Draft
Environmental Impact Report

SCH# 2022110558

Volume 4

Appendix G through O

PELICANS JAW HYBRID SOLAR PROJECT

by Pelicans Jaw Solar, LLC *(PP21124)*

Conditional Use Permit No. 3, Map No. 5
General Plan Amendment No. 2, Map No. 5

Kern County
Planning and Natural Resources Department
Bakersfield, California

August 2023

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Kern County
Planning and Natural Resources Department
Bakersfield, California

Technical Assistance by:
Kimley-Horn

August 2023

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Appendices – Volume 4

NOTE TO REVIEWER OF ELECTRONIC FILES:

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Appendix G

Archaeological Resources Inventory Report

Archaeological Resources Inventory Report

Pelicans Jaw Hybrid Solar Project Kern County, California

FEBRUARY 2023

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National Archaeological Database (NADB) Information

Authors:	Adam Giacinto, MA, RPA; Ross Owen, MA, RPA; William Burns, MsC, RPA; Nicholas Hanten, MA; Julie Royer, MA
Firm:	Dudek
Project Proponent:	Pelicans Jaw Solar, LLC
Report Date:	February 2023
Report Title:	Draft Archaeological Resources Inventory Report for the Pelicans Jaw Hybrid Solar Project, Kern County, California
Type of Study:	Archaeological Inventory
Resources:	PJ-S-001, PJ-S-002, PJ-S-003, PJ-S-004, PJ-S-005, PJ-S-006
USGS Quads:	W Camp, Lone Tree Well and Lost Hills NW, California 1:24,000 Township 25S, Range 20E, Sections 1, 12, 35, and 36; Township 25S, Range 20E, Sections 3-12, 14-23, 26-33, 35, 36
Acreage:	Approximately 3,371
Permit Numbers:	Pending
Keywords:	W Camp, Lone Tree Well and Lost Hills NW, USGS 7.5-Minute Quadrangles, Intensive Pedestrian Survey, Geoarchaeology

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APE	area of potential effect
CCS	cryptocrystalline silicate
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CRHR	California Register of Historical Resources
DPR	California Department of Parks and Recreation
FGV	Fine-grained volcanic
m	meter
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PRC	California Public Resources Code
Project	Pelicans Jaw Hybrid Solar Project
USGS	U.S. Geological Survey

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Executive Summary

Pelicans Jaw Solar, LLC (Project proponent or Applicant) is proposing construction of the Pelicans Jaw Hybrid Solar Project (Project), a solar photovoltaic energy generation and storage facility and associated ancillary facilities located in unincorporated northern Kern County (County) in the San Joaquin Valley in central California. The applicant contracted Dudek to perform a Phase I cultural resources inventory for the Project. This archaeological resources inventory report was conducted in compliance with the California Environmental Quality Act (CEQA). The lead agency for compliance with CEQA is the County. While work has been completed to typical federal agency standards, specific federal agency review has not been determined at this time.

The proposed Project is located approximately 8 miles north of Lost Hills, a census-designated place in the County. The solar generation site (Project site) is bounded by the Kern County and Kings County line to the north, the Kern River to the east, Twisselman Road to the south, and Interstate 5 to the west. Specifically, the Project site consists of an area approximately 3,371 acres in size. For the purposes of future federal agency review, should this occur, this Project site should also be considered the direct area of potential effect (APE). For the purposes of analysis, the vertical APE is assumed to be up to 20 feet below the existing grade, although Project design is still underway and the exact maximum depth of ground disturbance may be subject to change.

Elevations across the site range from approximately 210 feet above mean sea level in the eastern portion of the site to approximately 220 feet above mean sea level in the northwestern portion of the site. The Project boundary is located near the western margin of the Central Valley, approximately 10 kilometers south of the historic shoreline of Lake Tulare. The Project site is undeveloped, privately owned, and being used for livestock grazing. Specifically, the Project is located in W Camp, Lone Tree Well and Lost Hills NW, California 1:24,000 Township 25S, Range 20E, Sections 1, 12, 35, and 36; Township 25S, Range 20E, Sections 3-12, 14-23, 26-33, 35 and 36 of the "W Camp, CA," "Lone Tree Well, CA," and "Lost Hills NW, CA," U.S. Geological Survey 7.5-minute quadrangles.

A Southern San Joaquin Valley Information Center (SSJVIC) records search identified no previously recorded cultural resources within the Project boundary, and four cultural resources within 1-mile of the Project site. These resources report the presence of human remains, habitation debris, and lithic material, along with a historic freeway. Dudek requested a Native American Heritage Commission Sacred Lands File search, the results of which were provided on June 8, 2022. Results of this search were negative. Dudek has not directly contacted Native American tribes with the intent of avoiding disruptions to ongoing government-to-government notifications and consultation pursuant to Assembly Bill 52 and Senate Bill 18; a full record of this outreach will be on file with the County of Kern.

Dudek conducted a Phase I Inventory intensive pedestrian survey of the Project site to document sites and features. Dudek archaeologists intensively surveyed the entire Project site and associated access roads, walking transects spaced no more than 20 meters apart and oriented along cardinal directions. Evidence of buried cultural deposits were opportunistically sought through inspection of natural or acritical erosion/excavation exposures and the spoils from rodent burrows. Pedestrian surveys were conducted from May 9 through October 21, 2022, and February 2, 2023. Phase I Inventory was directed at identifying the general distribution of surface cultural material.

Phase I Inventory efforts resulted in identification of a general low-density scatter of prehistoric debitage throughout the Project site. Approximately 1,151 fragments of debitage were identified in total. This distribution of debitage is understood to be partially the result of an extended history of historical agricultural activities, which have spread artifacts from their original unknown location(s) of deposition across a large area. Within this broader distribution

of debitage that is present throughout the Project site, there is a patterning of more discrete concentrations of formal artifacts that meet the definition of archaeological sites. These four sites (PJ-S-001, PJ-S-002, PJ-S-003, and PJ-S-004) have a higher frequency of artifacts, an assemblage of greater variation and complexity, and likely higher potential for subsurface deposits than the surrounding areas. Formal artifacts from the Project site with additional data and/or diagnostic potential identified during survey include 63 shell beads and 82 stone tools.

Historically, portions of the Project site would have been seasonally inundated by Tulare Lake; the site falls immediately west of the historic route of the Buena Vista Slough that channeled water northward from Buena Vista Lake. These features represented a resource-rich environment. Further, they would have acted as a physical impediment to further passage by prehistoric peoples when traveling along the western peripheries of the Central Valley, and therefore the project site would have presented a natural stopping point. The area has been subject to substantial alluvial soil deposition through reoccurring events; these conditions have potential to result in capping of underlying ground surfaces and the development/preservation of subsurface archaeological deposits. At present, it is unclear if the substantial history of agricultural discing and other activities has completely disturbed any potential subsurface deposits that may have been present, or if residual deposits may remain.

As presently designed, the Project would intersect six archaeological sites and features, including two historic-era ditch features and four prehistoric sites. The historic-era ditch features (PJ-S-005 and PJ-S-006) have been documented and evaluated; they are recommended not eligible for listing on the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) under any criteria. As such, disturbance of these historic-era ditches would not constitute a significant impact. The four prehistoric archaeological sites were subject to intensive-level documentation. The sites appear to lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A, B, or C or CRHR under Criteria 1, 2, or 3. Criterion D/4 is most appropriately applied to an assessment of the sites' eligibility. Given the geomorphic context, the site has potential for buried archaeological resources. Surface and potential subsurface artifacts have potential to contribute additional data relating to prehistoric use, chronology, and other important research themes. As such, these sites are recommended eligible for listing on the NRHP/CRHR under Criterion D/4, for their potential to yield information important in prehistory or history. The preferred management strategy should include avoidance or other methods of preservation in place. Should avoidance be determined infeasible, mitigation required to address potential impacts to these significant resources should require archaeological data recovery prior to disturbance by construction activities. In addition, a cultural resources monitoring program is recommended to occur during initial subsurface disturbing activities throughout the Project site.

1 Introduction

1.1 Project Location and Description

Pelicans Jaw Solar, LLC is proposing construction of the Pelicans Jaw Hybrid Solar Project (Project), a solar photovoltaic energy-generating facility to be located in northern Kern County. The Project incorporates solar energy generation, storage, and associated ancillary facilities.

The proposed Project is located approximately 8 miles north of Lost Hills, a census-designated place in unincorporated Kern County in the San Joaquin Valley in central California (Figure 1, Project Location). The approximately 3,371-acre proposed Project site is located in northwestern Kern County, adjacent to the southern border of Kings County, with direct access from Interstate 5 located approximately 2 miles to the west (Figure 2, Project Site). The Project site is bounded by the Kern County and Kings County line to the north, the Kern River to the east, Twisselman Road to the south, and Interstate 5 to the west. Elevations across the site range from approximately 210 feet above mean sea level in the eastern portion of the site to approximately 220 feet above mean sea level in the northwestern portion of the site. The Project area is generally undeveloped, with the exception of a few farm-related structures located near the southwestern portion of the Project site. The site is currently privately owned and is being used for livestock grazing.

For the purposes of providing management recommendations, the vertical area of direct impact (ADI) or area of potential effect (APE), as represented by the maximum depth of disturbance, is assumed to be 20 feet below the existing ground surface. However, the proposed solar development area would likely have a shallower actual ground disturbance.

In preparation for the Project, Dudek was contracted to perform a Phase I cultural resource inventory. This inventory was conducted in compliance with the California Environmental Quality Act (CEQA). Due to jurisdictional waters considerations and anticipated review by the U.S. Army Corps of Engineers, this inventory has been completed to standards and requirements meeting compliance with Section 106 of the National Historic Preservation Act (NHPA).

1.2 Report Structure and Key Personnel

This report is divided into six chapters. Following this introduction, Chapter 2 reviews the natural environment and the cultural context and Chapter 3 provides the methods used to complete the current inventory. The records search, survey results, and tribal correspondence are discussed in Chapter 4. Chapter 5 provides a cultural resources effects analysis. Chapter 5 also summarizes the cultural resources work completed for this Project to date and provides recommendations for further management of cultural resources, consistent with CEQA and Section 106 of the NHPA. Chapter 6 provides a list of references cited throughout this report. Several appendices are attached to this report. Appendix A contains confidential maps showing cultural resources overlaid on the Project boundary, Appendix B includes confidential records search results, Appendix C includes confidential Native American Heritage Commission (NAHC) Sacred Lands File search results, Appendix D contains confidential documentation of newly recorded cultural resources, Appendix E provides a series of historic maps overlaid on the Project boundary, and Appendix F contains the resumes of key personnel.

Ross Owen, MA, RPA, drafted the major portion of the present report and, acting as field director, conducted the intensive pedestrian survey with additional Dudek archaeologists. Ross Owen, Nicholas Hanten, William Burns, and Julie Royer drafted the technical report. Adam Giacinto, MA, RPA acted as principal investigator, prepared management recommendations, and finalized the technical report. All archaeologists meet the Secretary of the Interior's standards for archaeology and have extensive experience working within local, state, and federal regulatory contexts.

1.3 Regulatory Context

The current cultural resources investigation was completed to satisfy CEQA and Section 106 of the NHPA.

1.3.1 Federal Requirements

National Historic Preservation Act

The National Register of Historic Places (NRHP) is the United States' official list of districts, sites, buildings, structures, and objects worthy of preservation. Overseen by the National Park Service under the U.S. Department of the Interior, the NRHP was authorized under the NHPA, as amended. Its listings encompass all National Historic Landmarks and historic areas administered by the National Park Service.

