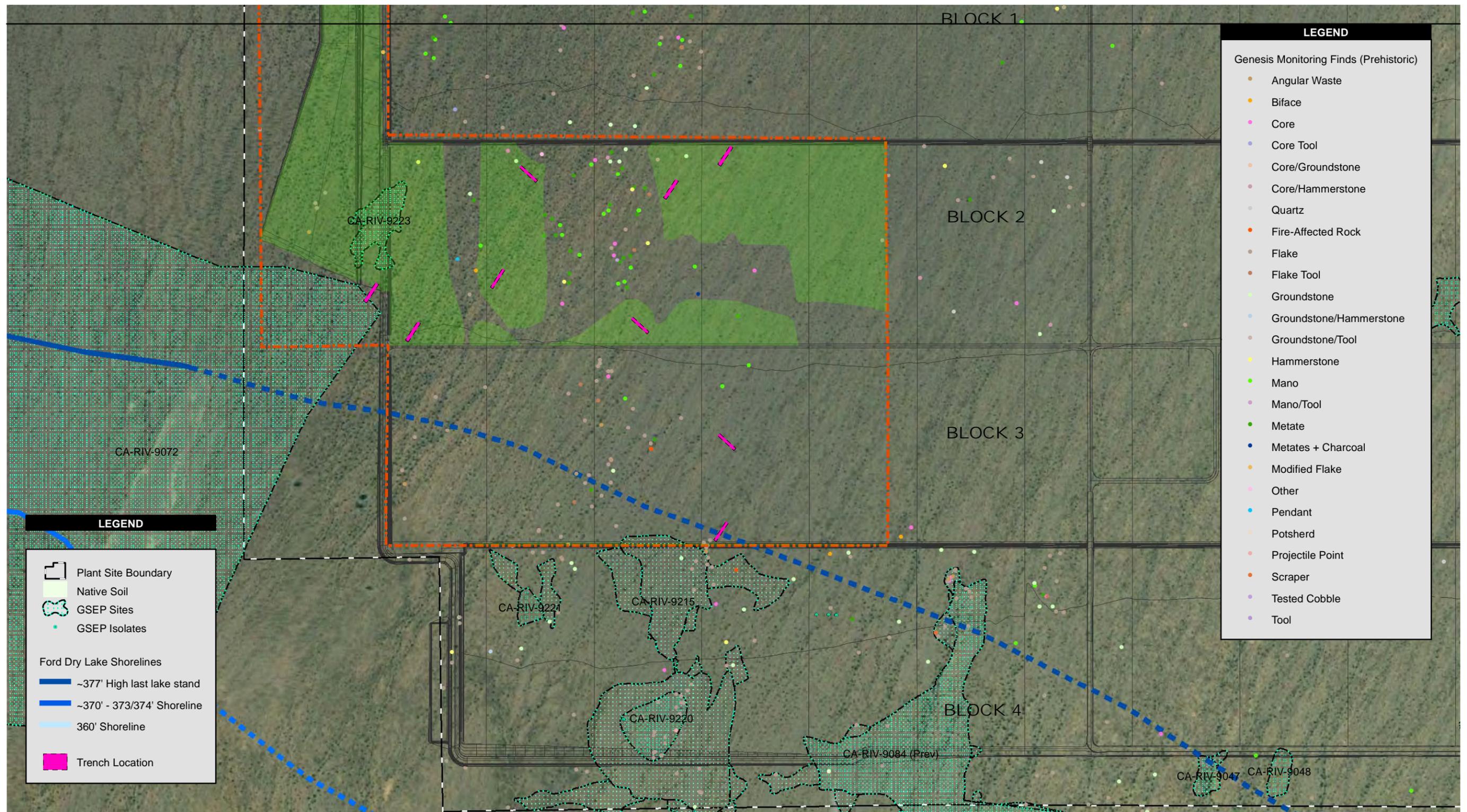
Trenching will be conducted in two linear transects, one oriented northeast/southwest, and the other oriented northwest/southeast. Trenches are oriented perpendicular and parallel to the slope axis because slope is one of the primary controls of depositional and pedogenic variability at the site. One series of trenches will be oriented perpendicular to the slope axis (northwest/southeast) to expose alluvial sheetwash and channel deposits in profile. A second series of trenches will be oriented parallel to the slope axis (northeast/southwest) to expose the full range of soils represented at the site, which are expected to vary according to slope position. The excavation of a series of trenches along these two axes will enable the geoarchaeologist to fully examine and describe the range of variability of the Qal deposit within Blocks 2 and 3, and to document the existence of any intact subsurface cultural features exposed during trenching. This information will be used to generate a detailed facies model depicting stratigraphic relationships between natural alluvial deposits and cultural strata.

Trenching will determine the potential for buried, intact features on the basis of the presence and thickness of the Qal deposit, as well as the presence of any paleosols associated with relict occupational surfaces. Areas with thicker Qal sequences will have a greater potential for containing intact cultural materials and features; likewise, areas with well-developed soils and paleosols will have a greater potential to contain intact, buried cultural features. Any paleosols or discrete cultural strata (such as midden deposits or other cultural features) encountered will be drawn in profile, photographed, and described in accordance with NRCS guidelines. Bulk sediment samples (a minimum of 100 grams) may be collected for particle size analysis (PSA) if granulometric assays are warranted to quantify argillic (clay) enrichment associated with buried soils or otherwise characterize physical properties of deposits. Any organics identified in buried A horizons or cultural features will be mapped in profile and collected for radiometric analysis. Optically stimulated luminescence (OSL) samples (a minimum of 250 grams) may be collected from buried A horizons in the absence of radiocarbon samples. OSL, directly dates the last exposure of sediments to sunlight, is a useful method for establishing the age of relict occupational surfaces.