NRHP guidelines for the evaluation of historic significance were developed to be flexible and to recognize the accomplishments of all who have made significant contributions to the nation's history and heritage. Its criteria are designed to guide state and local governments, federal agencies, and others in evaluating potential entries in the NRHP. For a property to be listed in or determined eligible for listing, it must be demonstrated to possess integrity and to meet at least one of the following criteria:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
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; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

Integrity is defined in NRHP guidance as "the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity" (NPS 2009). NRHP guidance further asserts that properties must have been completed at least 50 years before evaluation to be considered for eligibility. Properties completed fewer than 50 years before evaluation must be proven to be "exceptionally important" (criteria consideration G) to be considered for listing.

A historic property is defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria" (36 Code of Federal Regulations [CFR] Sections 800.16[i][1]).

Effects on historic properties under Section 106 of the NHPA are defined in the assessment of adverse effects in 36 CFR Sections 800.5(a)(1):

> An adverse effect is found 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.

Adverse effects on historic properties are clearly defined and include the following (36 CFR 800.5 [2]):

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

To comply with Section 106, the criteria of adverse effects are applied to historic properties, if any exist in the Project site, pursuant to 36 CFR Sections 800.5(a)(1). If no historic properties are identified in the Project site, a finding of "no historic properties affected" is made. If there are historic properties in the Project site, application of the criteria of adverse effect will result in Project-related findings of either "no adverse effect" or "adverse effect." A finding of no adverse effect may be appropriate when the undertaking's effects do not meet the thresholds in criteria of adverse effect found in 36 CFR Sections 800.5(a)(1), in certain cases when the undertaking is modified to avoid or lessen effects, or if conditions were imposed to ensure review of rehabilitation plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (codified in 36 CFR Part 68).

If adverse effects findings are expected to result from a project, mitigation would be required, as feasible, and resolution of those adverse effects by consultation may occur to avoid, minimize, or mitigate adverse effects on historic properties pursuant to 36 CFR Part 800.6(a).

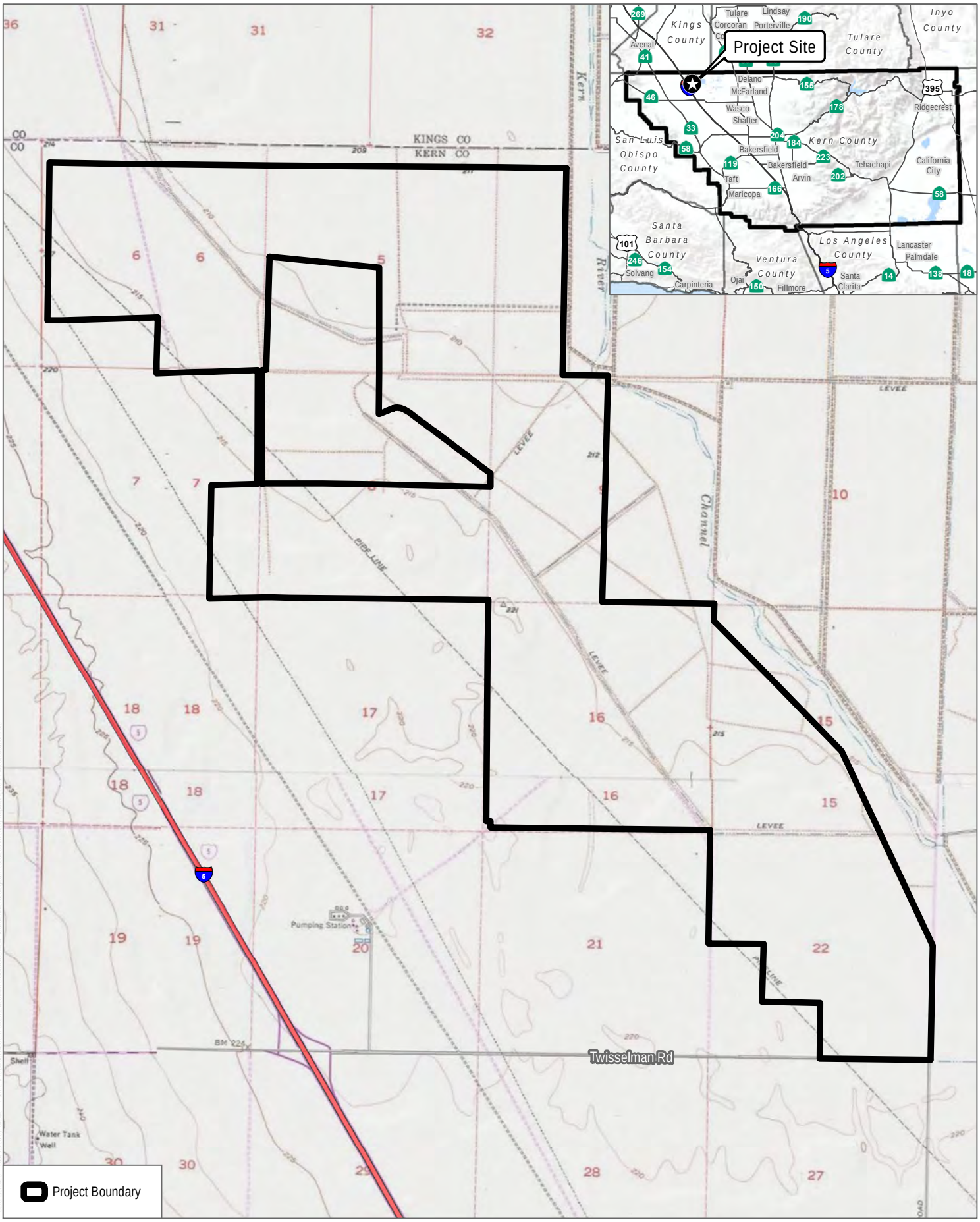
1.3.2 State Requirements

In California, the term "historical resource" includes "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California Public Resources Code [PRC] Section 5020.1[j]). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP. According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
2. Is associated with the lives of persons important in our past.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. Has yielded, or may be likely to yield, information important in prehistory or history.

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852[d][2]).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic-era resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are State Landmarks and Points of Interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.



SOURCE: USGS 7.5 minute series West, Camp, Lone Tree, and Lost Hills NW quadrangles

DUDEK

0 1,500 3,000 Feet

FIGURE 1

Project Location

Archaeological Resources Inventory Report for the Pelicans Jaw Hybrid Solar Project, Kern County, California

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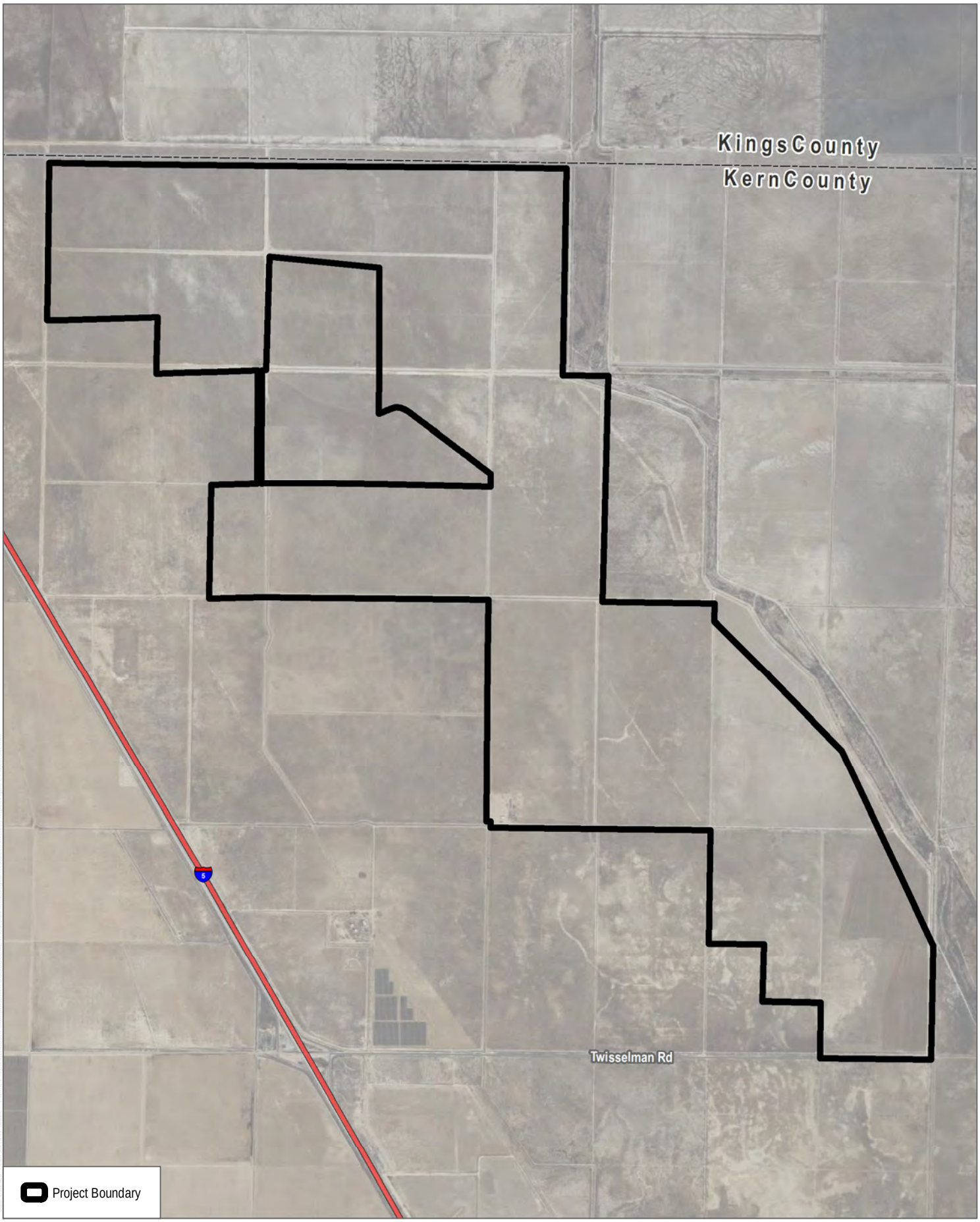

SOURCE: USGS 7.5 minute series West, Camp, Lone Tree, and Lost Hills NW quadrangles

DUDEK

0 1,500 3,000 Feet

FIGURE 2

Project Site

Archaeological Resources Inventory Report for the Pelicans Jaw Hybrid Solar Project, Kern County, California

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California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on "historical resources," "unique archaeological resources," and "tribal cultural resources." Pursuant to PRC Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Section 21083.2 requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

As described further in subsequent text, the following CEQA statutory provisions and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

- PRC Section 21083.2(g) defines "unique archaeological resource."
- PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource." It also defines the circumstances when a project would materially impair the significance of an historical resource.
- PRC Section 21074(a) defines "tribal cultural resources."
- PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated cemetery.
- PRC Sections 21083.2(b)-(c) and CEQA Guidelines section 15126.4 include statutes and regulations providing information regarding the mitigation framework for archaeological and historic resources, including options of preservation-in-place mitigation measures; identifies preservation-in-place as the preferred manner of mitigating impacts to significant archaeological sites.

PRC Sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures. Preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context, and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site.

Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; CEQA Guidelines Section 15064.5[b]). If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources, or identified as significant in a historical resources survey (meeting the requirements of PRC Section 5024.1[q]), it is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (PRC Section 21084.1; CEQA Guidelines Section 15064.5[a]). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (PRC Section 21084.1; CEQA Guidelines Section 15064.5[a]).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines

Section 15064.5[b][1]; PRC Section 5020.1[q]). In turn, the significance of a historical resource is materially impaired when a project does any of the following (CEQA Guidelines Section 15064.5[b][2]):

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

If an archaeological site does not meet the criteria defining a historic resource, it still may qualify as a unique historic resource. PRC Section 21083.2(g) defines a unique archaeological resource as an archaeological 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 any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

CEQA Guidelines Section 15126.4(b)(3) provides that provides that preservation in place is the preferred manner of mitigating impacts to historic resources of an archaeological nature, and may be accomplished by, but is not limited to, methods such as planning construction to avoid archaeological sites, incorporation of sites within parks, greenspace, or other open space; covering archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site; or deeding the site into a permanent conservation easement. However, if data recovery through excavation is the only feasible mitigation, then a data recovery plan making provision for adequately recovering scientifically consequential information from and about the historical resource must be prepared and adopted prior to commencing excavation. Curation generally must be employed for any artifact that must be removed from during project excavation.