Goal 2

The Unit I cultural resource sits immediately east of two NRHP- and CRHR-eligible prehistoric sites (CA-RIV-9072 and CA-RIV-9223) which may or may not be spatially contiguous with the project area site. Subsurface testing at CA-RIV-9072 revealed limited to no subsurface cultural material, suggesting the site is predominantly a surface component. The fact that a substantial subsurface cultural component has been encountered in Unit 1 as the result of construction activities and controlled grades would suggest some difference in depositional intensity between the two sites, resulting in the differential exposure of prehistoric materials at the surface. Unit 1, which sits at a higher elevation on the alluvial fan landform, may be aggrading at a faster rate, thus explaining the increased prevalence of subsurface cultural materials relative to CA-RIV-9072.

To resolve these issues, a northeast/southwest-running trench will be placed at the nexus of the Unit 1 exclusion area and CA-RIV-9072 to expose deposits underlying both resources in a single profile. Trenching will enable stratigraphic correlation of the two sites, specifically comparisons of the depth and thickness of Qal sequences. Particular attention will be directed towards



Source: AECOM, Sukat, NextEra, ESRI

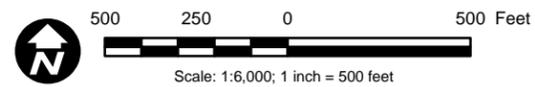


Figure 5
Geochronological Trenching Locations

determining whether Qal deposits exhibit any erosional or depositional unconformities that would account for the more pronounced subsurface component in Unit 1 relative to CA-RIV-9072.

Any paleosols or discrete cultural strata (such as midden deposits or other cultural features) encountered will be drawn in profile, photographed, and described in accordance with NRCS guidelines. Bulk sediment samples (at least 100 grams) may be collected for PSA if granulometric assays are warranted. Any organics identified in buried A horizons or cultural features will be mapped in profile and collected for radiometric analysis. OSL samples (a minimum of 250 grams) may be collected from buried A horizons in the absence of radiocarbon samples.

Goal 3

A northwest/southeast-oriented trench will be placed to transect the inferred 377' shoreline in Blocks 3 and 4, in order to establish the relationship between the Unit 1 cultural resource and lacustrine (Ql) deposits. Ql deposits were detected in controlled grades of Block 4, suggesting they may interdigitate with later Quaternary (Qal) cultural deposits. Ql deposits were also observed in a drainage cut at the southeast corner of Unit 1, suggesting lake deposits may occur at higher elevations than originally suggested (Kenney 2010). Lake deposits associated with the 377' shoreline are tentatively dated to 12 kya; therefore, the location of the Ford Dry Lake high stand carries implications for interpretations regarding prehistoric habitation and use of the lakeshore environment. Mapping the occurrence of the highest playa lake shoreline within the project area will also clarify the southern terminus of the Unit 1 cultural resource.

Logistics

Trenching will be overseen by three geoarchaeologists representing NextEra, BLM and the Energy Commission respectively. The NextEra geoarchaeologist is Mary Ann Vicari. In the past, the BLM has hired Craig Young from Far Western and the Energy Commission has worked with Tom Bullard of the Desert Research Institute. If these specialists are available, they are recommended for this role. Trenching will be conducted over a period not to exceed two weeks. All PSA analyses will be conducted by Mary Ann Vicari at SWCA, Inc. facilities. PSA samples can be analyzed within three days (max: n=10). Radiocarbon analyses will be conducted by Beta Analytic, with results within 14 business days of sample submission.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) will be conducted to identify subsurface cultural features associated with the Unit 1 resource using a remote, non-invasive technology. In particular, GPR is used here to target buried prehistoric thermal or storage features, such as hearths and storage pits. Subsequent testing and excavation of any features identified using GPR may yield ecological data (faunal and ethnobotanical remains) relevant to research on prehistoric subsistence and paleoenvironmental context. Subsurface cultural features also have good potential to contain datable materials, necessary for establishing chronologic control for associated cultural materials at the site. These datasets may contribute to the NRHP and CRHP evaluation of the resource when determining its potential to address research questions under the domains of prehistoric chronology, subsistence, site structure and function (criterion D/4).

Traditional excavation techniques are, by their nature, invasive techniques, sometimes damaging the cultural resources they were designed to detect and investigate. Non-invasive remote sensing techniques utilizing geophysical methods have gained support in the cultural resource community as a more conservative and preservationist approach to subsurface investigation. Remote sensing methods have a long and proven track record of detection, delineation, and mapping of prehistoric sites and associated site features such as burnt rock middens, hearths, excavations, foundations, burials, and dwellings.

PHASE I GPR TESTING

It is unknown whether the soils in the study area are amenable to GPR methods. The technology is widely used; however, it has limitations which are sometimes caused by ground conditions that reduce the effective depth of penetration and resolution of the radar waves. In particular, the presence of silt and clay, even in minor amounts, can effectively limit the depth of radar waves. Such conditions and potential interferences from steel reinforcement and other nearby reflecting objects on the surface may result in not all subsurface features being detected or false positives being created.

As a contingency, therefore, a Phase I full-coverage grid survey will be conducted of an ungraded 1-acre parcel within Block 2, and a 1-acre parcel within Block 3, as an initial test of GPR as an effective method in the project area. It is necessary to test Blocks 2 and 3 individually because Block 3 has experienced a high rate of ground disturbance that may interfere with GPR results. Given appropriate site conditions (suitable topography and absence of vegetation and obstructions), the survey mode method involves collection of data in a regularly spaced grid of transects. This method, also called a radar transect grid or the gridded transect method, allows for the greatest flexibility in recording and post-processing of results for subsequent production of radar profiles and plan-view maps. In this mode, each survey cell encompasses a grid of survey transects spaced at 0.5 m intervals. The grid origin will be established at the southwest corner of the survey cell with transects running along a true north-south axis. The correct positioning and staking of all grid corners will be accomplished with metric survey tapes based upon southwest and northeast cell corners that were previously geo-located with the GPS unit. Acquisition of the GPR data in survey mode enables the processing of all of the line data as a 3-D data cube. This cube can then be viewed in plan-view as depth slices of the subsurface. The data in each plan-view slice represent the radar reflection amplitude at that depth level and is somewhat analogous to viewing aerial photo imagery of historic ground surfaces.

Any anomalies found during initial field review of GPR results will be marked with pin flags to avoid errors associated with re-locating anomalies using held-held GPS units. Post-field data processing will be conducted in the evenings to yield higher-resolution datasets and facilitate interpretation of results. Following post-processing of the data, anomalies will be ranked according to signal strength to prioritize stronger anomalies for further testing. Rankings decisions will be made by the archaeologist field lead and equipment operator, who is experienced in distinguishing between natural and cultural signatures. Ground-truthing will be used to establish a base-line specific to the project area for interpreting signal strengths.

Shovel-testing will be performed to ground-truth the lesser of 10 percent or 20 individual anomalies of those identified in the test survey. Ground-truthing will occur while GPR equipment is still in the field. Anomalies will be ground-truthed by excavating shovel test units centered on the anomaly using a shovel or trowel. Excavation depth will be determined by the projected depth of the GPR anomaly. Archaeologists will excavate until they exceed that depth or reach strata that are not likely to contain cultural materials. Ground-truthing is intended to determine the presence/absence and nature of the buried material and to compare these results with GPR data with minimal impact to cultural resources. Creating baseline data from particular anomalous signatures will aid our understanding of radar signatures for future GPR work if successful. Subsequent to ground truthing, all test excavations will be backfilled and the UTM coordinates will be recorded using a sub-meter accurate Trimble GPS unit. Any cultural features identified during Phase I ground-truthing will be excavated according to the data recovery protocols in the CRMMP and HPTP.

PHASE II GPR SURVEY

The initial GPR test may result in three possible outcomes: 1) no anomalies are detected; 2) anomalies are detected, but are determined to be false positives for cultural features; and 3) some or all detected anomalies are revealed to be subsurface cultural features. If testing results in outcomes one or two, this indicates either 1) the GPR method was not successful due to unsuitable site conditions; or 2) there were no subsurface cultural features in the test area. In the event of outcome three, which validates GPR as an effective method for locating subsurface cultural features in the project area, GPR survey will be expanded to previously-untested, ungraded portions of Block 2 and to previously-untested portions of Block 3. If testing proves successful in Block 2 but not Block 3, Phase II survey will be restricted to Block 2, and vice versa.

Block 2 will be stratified into two zones: ungraded (native soils) and graded (disturbed soils) areas. A 10 percent sample of the ungraded zone (totaling 43 acres) will be surveyed using GPR for a maximum of four acres to be surveyed in Block 1. A 10 percent sample of the entire Block 3 area (totaling 61 acres) will be surveyed, for a maximum of six acres to be surveyed in Block 3. GPR survey will be conducted in 1-acre blocks, for a maximum of 10 acres to be surveyed during Phase II. Anomalies will be tested following protocols described above, with anomaly testing procedures fine-tuned on the basis of Phase survey and ground-truthing results. That is, Phase II will target anomalies with signatures determined during Phase I to be diagnostic of cultural, rather than natural features. Any cultural features encountered during Phase II anomaly ground-testing will be excavated according to the data recovery protocols in the CRMMP and HPTP.

LOGISTICS

The GPR survey and all associated data analysis/interpretation will be conducted by SWCA, Inc. The GPR survey will be conducted by geophysical specialist Dr. Blake Weissling and one

assistant. Ground-truthing will be performed by one crew of two archaeologists. Excavations may be conducted by this crew or a larger crew, depending on the number of cultural features identified. Phase I GPR survey (with a maximum survey area not to exceed 2 acres) will be completed within four to five days. Total GPR survey, analysis, ground-truthing, and excavation will be performed within a period of time not to exceed one month.

OFF-SITE MITIGATION

Traditional techniques used to mitigate impacts to archaeological sites are generally focused on the recovery of additional data through subsurface excavation. However, such methods (including hand excavation of 1 m by 1 m or larger units or controlled grading of a sample of the site) are not appropriate for this resource due to its size and diffuse nature as well as its limited range of artifact types. The data recovered from such efforts would not sufficiently mitigate direct and cumulative impacts to the resource. Instead, mitigation efforts will focus on off-site cultural resources research and public outreach activities. Mitigation efforts include a diverse range of activities. A long-term ethnographic study will be prepared. Off-site archaeological studies will include geoarchaeological trenching, sediment core analysis, pedestrian archaeological study of the Ford Dry Lake shoreline, artifact analysis and assessment and potential nomination of Ford Dry Lake archaeological district. Public outreach efforts will include production of an educational website, production of an augmented reality application, production of an informational kiosk, establishment of a green energy/NEPA scholarship, and Section 106 training support. With these mitigation strategies, construction and associated cultural resources monitoring would continue in the area of the resource.

ETHNOGRAPHIC STUDY

A multi-year ethnographic study of the region around the project area will provide an ethnographic context for cultural material recovered from the resource and assist in the preservation and dissemination of Native American understandings of the landscape and the places and material remains within it. It is imperative that an ethnographic study be done in coordination with local tribes, especially those named in the GSEP programmatic agreement. The study will also benefit from coordination and/or collaboration with concurrent studies, such as the Prehistoric Trails Network Cultural Landscape studies led by Lowell Bean.

The research questions which will guide the ethnographic study should be determined in coordination with local tribal representatives and elders, with an emphasis on the GSPE resource(s), Ford Dry Lake and the broader Chuckwalla Valley. As a mitigation measure, it is essential that this study be focused on the goals of the Native American peoples it represents. It is recommended that an ethnographic working group be formed from members of each tribe participating in the GSEP programmatic agreement, or their representatives. The working group will provide a means for Native American input as well as a direct link from the Ethnographer(s) back to the tribes. With the facilitation of the study's Ethnographer(s), the working group would be tasked with monitoring the progress of the study, determining the study's research questions, and determining the more specific interview questions. The working group would also be responsible for assembling a list of key informants and important locations to be included in the ethnographic study.