Similarly, if it can be demonstrated that a project will cause damage to a historic or unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state under methods similar to those listed for historic resources of an archaeological manner, except that Subdivisions (c) and (e) of Section 21083.2 sets forth limits on the amount and costs of mitigation than can be imposed on projects. Under Section 21083.2(d), excavation as mitigation must be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project.

Excavation as mitigation shall not be required for a historic or unique archaeological resources if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential

information from and about the resource, if this determination is documented in the EIR. PRC Section 21083.2(d); CEQA Guidelines Section 15126.4(b)(D).

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact (PRC Section 21083.2[a]; CEQA Guidelines Section 15064.5[c][4]). However, if a non-unique archaeological resource qualifies as a tribal cultural resource (PRC 21074[c]; 21083.2[h]), further consideration of significant impacts is required.

AB 52 of 2014 established that tribal cultural resources must be considered under CEQA and also provided for additional Native American consultation requirements for the lead agency.

CEQA Guidelines Section 21074(a) defines a "tribal cultural resource" as either of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register of Historical Resources.
  - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 formalizes the lead agency–tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project site, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

If it can be demonstrated that a project will cause damage to a tribal cultural resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, data recovery is an acceptable form of mitigation following the standards for historic resources if the tribal cultural resource qualifies as one, and following the standards for unique archaeological resources if it does not. (PRC Section 21074(c)).

Native American Historic Cultural Sites (California Public Resources Code section 5097 et seq.)

The Native American Historic Resources Protection Act (Public Resources Code section 5097, et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance,

vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the NRHC to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act (California Repatriation Act), enacted in 2001, requires all state agencies and museums that receive state funding and that have possession or control over collections of human remains or cultural items, as defined, to complete an inventory and summary of these remains and items on or before January 1, 2003, with certain exceptions. The California Repatriation Act also provides a process for the identification and repatriation of these items to the appropriate tribes.

California Health and Safety Code

CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed in PRC Section 5097.98.

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains can occur until the county coroner has examined the remains (Section 7050.5b). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the California NAHC within 24 hours (Section 7050.5c). The NAHC will notify the most likely descendant. With the permission of the landowner, the most likely descendant may inspect the site of discovery. Recommendations must be provided within 48 hours of notification of the most likely descendant by the NAHC and being provided access to the project boundary. The most likely descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

2 Project Context

2.1 Environmental Context

The Project site is located in a rural setting and is surrounded primarily by agricultural parcels. A majority of the Project site consists of non-irrigated open space pasture. The Kern River Channel is immediately east of the Project site and Lost Hills, separating the main valley from the Antelope Plain, begin approximately 3.5 kilometers to the west. Historically, the Project site was situated in the vicinity of the outlet where Buena Vista Lake Slough flowed into Tulare Lake (Figure 3, 1856 Map with Project site). Both the flow of Buena Vista Lake Slough (dependent upon overflow from Buena Vista Lake to the south) and the shoreline of Tulare Lake were highly variable and dynamic throughout the Holocene. The alluvial fans and stream-born alluvial formations that dominate the Project site have been formed throughout the Pleistocene and into the Holocene, and have the potential to yield stratified deposits with cultural material.

The Project site is broadly within the southern San Joaquin Valley, near the western edge of the Central Valley and within the Tulare Basin. The Project site is approximately 20 kilometers south of the dry Tulare lake bed and 30 kilometers east of the Temblor Range. The region receives approximately 8.6 inches of precipitation annually, with average monthly high temperatures ranging from approximately 56°F to 97°F (U.S. Climate Data 2022). Topography is generally flat. Annual wet and dry periods would have caused the Project site to oscillate between arid-steppe similar to the Antelope Plain and marsh-like Tule wetlands with lacustrine resources and migrating water fowl. Periods of increased rainfall would have contributed to the ecological richness of the area, while possibly inundating activity areas and habitation sites in low-lying areas and forcing occupation onto higher ground.

2.2 Cultural Context

Various attempts to parse out information provided through recorded archaeological assemblages throughout California for the past 12,000 years have led to the development of numerous cultural chronologies. Some of these are based on geologic time, most are interpreted through temporal trends derived from archaeological assemblages, and others are interpretive reconstructions. The spatial extent and detail of these chronologies is also highly variable, with detail chronologies developed in some areas based on substantial numbers of radiocarbon dates, while other areas rely on cross-dating of stylistically distinct artifact styles or cultural patterns. However, each of these chronologies describes essentially similar trends in assemblage composition and cultural succession, with varying degrees of detail. California's archaeological assemblage composition is generally accepted as falling within the following overarching patterns: Paleoindian period (11,550–8550 cal BC), Archaic period (8550 cal BC–cal AD 1100), Emergent/Prehistoric period (cal AD 1100–1750), and Ethnohistoric Period (post-AD 1769). The most broadly applicable chronology for the Central Valley follows a similar framework, further subdividing the Archaic period into Upper, Middle, and Lower phases based on climatic and cultural variations (Bennyhoff and Fredrickson 1994; Groza 2002; Rosenthal et al. 2007).

2.2.1 Prehistoric Era

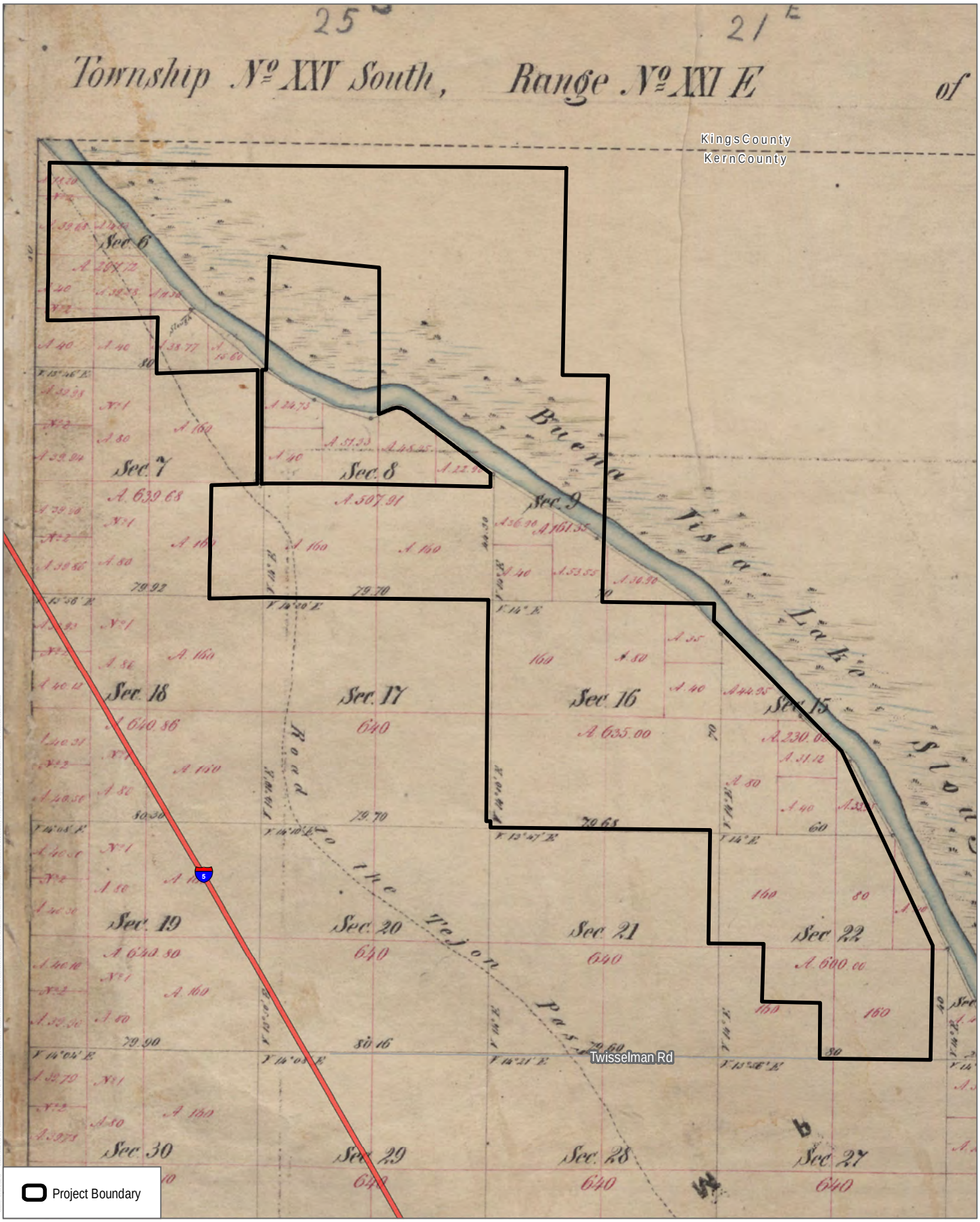
Paleoindian Period (11,550–8550 cal BC)

Occupation of the Central Valley is likely to have occurred at least 10,000 years ago, but only a handful of Paleoindian period sites with lithic bifacial points have been recorded in the region. Fluted points and other Paleoindian period sites are generally rare and found in isolated contexts in the Central Valley due to the dearth of Late Pleistocene–age deposits in the region resulting from periodic episodes of erosion and deposition during the Holocene that have removed or deeply buried large segments of the Late Pleistocene landscape that would contain Paleoindian sites. The largest and most continuous areas of Late Pleistocene surface deposits in the San Joaquin Valley are found north of the Project site, in and around Tulare Lake (Meyer et al. 2010). Along the southwestern periphery of Tulare Lake, the Witt Site represents the largest collection of early concave-base projectile points in the region, with hundreds of early concave-base and other Paleoindian points recovered from primarily surface contexts along the remnant shoreline (Fenenga 1993; Rondeau and Hopkins 2008). While some of these fluted points are likely from the Late Pleistocene, very few can truly be assigned as "Clovis-like," with other concave base point types such as the Great Basin Concave Point, and other point types similar to the Western Pluvial Lakes Tradition identified in the assemblage (Hopkins 2008; Rondeau and Hopkins 2008).

Archaic Period (8550 cal BC–cal AD 1100)

The Archaic period in the Central Valley is subdivided into three phases: the Lower Archaic (8550–5550 cal BC), the Middle Archaic (5550–550 cal BC), and the Upper Archaic (550 cal BC–cal AD 1100). As with the Paleoindian period, Lower Archaic deposits in the Central Valley tend to be isolated finds lacking stratigraphic context. Stemmed projectile points, flaked stone crescents, and other distinctive flaked stone artifact types are associated with this period, several of which have been found in the vicinity of Tulare Lake (Fenenga 1992).

Despite the paucity of Lower Archaic assemblages in the region as a whole, a small collection of sites in the vicinity of the Project site may represent a distinct Western Stemmed Tradition variant local to the southern San Joaquin valley and dating to the Lower Archaic (Sutton 2019). This variant of the Western Stemmed Tradition, the Buttonwillow Complex, is represented at three sites: the aforementioned Witt Site, CA-KER-166 on Buena Vista Lake, and CA-KER-2720 adjacent to the Buena Vista Slough. While only two artifact types can be firmly associated with the Buttonwillow Complex, stemmed dart points and crescents, numerous other flaked stone artifacts were recovered from the site assemblages, although ground stone artifacts were notably absent. The location, artifact assemblages, and feature from the Buttonwillow Complex sites indicate a subsistence system targeting lacustrine resources, primarily freshwater shellfish and fish, although waterfowl and large mammals also probably contributed to the diet as did marshland plants such as tule, cattail, and sedge (Sutton 2019).



SOURCE:

DUDEK

0 1,500 3,000 Feet

FIGURE 3

1856 Map with Project Site

Pelicans Jaw Hybrid Solar Project, Kern County, California

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The onset of the Middle Archaic in Central California marked a substantial change in the climate, with warmer, dryer conditions resulting in the shrinking and eventual drying out of Tulare Lake, a phenomenon common among other Pleistocene lakes throughout the western United States during this time. This also coincided with the formation of new wetland habitats as rising sea levels pushed inland, forming the Sacramento and San Joaquin Deltas. These climatic processes resulted in substantially more stable landforms as fans and floodplains stabilized within the delta, making buried Middle Archaic deposits much more common than those from the Early Archaic. Middle Archaic sites are typified by the distinct adaptive pattern of logistically organized subsistence practices and residential stability along river corridors (Rosenthal et al. 2007). The prevalence of ground stone tools, including early examples of mortars and pestles, suggests an increased reliance on vegetal resources, likely the result of greater residential stability driving resource intensification (e.g., Basgall 1987). Fishing was also an important component of subsistence, as new fishing technologies (including gorge hooks, composite bone hooks, and spears) along with abundant ichthyofaunal remains have been identified at Middle Archaic sites in Contra Costa, Sacramento, and San Joaquin Counties (Heizer 1949; Rosenthal et al. 2007; Schulz 1981). Regional variations of the Middle Archaic pattern include the Windmiller Pattern, which are characterized by a distinctive burial pattern of extended burials oriented to the west. While the Windmiller Pattern was first identified on old levee ridges at the confluence of the Mokelumne and Cosumnes Rivers, Windmiller sites are widespread in the San Joaquin Valley, as well as the Sacramento and San Joaquin Delta region.

The transition to the Upper Archaic period coincides with the onset of late Holocene environmental conditions, during which time the climate was markedly cooler, wetter, and more stable. The archaeological record from the Upper Archaic is better understood and represented throughout the Central Valley, and is marked by an increase in cultural diversity, with numerous regional distinctions in burial posture, artifact styles, and other elements of material culture (Bennyhoff and Fredrickson 1994; Rosenthal et al. 2007). The Upper Archaic record is marked by the development and proliferation of numerous bone tools and implements, as well as widespread production and trade of manufactured goods, including *Olivella* shell beads, *Haliotis* ornaments, and obsidian bifacial roughouts and ceremonial blades (Bennyhoff and Fredrickson 1994; Moratto 1984). Subsistence economies during the Upper Archaic focused on seasonally structured resources that could be harvested and processed in bulk, including acorns, salmon, shellfish, deer, and rabbits. The proliferation of mortars and pestles and archaeobotanical remains indicate that the first widespread reliance on acorns occurred during this period (Wohlgemuth 1996, 2004). Large mounded village sites also first occurred in the delta region during this period (Bennyhoff and Fredrickson 1994; Boey 1995; Rosenthal et al. 2007). Less is known about the Upper Archaic in the southern San Joaquin Valley; however, the presence of what appear to be year-round villages on Buena Vista Lake, with a variety of residential features and extensive accumulation of midden deposits indicating exploitation of aquatic and terrestrial food sources, appears consistent with the Upper Archaic pattern in general (Hartzell 1992; Rosenthal et al. 2007).

On the whole, the Archaic period in the Central Valley is characterized by increasing residential stability, cultural diversity, and subsistence intensification though time.

Emergent Period (cal AD 1100–Historic Contact)

The archaeological record for the Emergent period is the most substantial and well-documented of any period in the Central Valley, and the assemblages and adaptations represented therein are the most diverse. The Emergent period also marks the onset of cultural traditions consistent with those documented at European contact and the disappearance of several previous archaeological traditions. Large villages developed in areas of the Sacramento Valley, and the number of mound villages and smaller hamlets increased across the region, with villages and smaller residential communities developing along many of the foothill sidestreams, river channels, and sloughs in the San

Joaquin Valley. Subsistence economies during the Emergent period were increasingly reliant on fishing and plant gathering, with increased subsistence intensification evident in the increased reliance on small seeds and a more diverse assortment of mammals and birds (Broughton 1994; Rosenthal et al. 2007; Wohlgemuth 2004). Perhaps the most notable technological change during the Emergent period is the introduction of the bow and arrow, which replaced atlatl technology as the favored hunting implement sometime between AD 1100 and AD 1300 (Bennyhoff and Fredrickson 1994). The material record during the Emergent period is also marked by the introduction of new *Olivella* bead and *Haliotis* ornament types, and eventually the introduction of clamshell disc beads (Groza 2002; Moratto 1984; Rosenthal et al. 2007). The Emergent period in general is marked by an increase in population size and the number of residential sites and villages throughout the region, with increasing regional variability and resource intensification.

2.2.2 Ethnohistoric Period (post-AD 1750)

The history of Native American communities prior to the mid-1700s has largely been reconstructed through later mission-period and early ethnographic accounts. The first records of the Native American inhabitants of the region come predominantly from European merchants, missionaries, military personnel, and explorers. These brief, and generally peripheral, accounts were prepared with the intent of furthering respective colonial and economic aims and were combined with observations of the landscape. They were not intended to be unbiased accounts regarding the cultural structures and community practices of the newly encountered cultural groups. The establishment of the missions in the region brought more extensive documentation of Native American communities, though these groups did not become the focus of formal and in-depth ethnographic study until the early twentieth century. The principal intent of these ethnographic researchers was to record the pre-contact, culturally specific practices, ideologies, and languages that had survived the destabilizing effects of missionization and colonialism. This research, often understood as “salvage ethnography,” was driven by the understanding that traditional knowledge was being lost due to the impacts of modernization and cultural assimilation. Alfred Kroeber applied his “memory culture” approach (Lightfoot 2005: 32) by recording languages and oral histories within the region.

Based on ethnographic information, it is believed that at least 78 mutually unintelligible languages were spoken from Baja California Sur to the southern Oregon state border at the time of Spanish contact. The distribution of recorded Native American languages can be grouped as a geographic mosaic across California through seven primary language families (Golla 2007, 2011).

During the ethnohistoric period, people living in the immediate vicinity of the Project site would have likely spoken Wowol, a dialect of the Southern Valley Yokuts spoken in the areas southeast of Tulare Lake. More generally, the territory of the Southern Valley Yokuts included most of the southern end of the San Joaquin Valley including Tulare Lake and its surrounding sloughs, as well as the lower portions of the Kings, Kaweah, Tule, and Kern Rivers (Gayton 1948; Kroeber 1925; Latta 1977; Wallace 1978). Many ethnographers also group Yokuts speakers in the area surrounding Buena Vista and Kern Lakes with the Southern Valley Yokuts due to similarities in lifeways; however, Golla (2011) distinguishes between Southern Valley and Buena Vista Yokuts based on linguistic differences between the groups.

The Southern Valley Yokuts followed a mixed subsistence economy emphasizing fishing, hunting waterfowl, and collecting shellfish and aquatic plants (Gayton 1948; Wallace 1978). Terrestrial large game made up a small proportion of the diet, although vegetable resources were seasonally gathered (Gayton 1948). Although acorns were collected and sometimes traded for, there were no acorn granaries like those seen among foothill groups (Kroeber 1925). Fish were caught in myriad ways including nets of varying sizes and complexity, spears, basket

traps, and sometimes the bow and arrow, while waterfowl were taken by snare or with the bow and arrow and mussels were gathered in large quantities and steamed on tule mats (Wallace 1978). Mortars, for the processing of plant foods, were most commonly constructed from hard woods such as oak, although occasional imported stone specimens were used (Kroeber 1925). Boats, constructed by lashing bundles of tules into a canoe-shaped balsa, were important for hunting, transport of goods and people, and numerous other tasks.

Southern Valley Yokuts habitation areas were most commonly situated in proximity to aquatic resources, particularly along lakeshores, marshes, or at the confluence of two waterways, as these areas were particularly productive for their primary food sources. Because of the abundance and reliability of subsistence resources, Southern Valley Yokuts generally occupied permanent settlements year round. Notable among Wowol and the groups living in the vicinity of Buena Vista lake was the construction of large steep-roofed communal residences shared by 10 or more families (Wallace 1978). These dwellings were constructed of tule reed–woven mats placed over a pole-frame structure, some of which were at least 100 feet long (Gayton 1948). Other structures included earth-covered sweat lodges and granaries for the storage of fish, roots, seeds, and other foods.

2.2.3 The Historic Period

Spanish Period (1769–1822)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish period in California begins with the establishment in 1769 of a settlement at San Diego and the founding of Mission San Diego de Alcalá, the first of 21 missions constructed between 1769 and 1823. Missions in the region included San Francisco de Asís (1776), Santa Clara de Asís (1776), San José de Guadalupe (1797 in Alameda County), San Rafael Arcángel (1817 in Marin County), and San Francisco Solano (1823 in Sonoma County) (Grunsky 1989).

The first Spaniards arrived in the San Joaquin Valley in 1772, led by don Pedro Fages who traveled through the Tejon Pass down into the southernmost part of the valley and visited a village in the vicinity of Buena Vista Lake before traveling west to San Luis Obispo (Wallace 1978). Active exploration of the region by the Spanish began in 1805, when several expeditions entered San Joaquin Valley including the expedition by Gabriel Moraga in 1806, which reached the San Joaquin and King Rivers and Buena Vista Lake, and the Palomares expedition to the Tulares in 1808, among others (Cook 1960).

Mexican Period (1822–1848)

Mexico's separation from the Spanish empire in 1821 and the secularization of the California missions in the 1830s caused further disruptions to Native American populations. Following the establishment of the Mexican Republic, the government seized many of the lands belonging to Native Americans, providing them as parts of larger land grants to affluent Mexican citizens and rancheros. The 1833 Secularization Act passed by the Mexican Congress ordered half of all mission lands to be transferred to Native Americans and the other half to remain in trust and managed by an appointed administrator. These orders were never implemented due to several factors that conspired to prevent Native Americans from regaining their patrimony.

American Period (Post-1848)

California was officially ceded to the United States in 1848, which led to the continued appropriation of Native American territory by ranchers, prospectors, and an increasing number of settlers. The economic drive to promote

successful ranching activities within the Central Valley was of particular importance to the continued development, regional stabilization, and western growth of the United States government's authority. While mining had limited direct impact on the San Joaquin Valley, by the mid-nineteenth century, Euro-American miners, failed in the lodes to the east, began to move into the area to try their luck at agriculture, ranching, and as farm/ranch hands (Rolle 1998). From 1850, with the passage of California's Indian Act, until legislative reforms in the late 1880s, state laws provided little actual protections to Native American populations throughout California who often worked on these local ranches and farms. This large influx of people into central California resulted in a large demand for meat and animal byproducts. In the early 1850s, entrepreneurs brought large herds of cattle, sheep, and hogs into the large grazing areas of the Central Valley and the Sierra Foothills (Caltrans 2007).

A report was commissioned by the United States military based in Monterey to examine the Tulare Valley (present-day San Joaquin Valley) and the areas around Tulare Lake, "for the purpose of selecting a suitable position for the establishment of a military post in the neighborhood of the Tulare lake" (Derby and Farquhar 1932: 247). In the report, Lt. Derby describes the landscape as the group approached the western edge of Tulare Lake (Derby and Farquhar 1932: 252): "The country passed over was a perfect desert, and I found here no forage for the animals but wire grass, the water standing in the tule marshes brackish, and no wood at all."