Before conducting fieldwork for the ethnographic study, a thorough review and synthesis of the existing literature would also be necessary. Sources include, but are not limited to:

- Barrows, David Prescott. 1967. *The Ethno-Botany of the Coahuilla Indians of Southern California*. Malki Museum Press.
- Bean, Lowell John. 1974. *Mukat's People: The Cahuilla Indians of Southern California*. University of California Press.
 - 1976. *Native Californians: A Theoretical Retrospective*. Ballena Press.
 - 1982. *Temalpakh Cahuilla Indian Knowledge and Usage of Plants*. Malki Museum Press.
 - 1989. *The Cahuilla* (Indians of North America). Chelsea House Publishers.
 - 1991. *The Cahuilla Landscape: The Santa Rosa and San Jacinto Mountains*. Ballena Press.
 - 1992. *California Indian Shamanism*. Malki-Ballena Press.
- Bronson, Leisa G. *A Chronological history of the Quechan Indians and their lands*.
- Cuero, Delfina and Florence Connolly Shipek. 1991. *Delfina Cuero: Her Autobiography - An Account of Her Last Years and Her Ethnobotanic Contributions*. Ballena Press.
- Ezell, Paul and Greta Ezell Dodyns. 1963. *Death of a Society: The Halchidhomas*. Ethnohistory.
- Forbes, Jack D. 1965. *Warriors of the Colorado: The Yumas of the Quechan Nation and Their Neighbors* (Civilization of American Indian). University of Oklahoma Press.
- Halpern, A. M. 1997. *Kar?úk: Native Accounts of the Quechan Mourning Ceremony*. University of California Publications in Linguistics, University of California Press.
- Kroeber, Alfred Louis. 2006. *Handbook of the Indians of California, Vol. 2*. Kessinger Publishing, LLC.
 - 2009. *Yuman Tribes of the Lower Colorado*. BiblioBazaar.
- Laird, Carobeth. 1976. *The Chemehuevis*. Malki Museum Press.
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- Luthin, Herbert W. 2002. *Surviving Through the Days: Translations of Native California Stories and Songs*. University of California Press.
- Manners, Robert A. 1974. *Paiute Indians, Vol. 1: Southern Paiute and Chemehuevi- an Ethnohistorical Report* (American Indian Ethnohistory: California and Basin-Plateau Indians). Garland Publishing.

- Mason, William Marvin and Lowell John Bean. 1962. *The Romero Expeditions 1823-1826*. Ward Ritchie Press.
- Mifflin, Margot. 2009. *The Blue Tattoo: The Life of Olive Oatman*. University of Nebraska Press.
- Miller, Ronald Dean. 1975. *The Chemehuevi Indians of Southern California*. Malki Museum Press.
- Odens, Peter. 1971. *The Indians and I: Visits with the Dieguenos, Quechans, Fort Mojaves, Zunis, Hopis, Navajos and Piutes*. Imperial Printers.
- Redhawk, Richard. 1987. *Grandmothers Christmas Story: A True Quechan Indian Story*. Sierra Oaks Publishing Company.
- Santiago, Mark. 2010. *Massacre at the Yuma Crossing: Spanish Relations with the Quechans, 1779-1782*. University of Arizona Press.
- Snider, Jackie. 1986. *The Quechan Indians: Cultural aspects of a California Indian tribe* (Publications in American Indian studies). Department of American Indian Studies: San Diego State University.
- Strong, William Duncan. 1972. *Aboriginal Society in Southern California*. Malki Museum.
- Trafzer, Clifford E. 1997. *Chemehuevi people of the Coachella Valley: A short history of the Sovereign Nation of the Twenty-Nine Palms Band of Mission Indians of Southern California*. Chemehuevi Press.
- Trimble, Stephen. 1993. *The People: Indians of the American Southwest*. School of American Research (SAR) Press.
- Vane, Sylvia Brakke and Lowell John Bean. 1990. *California Indians: Primary Resources: A Guide to Manuscripts, Artifacts, Documents, Serials, Music, and Illustrations*. Malki-Ballena Press.

The field team will be composed of two senior Ethnographers and two junior Ethnographers. The ethnographic working group will be involved in the evaluation and selection of the field team. To further support the preservation of local Native American culture, one or both of the junior Ethnographers should be a Native American student. The working group may also consider the usefulness of an ethnobotanist to complete an inventory of the project area for inclusion in the ethnographic study. Interviewees/participants should be given a small honorarium to compensate them for their time. Additionally the field team should escort interviewees/participants on visits to the project site as well as other relevant traditional cultural sites in the region. The field team will also provide for a photographer, should the need arise, to document viewsheds and landscape elements that form part of a traditional cultural place. It is anticipated that ethnographic fieldwork would comprise a full-time effort for up to a year, and distribution of the

ethnographic study would be determined in conjunction with the Native American ethnographic study working group, BLM and the Energy Commission.

ARCHAEOLOGICAL STUDY

The archaeological study supporting the off-site mitigation program will focus on the development of a cohesive reconstruction of human land use at Ford Dry Lake over the course of the Holocene. Using archaeological, paleoenvironmental, and geomorphological data, the program will focus on how the episodic infilling and drying of the lake may have influenced human settlement and subsistence at this location.

The archaeological study in support of the off-site mitigation will tie into a range of recent investigations in California that explore how humans adapt to their environment and respond to environmental change. In marginal environments such as the California deserts, the effects of both short and long-term environmental shifts may be especially profound, resulting in wide fluctuations in the availability of food, water, and other resources important to humans. Desert lake basins, in particular, may provide abundant resources during wetter intervals, but very few when dry; and the ways in humans adjusted to these varying conditions is an important area of research. This research, however, has been impeded by poor resolution of both the archaeological and environmental records. The present off-site research program is designed specifically to integrate the records both of past environments and of human land use to fully explore the prehistoric human-environmental interactions at Ford Dry Lake.