The following excerpt is a description following the group's traverse across a "ridge of sand about one hundred yards in width, and twelve feet above the level of the lake, which divides the water of the northern or Taché from the bed (now nearly dry) of the southern or Ton Taché" (Derby and Farquhar 1932). The ridge sounds similar to the Sand Ridge depicted on topographic maps for the region (Appendix E) (Derby and Farquhar 1932: 252–253):

> This last is little more than a very extensive swamp, covering the plain for fifteen miles in a southerly direction, and is about ten in width. It is filled with sloughs and small tule lakes, and is of course impassable except with the assistance of boats or rafts. The gradual receding of the water is distinctly marked by the ridges of decayed tule upon its shore, and I was informed, and see no reason to disbelieve, that ten years ago it was nearly as extensive a sheet of water as the northern lake, having been gradually drained by the connecting soughs, and its bed filled by the encroachments of the tule.

The Project site is located along the margins of the two landscapes described above. Climate variability resulted in fluctuations in annual precipitation that likely would have caused the conditions within Project site to oscillate between the two prior to the onset of industrial agriculture and irrigation within the San Joaquin Valley.

With the construction of the Southern Pacific Railroad in the late nineteenth century, agricultural activities in the region continued to intensify. Wheat and other cash crops became an important part of the economy and with them came development of large-scale irrigation systems beginning in the late nineteenth century (Preston 1981; Wallace and Riddell 1993). As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. Continued irrigation, as well as large water infrastructure projects on the rivers supplying the lake, resulted in the lakes effectively drying out except during especially rainy seasons by the mid-twentieth century.

3 Research Methods

The Secretary of the Interior has issued Standards and Guidelines for Archeology and Historic Preservation (48 FR 44720–44726), which are used for the identification and evaluation of historic properties and to ensure that the procedures are adequate and appropriate. The identification and evaluation of historic properties are dependent upon the relationship of individual properties to other similar properties (NPS and ACHP 1998: 18–20). Information about properties regarding their prehistory, history, architecture, and other aspects of culture must be collected and organized to define these relationships (NPS 2009), which is the intent of the current inventory.

This investigation consisted of a records search, historic background research, and a pedestrian survey of the Project site. The record search, conducted at the Southern San Joaquin Valley Information Center at California State University, Bakersfield, included a search of the Project site and a 1-mile radius around the Project boundary. In addition to the record search, historic research was also conducted to inform the history of land use within the Project site. This research included review of historic topographic maps and aerial photographs (NETR 2022a, 2022b, GLO 1856, 1868).

Following Bureau of Land Management precedents, which are appropriate for federal projects, survey techniques are loosely grouped into two categories: reconnaissance and intensive (BLM 2004; NPS 2009). The choice of survey category depends on the level of effort required for a particular project, which can vary depending on the nature of the properties or property types, the possible adverse effects on such properties, and agency requirements (NPS and ACHP 1998). The selection of field survey techniques and level of effort must be responsive to the management needs and preservation goals that direct the survey effort. For any survey, it is important to consider the full range of historic properties that may be affected, either directly or indirectly, and consider strategies that will minimize any adverse effects and maximize beneficial effects on those properties (BLM 2004; NPS 2009; NPS and ACHP 1998).

The current survey methods can be classified as intensive because close-interval transect spacing and full documentation of cultural resources were completed. Survey staff exceed the applicable Secretary of Interior's Professional Qualifications Standards for archaeological survey. Dudek archaeologists surveyed the entire Project site. The survey was conducted with transects spaced no more than 20 meters (m) apart and oriented along the Project alignment. A GPS receiver with sub-meter accuracy and loaded with a shapefile of the Project boundary was used to verify the accuracy of the survey coverage. Evidence for buried cultural deposits was opportunistically sought through inspection of natural or artificial erosion/excavation exposures and the spoils from rodent burrows. Field recording and photo documentation of resources were completed as appropriate.

Documentation of cultural resources complied with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716–44740) and the California Office of Historic Preservation Planning Bulletin Number 4(a), December 1989, Archaeological Resource Management Reports: Recommended Contents and Format for the Preparation and Review of Archaeological Reports. All cultural resources identified during this inventory were recorded on California Department of Parks and Recreation (DPR) Form 523 (Series 1/95), using the Instructions for Recording Historical Resources (OHP 1995).

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4 Results

This section presents the results of the records search and the field survey of the current study.

4.1 Records Search Results

A records search was completed for the Project site and a 1-mile buffer by staff at the SSJVIC at California State University, Bakersfield, on April 25, 2022. The records search identified 13 previous studies performed within the records search area. Of these, one study has covered a portion of the Project site (Table 1 and Confidential Appendix A).

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Project Site

Report ID	Year	Author	Title
Reports Intersecting the Project Site			
KE-02873	2001	Unknown	Los Banos-Gates 500 kV Transmission Project: Draft Supplemental Environmental Impact Report [Cultural Resources Section]
Reports Within 1 Mile of the Project Site			
KE-00049	1994	Osborne, Richard and Comeyne, Dominique	Negative Archaeological Survey Report. Highway project description: District 06, Kern County, Route 5, Post Mile 82.35, Charge Unit 169, Expenditure Authorization 37630K
KE-01840	1987	Unknown	Report on the Cultural Resources Assessment of the Proposed San Joaquin Valley Pipeline
KE-02648	2000	Reisig, Mark R. and Nadolski, Jessica A.	Nextel Communications ESMR Antenna Site CA 1541B, Interstate 5 at Twisselman, Wasco
KE-02873	2001	Unknown	Los Banos-Gates 500 kV Transmission Project: Draft Supplemental Environmental Impact Report [Cultural Resources Section]
KE-03873	2009	Romani, John F.	Archaeological Survey Report Improvements to Twisselman Road from King Road to Interstate 5 (approximately 7.2 miles), Unincorporated Area, Kern County, California
KE-04732	2014	Laurie, Leroy	Archaeological Investigation of Twisselman Road CMAQ Project #S116B41C in Unincorporated Kern County, California
KE-04884	2017	Roper, C. Kristina	Historic Resources Compliance Report Interstate 5 Vehicle Detection Systems at 21 Locations in Kern County, California
KE-04884A	2017	Roper, C. Kristina	Archaeological Survey Report Interstate 5 Vehicle Detection Systems at 21 Locations in Kern County, California
KE-05073	2018	Rhoades, Ruth M.	Historic Property Survey Report for the Lost Hills Rubber Rehab II Project on Interstate 5 between Kettleman City and Lost Hills, Northwestern Kern County, California

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Project Site

Report ID	Year	Author	Title
KE-05073A	2018	Rhoades, Ruth M.	Historic Property Survey Report for the Lost Hills Rubber Rehab II Project on Interstate 5 between Kettleman City and Lost Hills, Northwestern Kern County, California
KI-00058	1979	Dudley M. Varner and Kathleen L. Cursi	An Archaeological Reconnaissance for the Tulare Lake Drainage District, Kings County, California
KI-00141	2001	Unknown	Los Banos-Gates 500 kV Transmission Project Draft Supplemental Environmental Impact Report (Cultural Resources Section)
KI-00271	1987	Peak & Associates	Report on the Cultural Resources Assessment of the Proposed San Joaquin Valley Pipeline

The records search identified no previously recorded cultural resources within the Project site and four cultural resources within 1 mile of the Project site (Table 2 and Confidential Appendix B). These sites are summarized below.

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Project Site

Primary Number	Trinomial	Name	Type	Age	Attributes
Previously Recorded Sites Intersecting the Project Site					
None					
Previously Recorded Sites Within 0.5 Miles of the Project Site					
P-15-000593	CA-KER-000593	—	Site	Prehistoric	Burials; Habitation debris
P-15-000594	CA-KER-000594	—	Site	Prehistoric	Lithic scatter; Burials; Shell beads
P-15-000726	CA-KER-000726	—	Site	Prehistoric	Burials; Habitation debris
P-15-020558	—	Interstate 5	Site	Historic	Roads; Highway

P-15-000593 (CA-KER-000593)

CA-KER-000593 was first and last recorded in May 1972 by C. W. Ritchie (Ritchie 1972). It was described as a prehistoric habitation site including three midden areas with lithic debitage, shell beads, and two distinct ash lenses interpreted as burials. No further details were provided regarding the nature of the deposit and associated artifacts. A dirt road bisected the southernmost midden area. The site was described as "lightly potted to a depth of 10 cm," but not affected by erosion. The site is located approximately 2 miles north of Twisselman Road and 700 feet west of the Project site, within the Kern River flood plain sagebrush grasslands. Based on the information available on the site record, site CA-KER-000593 has not been evaluated for either the NRHP or CRHR.

P-15-000594 (CA-KER-000594)

CA-KER-000594 was recorded in May 1972 by E. B. Allen as part of the same recording event as CA-KER-000593 (Allen 1972). The site is located within 500 feet north of site CA-KER-000593 and displayed similar features as the neighboring site. Allen mentioned midden soil, mounds, and burials without further details. Associated artifacts included lithic debitage and shell beads. Site disturbance appeared to have been significant with "potting" to a depth of 5 feet recorded in its northeastern section. Similar to site CA-KER-000593, the surrounding landscape consisted of sagebrush grasslands characteristic to the Kern River flood plain. The site has not been evaluated for either the NRHP or CRHR at this time.

P-15-000726 (CA-KER-000726)

CA-KER-000726 was recorded in December 1975 as a prehistoric "burial site along a ridge that has been leveled about four feet" (Schiffman 1975). The resource covered a 90 m by 25 m area located approximately 1 mile east of the Project site within Section 14 of U.S. Geological Survey (USGS) 7.5-minute Lone Tree Well quadrangle dated 1954. Schiffman described a deposit extending to about 0.75 m in depth with dark soils and at least four burials. Schiffman also mentioned one small projectile point and one *Olivella* shell filled with eight small beads. The site was described as having substantial disturbance most likely due to farming activities. At this time, the site has not been evaluated for either the NRHP or CRHR.

P-15-020558

Resource P-15-020558, also referred to as Interstate 5 or the Golden State Freeway, is a major eight-lane paved freeway spanning a total of 1,381 miles from the Mexican border in San Diego County, California, to the Canadian border in Washington State, with 800 miles located within the State of California (Urbana Preservation and Planning 2019). The route has its origins as early as 1910 and the section through the San Joaquin Valley from Sacramento to Los Angeles (Route 4) was paved circa 1930 and became US-99 in 1926. Following the passage of the Federal Aid Highway Act of 1956, the path of Interstate 5 followed the general route of US-99 and replaced portions of the original highway. The segment of Interstate 5 near Bakersfield was completed circa 1972 and was delineated on the 1974 Grapevine USGS Topographic Quadrangle Map as a four-lane highway in either direction (Urbana Preservation and Planning 2020).

The resource stretches northwest–southeast along the western edge of the Project site. At the closest point, the resource is located within 500 feet of the Project boundary, at the southwest end of the Project site, along Twisselman Road. Interstate 5 appears ineligible under NRHP/CRHP Criterion A, B, C and D.

Historic-Period Map Review

Historic aerial photographs of the Project site were available for the years 1956, 1984, 2010, 2014 and 2018 (NETR 2022a). Topographic maps including the Project site were available for the years 1856, 1868, 1873, 1932, 1942, 1947, 1950, 1954, 1957, 1975, 1976, 1978, 2012, 2015, and 2018 (GLO 1856, 1868; NETR 2022b). Refer to Figures E-1 through E-8 in Appendix E for a series of historic topographic maps overlaid on the Project site.

These historic documents indicate that the Project site once fell within the transition zone between Tulare Lake and Buena Vista Lake Slough, with the 1856 and 1868 GLO maps depicting the slough as intersecting the Project site on a southeast–northwest diagonal. The 1856 also shows a "Road to the Tejon Pass" that intersects the northwestern portion of the Project site as a north–south travel route. A subsequent 1873 map prepared for the

Department of the Interior shows the Project site situated along the shoreline of Tulare Lake near the point where the slough enters the lake. The slough and lakeshore are not apparent on the 1932 USGS topographic maps of the Project site and, aside from a few roads, no development is depicted within the Project site. In the 1942 USGS topographic map a levee is shown along the eastern exterior of the Project site and a drainage is shown to intersect the Project site 1 mile south of the northern edge at an east–west orientation. The 1948 map is similar, with the addition of Twisselman Road and Lost Hills Road along the south and east of the Project site. The 1954 map depicts the Kern River Channel along the eastern exterior, a complex network of levees throughout, and a pipeline along the western edge of the Project site. Topographic maps from the 1970s up to 2018 continue to depict the Kern River Channel, ancillary drainage, and roads; however, no other development is shown within the Project site or adjacent area.