The investigation will take a layered approach designed to integrate a variety of environmental and archaeological information. Key elements of this will include:

- A geoarchaeological study designed to identify the different kinds of sediment in the project area and the conditions and sequence in which they were deposited. When correlated with the archaeological remains, the geoarchaeological data will provide a physical context for past human habitation along and near the lakeshore.
- A series of sediment cores taken from the Ford Dry Lake playa. Analysis of the sediment within these cores will focus on identifying wet and dry intervals within the basin. Additionally, preserved pollen within the core sediments will provide a record of vegetation change in the surrounding area.
- A more complete and focused inventory of the surface archaeology of the northern shoreline of Ford Dry Lake that addresses the full range of prehistoric resources and the potential for establishment of a National Register District and/or Area of Critical Environmental Concern.
- Analysis of groundstone and flaked stone artifacts collected during the monitoring and controlled grading, as well as from other selected archaeological sites in the vicinity.

These approaches are discussed in detail below.

Geoarchaeological Investigations

The discovery of artifacts at depth during the Genesis monitoring program highlights the importance of assessing geomorphological and stratigraphic sequences within the study area. Of particular importance is to determine whether the finds represent an intact buried deposit or if they are the result of geologic processes that have redeposited them to their current locations. While some stratigraphic work has been done in the area using natural or construction-related exposures, the off-site mitigation program will utilize mechanically excavated trenches at selected locations to provide information directly relevant to archaeological interpretation. The trenching program will be supervised by Mary Ann Vicari of SWCA, who will also prepare a report on the investigations. The trenching is anticipated to require approximately one week.

The trenching program will avoid known cultural sites within the study area, but will, in consultation with the project geomorphologist, specifically target areas directly relevant to assessing the archaeological resources such as the former lake shorelines. Each trench proposed as part of this program will be 3 ft wide and will be excavated to a maximum depth of 4 ft below surface, per Occupational Safety and Health Administration standards in this vicinity, in order to investigate the overall stratigraphy in the area and potentially to identify buried deposits associated with the prehistoric lake stands of Ford Dry Lake. Trenching and sampling of each trench will be conducted in accordance with Section 9.4.2 of the HPTP, Section 9.4.2 of the CRRMP, and successful methods employed for other geoarchaeological trenching programs (McGuirt and Lerch 2008).

Spoils from each trench will be systematically sampled and screened for the identification of cultural materials. As employed successfully in previous trenching programs, one 5-gal bucket of excavated soil for every three backhoe buckets will be screened through 1/8-in. mesh screen to identify cultural materials (McGuirt and Lerch 2008). A trench record form will be completed for each trench including essential characteristics (trench number, length, width, and depth), the locations and types of archaeological features, the stratigraphy and characteristics of exposed sediments, and locations of disturbances such as tree roots or animal burrows. Trench walls, excavated within the boundaries of identified archaeological sites, will be scraped with hand tools to provide a clear exposure of subsurface cultural remains for detailed profile drawings and photographic documentation.

Sediment Cores

The sediment cores taken from the Ford Dry Lake playa will be designed to provide a baseline record of environmental change at this locality. Because deposition of sediment within playa bottoms is typically low-energy, the disturbance of sediments is minimal and the resolution of the sedimentary record is high. Desert playa settings have been shown to contain high concentrations of preserved pollen, which can provide a record of vegetation change in the surrounding area. If sufficiently controlled by radiocarbon dating, this environmental record will provide a valuable context for the archaeological results.

Research Questions

The program of sediment coring will be designed specifically to provide baseline data on the lacustrine history of Ford Dry Lake as well as information on vegetation change at this location throughout the Holocene. Key research questions include the following:

- *Lacustrine Episodes:* What was the duration and frequency of lakestands in Ford Dry Lake? Because most human activity in the study area likely took place during intervals when lakes were present, it is of interest to know when, and for how long, these lakestands took place. Analysis of sediments within the cores should reveal layers of clay that formed at the bottom of lakes as well as layers wind-blown silts or alluvium that represent dry intervals. If sufficient carbon is present within these layers in the form of charcoal or plant remains, radiocarbon dating can be used to derive direct calendar dates for these intervals.
- *Correlation with Regional Climate:* Do these lakestands, and intervening dry intervals, correlate with reconstructions of broader climatic trends in the Mojave and Colorado Deserts, or do they reflect primarily localized conditions? For example, the regionally dry conditions of the middle Holocene would produce relatively few lakestands, while high precipitation associated with the Little Ice Age (ca. AD 1350 – 1850) may have resulted in perennial lakes within the basin.
- *Vegetation Change:* How has vegetation in the Ford Dry Lake basin changed during the Holocene? Local vegetation communities would have been sensitive to changes in both temperature and precipitation, which would in turn affect the distribution of biotic resources important to humans. These changes can be assessed through analysis of pollen preserved in the cores.

Methods

Coring

Two cores will be extracted from selected locations within the Ford Dry Lake playa. The core locations will be selected in consultation with a specialist from PaleoResearch Inc. (PRI), who will serve as the paleoenvironmental consultant. The cores will be extracted using a truck-mounted hydraulic coring system that employs a 3-inch diameter split-barrel sampler deployed in a hollow-stem auger. The cores will be collected in individual sections, or drives, measuring approximately five feet in length. Collection, packaging, and labeling of individual drives will be directly supervised by the PRI specialist with assistance from one AECOM archaeologist. Each drive will be packaged in a plastic tube marked with the core designation and drive number. The drives will then be placed in wooden boxes and transported by truck to the PRI laboratory in Golden, Colorado. The coring will take approximately five days.

Analysis

Sediment within the cores will be examined macroscopically by the project geomorphologist and paleoenvironmental consultant to identify sediments representing lakestands and dry intervals. To extract the pollen, a hydrochloric acid solution will be used to remove calcium carbonate, then the samples will be screened through 250 micron mesh. Pollen will then be separated from the sediment and extraneous organic matter will be removed. Pollen diagrams will be produced using Tilia 2.0 and TGView 2.0.2. Total pollen concentrations are calculated in Tilia using the quantity of sample processed in cubic centimeters (cc), the quantity of exotics (spores) added to the sample, the quantity of exotics counted, and the total pollen counted and expressed as pollen per cc of sediment. The analysis of the core sediments and associated report will be conducted by PRI and will require approximately four to six months.

Pedestrian Survey and Artifact Analysis

While previous archaeological survey with the Genesis project area provides preliminary information on prehistoric use of areas near the highest shoreline, additional data are needed to develop a fuller picture of prehistoric human use of the Ford Dry Lake basin as a whole. In particular, relatively little work has been done along the existing playa margin, an area that likely attracted human groups during ephemeral lakestands over the past several hundred years. Additional archaeological survey and artifact analysis is therefore proposed as part of the off-site mitigation to explore additional areas along the current and former lake margins.

Research Questions

Preliminary identification of relict lake shorelines within and near the Genesis project area suggest that some former lakestands in the basin were substantially more extensive than those represented by the current Ford Dry Lake playa. The elevation of the high shoreline features above the present playa suggests that these high lakestands were relatively deep (>10 feet) and likely of long (multi-year or longer) duration. Lakes that periodically form in the current playa, in contrast, are typically much more ephemeral. The presumed differences in the durations of these lakestands suggest that there were differences in associated biotic communities as well, including resources important to humans. Temporal and spatial variability in the local physical and biotic environments will be clarified by the geoarchaeological investigations and sediment core analysis discussed above.

The pedestrian survey and artifact analysis proposed for the off-site mitigation will focus primarily on assessing the ways in which prehistoric humans exploited the lakeshore habitats and how this may have changed over time. The specific research issues to be addressed will be similar to those discussed previously for the NRHP evaluations under criterion D/4. The following discussion further more specifically applies these themes to the investigations proposed for off-site mitigation:

- *Chronology*: Can the archaeological sites in the study area be assigned to specific time periods? In the absence of controlled excavations within the archaeological sites, it is doubtful that any materials suitable for radiocarbon dating will be obtained. Nevertheless, certain artifact forms can provide at least a general timeframe for some archaeological

deposits. The use of pottery, for example, is limited to about the last millennium or so. Small-sized projectile points used with the bow and arrow appeared slightly earlier, by around 1300 to 1400 years ago. Larger projectile points of the Elko and Pinto series were in use during the early and middle Holocene, and certain earlier forms such as Lake Mojave points are thought to be more than 8,000 years old. Additional information on chronology of specific sites can be provided by the geomorphic setting: for example, a deposit within an active sand dune is likely to be relatively recent, while sites associated with earlier landforms may be older. The geoarchaeological study discussed previously will provide more refined criteria for assessing the age of sites based on their physical context.

- *Frequency and Duration of Occupations:* How often, and for how long, did prehistoric groups occupy the Ford Dry Lake basin? Can differences be discerned between the occupations along the high shoreline vs. the current playa margin? Can changes over time in settlement frequency and duration be identified? For example, if extended lakestands attracted longer-term occupations, then more substantial archaeological remains might be associated with the higher shoreline. This is the pattern that is seen on a larger scale on portions of the high shoreline of ancient Lake Cahuilla in the Coachella Valley (Schaefer and Laylander 2007). On the other hand, regional population increase may have led people to more intensively occupy the current playa margin during the late prehistoric period. Key data sets relating to this issue include the following:
 - *Artifact Density and Diversity:* Sites in different settings within the Ford Dry Lake basin may exhibit significant variability in the density and diversity of artifact assemblages. Comparison of surface assemblages of sites identified during the off-site mitigation with those in the Genesis project area may suggest different mobility and land use strategies.
 - *Features:* The presence of features such as hearths or roasting pits within artifact scatters is consistent with domestic activities associated with prehistoric camps. It is likely that hearth features will be identified at sites recorded during the off-site mitigation investigations, and these may exhibit variability (i.e. large, multiple-use hearths vs. smaller, single-episode features) that may suggest levels of mobility. Where these features have been dispersed, their presence may still be indicated by fire-affected rock.
 - *Portability:* As discussed previously, based on their dimensions and material type, groundstone artifacts may be classified into portable and non-portable forms. While collections from sites identified during the off-site mitigation investigations are expected to be limited, basic measurements in the field of groundstone artifacts at these sites can provide important comparative information.
 - *Site Structure:* While controlled assessments of site structure will not be conducted during the off-site mitigation, preliminary data in form of artifact clustering and possible activity areas will provide some basis for comparison with site in the Genesis project area.

Subsistence: Are any differences in diet discernible at the sites associated with the high shoreline vs. the current playa margin? It is doubtful, at the survey level, that sufficient animal bone will be found at any of the sites to discern any meaningful dietary patterns. Groundstone implements, however, appear to be relatively common and can provide important data on the use of plant resources. Recent refinements in the recovery of pollen and phytoliths from groundstone, for example, suggest that a relatively robust sample can be obtained from a variety of contexts within the study area. Key data sets discussed previously (subsistence-related artifacts, pollen and phytoliths, and protein residue) will provide important information. Additionally, while animal bone is expected to be rare in sites within the off-site mitigation study, field examination of archaeological specimens can provide some information on the kinds of animals being hunted.

- *External Relations and Exchange:* As discussed previously, the extensive network of prehistoric trails throughout the region attests to the movement of humans over wide areas. A variety of exotic materials at archaeological sites reveal extensive trade networks between the Colorado River, the Pacific coast, and the northern Mojave Desert. Implications of flaked stone and ceramic specimens to be examined during the evaluation phase were discussed previously. Additionally, it is anticipated that the off-site mitigation may reveal additional classes of material, such as obsidian or marine shell, that will provide additional information.
 - *Obsidian:* Obsidian at archaeological sites in this region is usually from two sources: Obsidian Butte in the Imperial Valley, and the considerably more distant Coso Volcanic Field roughly 250 miles to the northwest. The former was probably within the seasonal range of people occupying the project area; the latter probably required a more formalized exchange network to obtain in quantity. Obsidian sources can be identified through geochemical analysis.
 - *Shell:* Although uncommon in this area, marine shells can provide information human movements based on whether they are of species found along the Pacific coast or Gulf of California.