The 1956 aerial image is consistent with the topographic mapping from the same time, showing the Kern River Channel along the eastern exterior of the Project site, a network of levees west of the channel, and Twisselman and Lost Hills Roads to the south and east. The southern portion of the Project site appears undeveloped and marsh-like, while the northern portion appears to be utilized either for agricultural planting or grazing. In the 1984 aerial the Project site has changed dramatically, with the regular grid of agricultural fields throughout, oriented along cardinal directions. Since the 1980s the fields have gone through fallow periods and periods of grazing; however, no changes to the Project site between then and the present day are apparent in the aerial imagery available for the 1990s–2020s.

4.2 Review of Geomorphological Context

The ground surface of the Project site has been highly disturbed by previous agricultural and ranching activities. The USGS characterized deposits in the region as Quaternary alluvium and marine deposits (USDA 2022). No major rivers, streams, or drainages flow through the Project site, although the eastern edge of the Project site is in close proximity to the current, channelized route of the Kern River. Although the Project site itself would have likely been dry grassland, its proximity to the Kern River would have made this spot an attractive place to reside while exploiting these resources. The low elevation and level ground at the Project site indicate the area could have been subject to seasonal flooding from the Kern River, inundating and shifting alluvial sedimentation since the Holocene during wetter years.

Although the potential for buried prehistoric archaeological deposits in neighboring regions has been characterized as “Moderate” by the 2010 California Department of Transportation Districts 6 and 9 Geoarchaeological Overview and Assessment (Meyer et al. 2010), such broad analyses must be tempered by local conditions. The Project site is in an area that has a sparse record of prehistoric occupation indicated by the records search. However, this appears to be a result of the lack of previous intensive pedestrian survey within the Project site rather than the absence of archaeological resources, as indicated by the results from the current pedestrian survey. While agricultural fields extensively disturb archaeological deposits, they do not erase them; to the contrary, such activities often bring buried deposits to the surface. Potions of the Project site were observed to contain a high density of artifacts. As such, portions of the site are characterized as having a high potential for yielding significant archaeological deposits.

According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2022), five soil types are mapped in the Project boundary. These are partially drained Houser fine sandy loam (30.5%) located in the northern portion of the Project site, partially drained Nahrub clay (43.6%) located in the eastern portion of the

Project site along the Kern River, partially drained Nahrub-Lethent complex (5.4%) located in the southern portion of the Project site, moderately wet saline-alkali Twisselman clay (10.5%) located in the western portion of the Project site, and moderately wet saline-alkali Twisselman sandy loam (10.0%) located in the central-western portion of the Project site (4, Soils and Drainages). In general, the soils present in the Project site are consistent with alluvium derived from sedimentary rock and other parent material in stream terraces, brought to the vicinity from the foothills of the Sierra Nevada by the nearby rivers and drainages (in most recent times by the Kern River), and deposited on the Project site during times of seasonal flooding when rivers would overflow (Figure 4, Soils and Drainages Map).

Soil mapping from the geology report for the Project (Tretinjak and Farrand 2022) indicate that the following soil types are within the Project site:

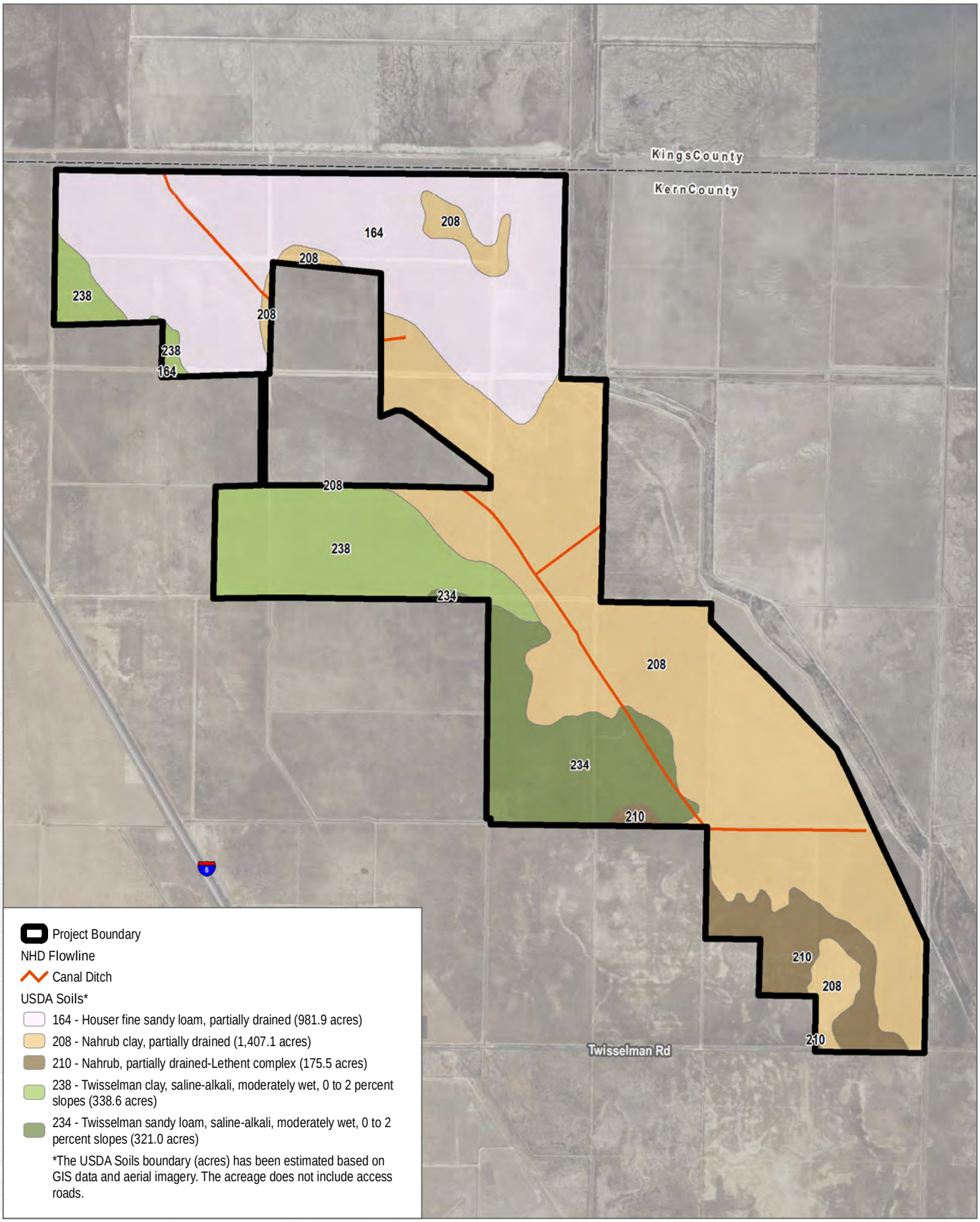
- **Fill:** Fill soils are anticipated to underlie portions of the Project site due to previous land use, roadway construction, and burial of utility lines. The fill soils are generally anticipated to be composed of clay, silt, sand, and gravel.
- **Agricultural Topsoil:** Agricultural topsoil is anticipated to mantle portions of the site that were previously used as farmland and is anticipated to be on the order of 1 to 2 feet in thickness. These soils are generally anticipated to consist of clay, silt, and sand and may contain organic material.
- **Basin Deposits:** Quaternary-age basin-derived alluvial deposits of the Great Valley (Smith 1964) underlie the fill and agricultural topsoil at the site. These soils are generally anticipated to consist of light brown to dark brown clay, silt, and sand.
- **Fan Deposits:** Quaternary-age fan-derived alluvial deposits of the Great Valley (Smith 1964) underlie the fill and agricultural topsoil in the western portion of the site. These soils are generally anticipated to consist of light brown to dark brown clay, silt, sand, and gravel.

Figure 3 (Geology) of the geology report for the Project (Tretinjak and Farrand 2022) indicates the northern portion of the Project site lies within Quaternary lake deposits. Historic maps from 1856 and 1873 display the northern portion of the Project site within the lakeshore of Lake Tulare, a massive freshwater lake that in more recent historic times has dried up due to its tributaries being channelized for agricultural use. Surrounding the lake would have been an extensive network of streams and sloughs (Osborne 1992). Lake Tulare was a very shallow lake and the shoreline would increase and decrease dramatically with the rainfall and snowpack in the Sierra Nevada each year. As Latta (1977) stated, “the rise and fall of one foot in the level of water in the lake (Tulare) might move the shoreline forward or backward often a distance as great at two miles.” Shorelines tend to be places of high biomass productivity and would be areas where the local native populations would find numerous attractive resources to exploit such as tule reeds, birds, fish, and freshwater clams. As the lake shoreline in the northern portion of the Project site would have been ever-shifting, it can be inferred that the entire area at particular times was a productive shoreline; thus, the entire northern portion of the Project’s mapped Quaternary lake deposits should be considered at a heightened sensitivity for buried prehistoric resources.

Aside from the northern portion mapped as Quaternary lake deposits, the vast remainder of the Project site is mapped as alluvial basin deposits with no major drainages or streams, although the current route of the Kern River follows the eastern edge of the Project site. Similar to the Lake Tulare shoreline, proximity to the Kern River would offer equally attractive resources as it flowed northward into Lake Tulare. The Kern River also changed course over the centuries and at times may have entered the eastern edge of the Project site, meaning the eastern edge of the Project site should also be considered at a heightened sensitivity for buried prehistoric resources. Portions of the Project site farther from the Kern River and northern shoreline are still mapped as alluvium, meaning they would have been

subject to flooding during wetter years. Cultural resources would have been buried and preserved by water-born silt during these floods, leaving the potential for intact resources to be present in these areas as well.

In consideration of the above factors, the sensitivity of the Project site for buried prehistoric resources in regard to geoarchaeology can be divided into "Moderate-High," "High," and "Very High." Portions of the Project site that have been mapped as Quaternary lake deposits (mapped as Houser fine sandy loam in Figure 4) are mapped as "Very High" sensitivity. Areas in proximity to the Kern River (mapped as Nahrub clay in Figure 4) are mapped as "High" sensitivity. Absent information related to the previously recorded sites, the remaining alluvial basin deposits would be considered to have "Moderate-High" sensitivity. However, three previously recorded archaeological sites with deposits and reported burials are mapped outside of the Project site, within Twisselman soils. This indicates that environmental factors beyond the depositional characteristics of these soils, such as relative proximity to prehistoric Tulare Lake and the Buena Vista Slough, must also be considered. As such, all sensitivity mapping will require confirmation through direct observation during cultural monitoring. All areas of the Project site should be assumed to have the potential to contain buried cultural deposits. During cultural monitoring, sensitivity mapping can be modified or refined as a direct observation of the local conditions is ascertained.



SOURCE: Bing 2022, USDA 2008

DUDEK

0 1,000 2,000 Feet

FIGURE 4

Soils and Drainages

Archaeological Resources Inventory Report for the Pelicans Jaw Hybrid Solar Project, Kern County, California

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4.3 Survey Results

Dudek Archaeologists Ross Owen, Kolin Taylor, Julie Royer, Jerry Pariseau, Michael Mendiola, Kornelie Krechlerova, Seth Bruck, David Faith, Elizabeth Sivell, and Walter Tovar Saldana conducted an intensive-level pedestrian survey of the entire Project site between May 9, 2022, and October 21, 2022. Ross Owen conducted an intensive-level pedestrian survey of the northern portion of assessor's parcel number 044-101-16 on February 2, 2023, which was added to the Project. The survey was conducted using standard archaeological procedures and techniques, as outlined in Chapter 3, Research Methods.