Methods

The methods to be applied to the pedestrian survey and artifact analysis are designed to help address the research questions discussed above.

Pedestrian Survey

The off-site archaeological survey will be designed to provide a fuller picture of site types and distributions within the Ford Dry Lake basin. While recent surveys within the Genesis project area provide data on sites near the lake's maximum shoreline, the off-site surveys will be directed at areas between the Genesis project area and the playa margin. The surveys will focus primarily on the northern playa margin, to provide data for comparison to the sites along the maximum shoreline. Additional data on site distributions will be provided by sample survey blocks between the playa and the Genesis project area. It is anticipated that the field survey,

including the recording of identified sites and isolates (see below), will require approximately three to four weeks.

To identify resources adjacent to the playa, a team of archaeologists will systematically survey areas along the north side of the playa that have not been previously surveyed. A survey corridor will be defined that follows the north side of the playa margin and extends from the playa north 100 m. At an estimated 10 miles (16 km) in length, this corridor would encompass approximately 400 acres. Two previously recorded cultural sites along the playa margin—CA-RIV-1516 and CA-RIV-2159—will be revisited and the site records updated as discussed below.

In addition, sample survey blocks will be conducted in the area between the north edge of the playa and the Genesis project area. These blocks will be consistent with the Class II inventory conducted in this general area by Tetra Tech (Farmer et al. 2010), with each block measuring 0.25 mile on a side (40 acres). Using the grid established for the Class II survey, a total of 10 blocks totaling 400 acres will be randomly selected.

The survey will be conducted by a team of three to five archaeologists walking in parallel transects spaced no more than 15 m apart. The ground surface will be carefully examined for prehistoric or historic artifacts or features such as hearths or roasting pits. Areas containing three or more artifacts or within 30 m of one another will be recorded as archaeological sites. Artifacts more than 30 m apart will be recorded as isolated finds. Field navigation will be conducted using handheld global positioning (GPS) units supplemented by hard copies of aerial images showing the survey areas.

Site and Isolate Recording

Sites identified during the pedestrian survey will be recorded in standard California Department of Parks and Recreation format (DPR Form 523). Site recording will include the production of a scaled sketch map showing natural features (topography and vegetation) as well as the locations of artifacts, artifact clusters, and features. A datum will be established at each site and its coordinates recorded using a GPS unit. Each site will be photographed in at least two directions. Features and selected artifacts at each site will also be photographed. Isolated finds will be described, photographed and mapped using a GPS unit. All artifacts collected from the surface for analysis (see below) will be mapped using a GPS unit.

Artifact Analysis

Laboratory analysis will be conducted on selected artifacts collected from sites identified during the off-site pedestrian survey. Additionally, a full analysis of artifacts recovered during the monitoring and controlled grading will be conducted as well. The analysis will apply a variety of techniques designed to provide data relevant to the research questions discussed above. The specific techniques to be applied to this analysis will be similar to those to be conducted during the site evaluations under criterion D/4 (see previous discussion).

To some degree the scope of the analysis of artifacts to be analyzed in support of the off-site mitigation will depend on the recovery of appropriate samples.

- *Flaked Stone:* Analysis of flaked stone artifacts for the off-site mitigation will include the remaining flaked stone specimens not examined during the evaluation phase. In addition, representative specimens of tools or debitage may be collected from the surface of sites identified during the pedestrian survey for assessment of technology or raw material.
- *Groundstone:* The analyzed sample will include the remaining groundstone implements recovered from the monitoring and controlled grading, as well as selected groundstone artifacts from sites discovered during the off-site survey. Each groundstone implement will be measured as appropriate for length, width, and thickness, and material type will be determined.
- *Pollen, Starch, and Phytoliths:* As discussed above, a total of 20 groundstone artifacts recovered from the Genesis project area will be submitted to PRI for analysis of pollen, starch, and phytolith residues. Additionally, up to 20 groundstone artifacts, with associated soil controls, will be selected from sites identified during the off-site pedestrian surveys.
- *Protein Residue:* Up to 10 specimens collected from playa margin sites identified during the pedestrian survey, will be submitted to PRI to identify protein residues adhering to the artifact. The analytical methods will be the same as those described previously.
- *Ceramics:* Selected specimens from the surface of sites identified during the off-site pedestrian survey will be submitted to a ceramics specialist for typological analysis. Up to 20 specimens will be collected.
- *Obsidian:* Although obsidian appears to be rare at sites in the Ford Dry Lake area, some specimens may be recovered and will be subjected to geochemical sourcing and hydration analysis. The geochemical sourcing will be conducted by the Richard Hughes of the Geochemical Research Laboratory, while hydration will be conducted by Origer Obsidian Hydration Laboratory.

Assessment of Archaeological District

Based on the findings of the off-site mitigation investigations, portions of the Ford Dry Lake area may be considered for National Register of Historic Places (NRHP) eligibility as a district. The National Park Service defines a district as a grouping of sites, buildings, structures, or objects that are linked historically by function, theme, or physical development. Archaeological districts typically contain groups of resources that have a direct relationship through cultural affiliation, related elements of a pattern of land use, or historical development (Little et al. 2000).

Consideration of the project area as a district would likely focus on thematic links related to cultural affiliation, regional trail systems, and/or ecological-cultural relationships of a lakeshore environment. These themes would be developed in consultation with the BLM, Energy

Commission, and Native American tribal representatives. If the area appears to meet the criteria for a National Register district, AECOM will prepare a nomination for submittal to the California SHPO and subsequently to the Keeper of the National Register. The nomination will be prepared by Andrew York and Rebecca Apple of AECOM, with major assistance from a GIS specialist to prepare the necessary spatial data. It is anticipated that approximately eight weeks will be required to prepare the nomination.