During the pedestrian survey, six previously unrecorded prehistoric and historic-era resources were identified and recorded. These resources included four prehistoric lithic scatters with ground stone and shell artifacts, and two historic water conveyance features.

Ground surface visibility was high (approximately 80%–99% in most areas) over much of the Project site due to sparse vegetation within fallow agricultural fields. Subsurface exposures along drainages and animal burrows were opportunistically inspected for evidence of subsurface archaeological deposits. Photos 1 and 2 show representative conditions within the Project site at the time of survey. Soils have been disturbed historically and in modern times from water conveyance infrastructure, agriculture, and ranching.

Phase I Inventory efforts resulted in a general low-density scatter of prehistoric debitage being identified throughout the Project site. This distribution of debitage is understood to be partially the result of an extended history of agricultural activities, which have spread artifacts from their original unknown location(s) of deposition across a large area. Given the Project site is in an area that may have been historically prone to flooding (falling within the historic boundaries of Lake Tulare and immediately adjacent to the Buena Vista Slough), this may also have had effects on the redistribution of cultural material, as well as resulting in buried cultural material. Within the broader distribution of debitage that is present throughout the Project site, there is an apparent patterning of more discrete archaeological sites. Survey resulted in the identification of four prehistoric sites (PJ-S-001, PJ-S-002, PJ-S-003, and PJ-S-004) and two historic-era ditch features (PJ-S-005 and PJ-S-006). An example of formal artifact constituents to this assemblage is provided in the photos below, including a cryptocrystalline silicate (CCS) late-stage biface (Photo 3); a charm stone, sometimes considered a fishing weight (Photo 4); and a sidewall shell bead of *Olivella biplicata* (Photo 5).

While all artifacts are consistent with Yokut tribe cultural use, the shell bead indicates trade with cultural groups such as the Chumash to the west. These formal artifact types are often associated with more complex resources in the region.

Due to previous ground disturbances from alluvial processes and agriculture operations it is not possible to fully understand the context of the surficial artifacts observed during survey. Sites were defined in areas where spatial density and frequency of formal tools were distinct from other areas within the Project. In one instance, site definition was also informed by the possible presence of anthropogenic soils on the surface which may indicate subsurface deposits.

Photo 1. Survey Conditions, Southeastern Portion of Project Site, Facing West

Photo 2. Survey Conditions, Northern Portion of Project Site, Facing East

Photo 3. Cryptocrystalline Silicate Biface

Photo 4. Charm Stone

Photo 5. Olivella Bead

4.3.1 Previously Recorded Resources

All previously recorded resources are located within the 1-mile radius around (outside of) the Project site, while the cultural survey was conducted within the Project site only. Consequently, no previously recorded resources were re-located or re-visited during this survey.

4.3.2 Newly Recorded Resources

Six newly recorded cultural resources were identified as a result of Dudek surveys, which included four prehistoric and two historic sites (Figures A-1 through A-3 in Confidential Appendix A). Isolated resources are categorically not eligible for listing on the CRHR and NRHP, and are discussed separately below.

4.3.2.1 Prehistoric-Era Resources

The four newly recorded prehistoric resources (PJ-S-001, PJ-S-002, PJ-S-003, PJ-S-004) identified within the Project site represent relatively sparse surface scatters of debitage and formal artifacts that are distributed in increased relative frequency, variety, and density compared to the surrounding area. All four sites, while subjected to an extended history of agricultural disturbance, have potential for buried archaeological deposits.

PJ-S-001

This prehistoric site consists of an extensive lithic scatter with *Olivella* shell beads and three potentially thermal features. The site is located within fallow agricultural fields. Soils observed on the surface within the site are compact grayish brown silty sands. Site vegetation is sparse, consisting of singed bunch grasses, providing 75%–99% ground visibility across the site. The setting has been plowed and disced for agricultural production. The site measures 732 m north–south by 597 m east–west. Artifact density is sparse in the northeast portion of the site. The three features are characterized by visibly distinct soils, possibly thermally altered dense shell concentrations, and fire-affected rocks.

While 216 of a total of 251 artifacts were identified during surface survey as debitage, there were also 21 *Olivella* shell beads, 10 bifaces (8 CCS, 2 obsidian), 2 retouched flake tools (1 CCS, 1 obsidian), 1 CCS core, and 1 steatite vessel fragment.

A total of three potentially cultural features were identified within site PJ-S-001. The three potentially cultural features are characterized by visibly distinct soils, possibly thermally-altered dense shell concentrations, and fire-affected rocks. While shell fragments were observed across the Project site, concentrations within each of the features was notably higher. Increased density of shell, along with distinct soil color and texture, and the presence of fire-affected rocks indicate possible cultural levels below the surface exposed through rodent burrows and agricultural practices.

Feature 1 measures 6 m (north–south) by 3.8 m (east–west). Soil within the feature is a 2.5Y 3/1 dark grey silty sand with higher clay content than the surrounding area. Soil is more shell-rich than the surrounding area (shell fragments appear to be from freshwater specimen) and heavily bioturbated. Two pieces of possible CGV fire-affected rock are associated with the feature.

Feature 2 measures 7 m (east–west) by 6.25 m (north–south). Soil within the feature is a 2.5Y 4/2 dark greyish brown silty sand, and is more shell-rich than the surrounding area and heavily bioturbated.

Feature 3 measures 6.5 m (east–west) by 5.8 m (north–south). Soil within the feature is a 2.5Y 3/2 very dark grey-brown sandy silt with higher clay content than the surrounding soils. It has more shell-rich soil than the surrounding area with heavy bioturbation, and contains fish vertebra, possible rodent bone, and two pieces of CGV fire-affected rock.

Debitage included 169 CCS interior flakes, 3 obsidian interior flakes, 2 metavolcanic interior flakes, 33 CCS secondary flakes, 5 metavolcanic secondary flakes, and 4 CCS primary flakes. CCS exhibited wide variety of colors, with grey/white and milky white patina on brown the most frequent. Table 3 includes additional details for the recorded tools, and a DPR form has been prepared and is included as Confidential Appendix D.

Table 3. Summary of Cultural Material Documented within PJ-S-001

Artifact	Type	Material	Description
A1	Biface	CCS	Grey/white CCS late-stage biface midsection (1.1 × 1.3 × 0.2 cm)
A2	Bead	Shell	*Olivella* shell bead (1.2 × 1 × 0.1 cm), hole drilled from exterior
A3	Biface	CCS	Mid-stage biface fragment (poss. Retouched flake tool), blue/white CCS (1.6 × 2.2 × 1.1 cm)
A4	Biface	CCS	Tan CCS late-stage biface tip (2.6 × 2.4 × 0.7 cm)
A5	Biface	CCS	Blue/white CCS late-stage biface midsection (2.1 × 2 × 1 cm)
A6	Bead	Shell	Shell bead (1.2 × 0.8 × 0.1 cm)
A7	Bead	Shell	Fractured shell bead (1.1 × 0.7 × 0.1 cm)
A8	Flaked stone tool	CCS	Grey/white CCS (chalcedony) utilized flake (2.9 × 1.7 × 0.6 cm)
A9	Biface	Obsidian	Obsidian, mid-stage biface fragment (2.1 × 2.8 × 0.9 cm)
A10	Bead	Shell	*Olivella* shell bead (1.3 × 1.1 × 0.4 cm)
A11	Bead	Shell	*Olivella* shell bead (1.3 × 0.9 × 0.4 cm)
A12	Bead	Shell	*Olivella* shell bead, exterior drilled with bevel (0.9 × 0.8 × 0.1 cm)
A13	Bead	Shell	*Olivella* shell bead, appears drilled, bevel both sides (1.3 × 1 × 0.1 cm)
A14	Bead	Shell	*Olivella* shell bead, appears drilled, bevel both sides (1 × 0.8 × 0.1 cm)
A15	Bead	Shell	*Olivella* shell bead, appears drilled, bevel both sides (1 × 0.8 × 0.1 cm)
A16	Bead	Shell	Fractured *Olivella* shell bead, appears similar in style but hole not present (1.1 × 1 × 0.1 cm)
A17	Bead	Shell	*Olivella* shell bead sidewall (1.4 × 1.2 × 0.1 cm) hole drilled on both sides (0.2 cm D)
A18	Biface	CCS	CCS biface, greyish white (3.2 × 1.2 × 0.6 cm)
A19	Biface	CCS	CCS biface/retouched flake, reddish grey blue (4 × 2 × 1.6 cm)
A20	Bead	Shell	*Olivella* shell bead, sidewall, drilled both sides (1.3 × 1.35 × 0.1 cm), hole (0.22cm D)
A21	Ground stone	Steatite	Steatite vessel fragment, 2 lines incised on interior, plow scar exterior (4.2 × 3.9 × 0.8 cm)
A22	Biface	CCS	Green CCS late-stage biface, nearly complete (6.4 × 3 × 1.1 cm)

Table 3. Summary of Cultural Material Documented within PJ-S-001

Artifact	Type	Material	Description
A23	Bead	Shell	*Olivella* shell bead, side wall fragment, fractured along hole, punctured not drilled (1.4 × 0.9 × 0.1 cm)
A24	Flaked stone tool	Obsidian	Retouched flake tool, obsidian, possibly flake off of biface (1.1 × 1.5 × 0.3 cm)
A25	Core	CCS	Possible core tool, white patina CCS (2.6 × 2.2 × 1.3 cm)
A26	Bead	Shell	*Olivella* shell side-wall bead, drilled interior, punctured exterior (1.3 × 1.1 × 0.1 cm) hole (0.16 cm D)
A27	Biface	Obsidian	Obsidian late-stage biface midsection fragment (2.5 × 2.5 × 0.7 cm; 5.94 g)
A28	Biface	CCS	CCS late-stage biface midsection (1.9 × 1.6 × 0.8 cm; 1.49 g)
A29	Bead	Shell	*Olivella* shell bead (halved with shelf present), hole appears punctured, ground and fracturing around edge (1.1 × 0.8 × 0.4 cm, hole 0.2 cm D; 0.15 g)
A30	Bead	Shell	*Olivella* shell bead (sidewall), hole drilled from interior (0.8 × 0.9 × 0.3 cm, hole 0.2 cm D; 0.12 g)
A31	Bead	Shell	*Olivella* shell bead (sidewall), hole drilled from interior (0.9 × 0.8 × 0.2 cm, hole 0.2 cm D; 0.09 g)
A32	Bead	Shell	*Olivella* shell bead (sidewall), hole drilled from interior (1 × 0.9 × 0.3 cm, hole 0.2 cm D; 0.17 g)
A33	Bead	Shell	*Olivella* shell bead (sidewall), punctured from exterior, ground and fractured edges (1.1 × 1.2 × 0.4 cm, hole 0.3 cm D; 0.23 g)
A34	Bead	Shell	*Olivella* shell bead (sidewall), drilled from exterior (0.8 × 0.9 × 0.3 cm, hole 0.2 cm D; 0.20 g)
A35	Bead	Shell	*Olivella* shell bead (sidewall), drilled from interior, partial shelf present, fractured edges (1 × 0.8 × 0.3 cm, hole 0.2 cm D; 0.15 g)

Note: cm = centimeters; g = grams; D = diameter.