PUBLIC OUTREACH

As part of the off-site mitigation measures, a number of activities should be developed that involve the general public and/or Native American stakeholder groups. These include:

Production of Educational Website

An educational website should be produced that includes archaeological and ethnographic information about the project area, the mitigation measures in place, and the level of involvement of the various surrounding Tribes. The website may include descriptions of various artifacts and features found at the site, historic and contemporary photographs, as well as video “featurettes” of interviews with Native American elders, cultural resources staff, or other Tribal leaders about the importance of the area and the attachment they may have to the region. The website may also include timelines of the area told from various perspectives, including those Tribes involved in the project. While the production of the website would likely be conducted by AECOM web developers and/or a subconsultant with website developing experience, the various Tribes should be consulted with regarding content, detail, and organization. AECOM ethnographers, public outreach staff, and archaeologists should be involved in the development of content. It is anticipated that the website would involve five key core AECOM team members for the development and review of content and of the website itself. Additional staff may be added as needed for video production for featurettes. It is anticipated that the educational website could be developed in 6 to 9 months, allowing for adequate time to consult with involved Tribes.

Production of Augmented Reality Application

An augmented reality (AR) application should be developed as an educational and entertainment cell-phone application. AR applications are live views of physical, real-world environments augmented by computer-generated sensory input, such as video and graphics. The augmentation happens in real-time. For an application such as this, the AR would need to be georeferenced to key viewsheds around Ford Dry Lake. Typically, AR applications are executable via smartphones, tablets, or computers with video capabilities. For information on AR in an archaeological context, please see Dahne and Karigiannis 2002. The AR application should be able to portray the Ford Dry Lake area at certain key points (up to five) and digitally render the inundated state of the lake and the type of sites and prehistoric activity that would be common along the edge of the lake. While the production of the AR application would likely be conducted by AECOM software developers and/or a subconsultant with AR application development experience, the various Tribes should be consulted with regarding content, detail, and location. AECOM ethnographers, visual simulation experts, and archaeologists should be

involved in the development of the scenes and AR content. It is anticipated that the website would involve three key core AECOM team members for the development and review of the content and of the AR application itself. Additional staff may be added as need for AR application programming. It is anticipated that the AR application could be developed in 4 to 7 months, allowing for adequate time to consult with involved Tribes. The AR application should be available for major smartphone operating systems (i.e., iPhone and Android) and would be subject to review by various “app store” operators for content; this review is not included in the 4-7 months needed for development.

Production of Informational Kiosk

Coordinating with NextEra, Caltrans, and Riverside County, an outreach effort will be made to those visitors stopping at the Wiley’s Well rest area, instructing them about the cultural relevance of the project area for nearby Native American tribes. The tribes will be invited to be involved in this coordination, having the opportunity to comment on outreach materials or provide a Tribal cultural resources docent the opportunity to participate in the outreach activities. An informational kiosk will be designed, developed, and installed at the Wiley’s Well rest area that informs visitors of the work being done at the project site and the culturally sensitive nature of the surrounding landscape. Through consultation, the Tribes should be involved in the design and development of the informational kiosk.

Instructional Module of Archaeology and Language

In consultation with Tribal representatives, an instructional module on archaeology and Native American languages will be developed at the 3rd grade level (in conjunction with the established “Continuity and Change” curriculum) that details some of the archaeology and ethnography at the project site, but expands to more general topics such as:

- What is archaeology?
- What are prehistoric sites?
- What Native Americans living the area?
- Do they live here still?
- How did they live?
- What do they believe (i.e., religious views)?
- What did they speak (e.g., common greetings and sayings)?
- While the planning and organization of the instruction module would likely be conducted by AECOM staff in coordination with a subconsultant with educational materials development experience, the various Tribes should be consulted with regarding content, detail, and organization. AECOM ethnographers, public outreach staff, and archaeologists should be involved in the development of content of the educational materials, but it is likely that the educational planning subconsultant would format the

materials to be age appropriate. It is anticipated that the instruction module would involve five key core AECOM team members for the development and review of content and of the module itself, while an additional three members of an educational planning subconsultant would be involved.. Additional staff may be added as needed for the development of various facets of the model (e.g., language). It is anticipated that the learning module could be developed in 6 to 9 months, allowing for adequate time to consult with involved Tribes.

Establishment of Green Energy/NEPA Scholarship

A trust fund shall be established for full-tuition, books, and living expenses for undergraduate or graduate scholarships for up to twenty scholarship years (e.g., 5 students for four years each) at an accredited institution to educate Tribal members in fields of study involving the sciences, technologies, and engineering of alternative energy development and/or the technical and legal aspects of environmental impact assessment, management, remediation, cultural resource management, and communication.

Section 106 Training, Basic and Advanced

Training shall be provided for Tribal members to participate in Section 106 training so that they can participate more fully in the Tribal consultation process. Training will be provided to members of each involved Tribe and training will be held at the basic and advanced level. While many entities can provide this training, it is recommended that the training be provided by the Advisory Council on Historic Preservation and include the “Essentials” and “Advanced” seminars.¹ These trainings are held on an annual basis at locations around the United States. NextEra will fund (registration fees and travel costs) one participant from each tribe to attend each of the seminars at a time and location (limited to training sites in the Pacific Time Zone, as well as Arizona) convenient for the individual Tribal participants.

REPORT PREPARATION

Within 7 days of the completion of all efforts described above for the NRHP and CRHR eligibility evaluation of the GSEP resource, AECOM will provide a preliminary report including NRHP and CRHR eligibility recommendation to the Energy Commission and the BLM. This report will clearly summarize the investigations undertaken during the evaluation phase and provide justification for the eligibility recommendation. This recommendation will be supported by reference to the NRHP and CRHR criteria and by explicit linkages to important regional research questions as outlined above. Within one month of completion of the efforts, a full evaluation report conforming to state and federal standards will be submitted to the Energy Commission and the BLM.

Off-site activities to mitigate impacts to the GSEP resource vary in duration and type. Upon completion of each specific ethnographic and public outreach tasks, a memo confirming

¹ See <http://www.achp.gov/106select.html>.

completion will accompany submittal of the final product to BLM and Energy Commission. Within 40 days of completion of all of the archaeological tasks described above, a single report will be provided detailing the methods, results, and interpretations arising from the archaeological mitigation.