PJ-S-002

Site PJ-S-002 is a sparse lithic scatter with ground stone, percussing tools, and *Olivella* shell beads. The site is located within a fallow agricultural field. Sparse bunch grasses are present. The setting has been plowed and disced for agricultural production. The resource was observed in an area measuring 584 m east–west by 411 m north–south. Except for a concentration of artifacts (C1) within the center of the northern half of the site, the scatter is characterized by an overall low density of artifacts. Of a total of 307 artifacts identified, 276 were pieces of debitage, with the remainder consisting of 12 shell beads (11 *Olivella*, 1 clam), 6 ground stone fragments (4 coarse-grained volcanic milling stone fragments and 2 steatite vessel fragments), 3 granitic percussion tools, 5 CCS bifaces, 3 flaked stone tools (2 CCS, 1 obsidian), 1 CCS multi-directional core, and 1 anomalous shell without discernable modification, possibly a limpet.

No indication of a subsurface deposit was observed in rodent burrow spoils. Soils within the site are very compact 2.5Y 4/2 dark grayish brown sandy silt. The area is characterized by sparse vegetation with 75% to 99% ground visibility. Extensive ground disturbance associated with historic- and modern-era agricultural use of the land and bioturbation seems to have affected the site.

Debitage included 222 CCS interior flakes, 43 CCS secondary flakes, 2 metavolcanic secondary flakes, 4 CCS primary flakes, and 5 metavolcanic primary flakes. CCS exhibited wide variety of colors, with grey/white, blue/grey and red the most frequent. Table 4 includes additional details for the recorded tools, and a DPR form has been prepared and is included as Confidential Appendix D.

Table 4. Summary of Cultural Material Documented within PJ-S-002

Artifact	Type	Material	Description
A1	Biface	CCS	White CCS retouched biface (1.4 × 2.6 × 0.8 cm)
A2	Biface	CCS	Grey/white CCS early-stage biface/core tool (3.8 × 3.5 × 1.7 cm)
A3	Biface	CCS	Grey/white CCS mid-stage biface mid-section (3 × 2.9 × 1.1 cm)
A4	Bead	Shell	*Olivella* shell bead (spire-lopped, hole punched) (1.7 H × 1.1 D × 0.1 cm), hole (0.7 cm D)
A5	Bead	Shell	*Olivella* shell bead (fragment), (0.9 × 0.6 × 0.1 cm)
A6	Ground stone	CGV	Ground stone fragment; 1 polished surface, volcanic (8.7 × 2.7 × 2.1 cm)
A7	Biface	CCS	Early-stage CCS biface midsection fragment (1.6 × 2.5 × 1 cm)
A8	Biface	CCS	CCS biface tip (1.9 × 1.7 × 0.5 cm)
A9	Bead	Shell	*Olivella* shell bead (sidewall), drilled from both sides, not ground (0.9 × 0.8 × 0.1 cm, hole 0.1 cm D)
A10	Core	CCS	CCS multi-directional core (2.2 × 2 × 1.2 cm)
A11	Flaked stone tool	CCS	Expedient flaked stone tool (3.3 × 1.7 × 1.3 cm), possible drill
A12	Bead	Shell	*Olivella* shell bead (sidewall), drilled from both sides (1.2 × 0.8 × 0.1 cm; hole 0.2 cm D)
A13	Bead	Shell	*Olivella* shell bead (halved), punctured from exterior, ground edge (2.1 × 1.3 × 0.1 cm; hole 0.3 cm D)
A14	Bead	Shell	*Olivella* shell fragment (1.45 × 0.7 × 0.1 cm); no modification present
A15	Flaked stone tool	CCS	Retouched flake tool (3.8 × 2.6 × 0.9 cm), possible scraper
A16	Bead	Shell	*Olivella* sidewall shell bead, hole-punched (1.1 × 1 × 0.1 cm) hole (0.2 cm D)
A17	Bead	Shell	*Olivella* half-shell bead, hole-punched (2.2 × 1.2 × 0.2 cm) hole (0.3 cm D)
A18	Ecofact	Shell	Anomalous shell (2 × 1.4 cm; possibly limpet; no visible modification)
A19	Percussion Tool	Granitic	Hammer stone, granitic, complete (6.7 × 5.7 × 4 cm)
A20	Ground stone	Granitic	Milling stone fragment, granitic (4.2 × 6.6 × 2.5 cm)
A21	Ground stone	Granitic	Milling stone fragment, granitic (7.5 × 7.5 × 5.2 cm)
A22	Bead	Shell	*Olivella* shell sidewall bead drilled hole, fractured edges (0.6 × 0.6 × 0.1 cm)
A23	Percussion Tool	Granitic	Possible granitic percussion tool (8 × 4.8 × 5.3 cm)
A24	Bead	Shell	*Olivella* shell bead (halved), (0.6 × 0.6 × 0.1 cm; hole 0.1 cm D; 0.06 g)

Table 4. Summary of Cultural Material Documented within PJ-S-002

Artifact	Type	Material	Description
A25	Flaked stone tool	Obsidian	Obsidian retouched flake (2.2 × 2 × 1.1 cm; 5.58 g)
A26	Percussion Tool	Granitic	Granitic percussing tool (10.7 × 6 × 6.1 cm)
A27	Ground stone	Steatite	Soap stone vessel fragment (3.9 × 1.6 × 1.1 cm; 9.49 g)
A28	Ground stone	Granitic	Milling stone fragment (7.1 × 6.9 × 3.3 cm)
A29	Bead	Shell	*Olivella* shell bead (halved), (1.1 × 0.9 × 0.2 cm; hole 0.3 cm D; 0.25 g)
A30	Bead	Shell	Clam shell bead (pismo?) (2.7 × 2 × 0.2 cm; hole 0.3 cm D; 1.47 g)
A31	Ground stone	Steatite	Soap stone vessel fragment (4.1 × 3.9 × 0.9 cm; 22.06 g)

Note: cm = centimeters; D = diameter; g = grams.

PJ-S-003

Site PJ-S-003 is a sparse lithic scatter with ground stone and *Olivella* shell beads identified by Dudek archaeologists during a pedestrian survey for the Project in October 2022. The site is located within fallow agricultural fields. Sparse bunch grasses are present. The setting has been plowed and disced for agricultural production. The site is characterized by a low-density scatter of artifacts within an area extending 360 m east–west by 241 m north–south, with no clear concentrations of artifacts. Of a total of 230 artifacts identified during survey, 200 were debitage, with the remainder consisting of 18 *Olivella* shell beads, 5 ground stone fragments (3 steatite vessel fragments and 2 granitic milling stone fragments), 2 CCS bifaces, 2 CCS projectile points, 1 CCS core, 1 CCS flaked stone tool, and 1 unknown object (possible manuport). Debitage assemblage consisted of 111 CCS interior flakes, 2 metavolcanic interior flakes, 82 CCS secondary flakes, 2 metavolcanic secondary flakes, 2 CCS primary flakes, and 1 metavolcanic primary flake.

PJ-S-003 is located in a landscape of alluvial fans and stream-born alluvial formations vegetated with sparse singed grasses allowing high ground visibility (75% to 99%). Soil within the site is very compact 2YR 4/2 dark grey-brown silty sand, and has been highly disturbed by agriculture, bioturbation, and livestock trampling.

Table 5 includes additional details for the recorded tools, and a DPR form has been prepared and is included as Confidential Appendix D.

Table 5. Summary of Cultural Material Documented within PJ-S-003

Artifact	Type	Material	Description
A1	Ground stone	Steatite	Soap stone vessel fragment (3.4 × 3.1 × 1.1 cm), polished on concave side
A2	Bead	Shell	Spire-lopped Olivella shell bead (0.9 cm L × 0.7 cm D), rough edges, appears punctured not drilled
A3	Biface	CCS	Grey/blue CCS early-stage biface (4.9 × 2.3 × 1.8 cm)
A4	Bead	Shell	*Olivella* shell bead (halved), tapered hole, appears drilled (1 × 1 × 0.1 cm)

Table 5. Summary of Cultural Material Documented within PJ-S-003

Artifact	Type	Material	Description
A5	Bead	Shell	*Olivella* shell bead (halved), tapered hole, appears drilled (1.2 × 1 × 0.1 cm)
A6	Bead	Shell	*Olivella* shell bead (spire-lopped) (1.7 cm L × 1.2 cm D)
A7	Bead	Shell	*Olivella* shell bead (halved), tapered hole, appears drilled (1.5 × 1.1 cm)
A8	Bead	Shell	*Olivella* shell bead (halved), tapered hole, appears drilled (1.4 × 1.1 cm)
A9	Bead	Shell	*Olivella* shell bead (halved), tapered hole, appears drilled (0.8 × 0.9 cm)
A10	Bead	Shell	*Olivella* shell bead (spire-lopped) (2 × 1.4 cm)
A11	Bead	Shell	*Olivella* shell bead (halved), punctured hole (2.1 × 1.3 cm)
A12	Projectile Point	CCS	White CCS complete projectile point, contracting stem dart (6 × 3.5 × 0.7 cm)
A13	Bead	Shell	*Olivella* shell bead (halved), punctured hole (1.7 × 1 cm)
A14	Ground stone	Steatite	Soap stone vessel fragment with incised groove (2.5 × 1 × 0.8 cm)
A15	Bead	Shell	*Olivella* shell bead, tapered hole, appears drilled (side-wall) (1.3 × 1.2 cm)
A16	Unknown	Unknown	Possible pipestem? Shell (Sea Urchin)? Cylinder with hole through middle (2.4cm L × 0.55 cm D; hole 0.1 cm D)
A17	Projectile Point	CCS	CCS projectile point tip (2.2 × 1.9 × 0.6 cm)
A18	Bead	Shell	*Olivella* shell bead (halved), hole punched (1.9 × 1.2 × 0.1 cm; hole 0.32 cm D)
A19	Core	CCS	White CCS core, multi-directional (2.9 × 3 × 1.7 cm)
A20	Biface	CCS	White CCS late-stage biface midsection (2.3 × 2.4 × 1 cm)
A21	Bead	Shell	*Olivella* shell bead (spire-lopped) (1.8 cm × 0.8 cm D; hole drilled, 0.2 cm D)
A22	Ground stone	Granitic	Milling stone fragment (5.6 × 4.2 × 2.5 cm; 69.66 g)
A23	Bead	Shell	*Olivella* shell bead (halved), (1.1 × 1 × 0.2 cm; hole 0.1 D; 0.21 g)
A24	Bead	Shell	*Olivella* shell bead (halved), drilled from both sides (1.8 × 1.2 × 0.2 cm; hole 0.4 cm D; 0.58 g)
A25	Bead	Shell	*Olivella* shell bead (halved), (1.8 × 1.2 × 0.2 cm; hole 0.3 D; 0.75 g)
A26	Flaked stone tool	CCS	Chert retouched flake tool (2.2 × 1.6 × 0.7 cm; 2.63 g)
A27	Bead	Shell	*Olivella* shell bead (halved), (1.7 × 1.1 × 0.2 cm; hole 0.4 cm D; 0.58 g)
A28	Ground stone	Granitic	Milling stone fragment (11.5 × 9.1 × 3.7 cm)
A29	Bead	Shell	*Olivella* shell bead (halved), (1 × 0.8 × 0.1 cm; hole 0.3 cm D; 0.13 g)
A30	Ground stone	Steatite	Steatite medicine tube (8 cm L × 3.8 cm D); hole drilled through center 1.6-2.2 cm D, polished exterior

Note: cm = centimeters; D = diameter; g = grams.

PJ-S-004

Site PJ-S-004 is a sparse lithic scatter with one shell bead identified by Dudek archaeologists during a pedestrian survey for the Project in October 2022. The site is located within fallow agricultural fields. Sparse bunch grasses are present. The setting has been plowed and disced for agricultural production. The site measures 460 m east–west by 250 m north–south and displays six concentrations of debitage at the center of the site and at the western and eastern corners.

PJ-S-004 is located on a flat, open terrain with sparse singed grasses allowing high ground visibility (75% to 99%). Soil within the site is a 2YR 4/2 dark grey-brown clay silty. The landscape has been altered by agricultural use, which greatly contributed to the site disturbance along with bioturbation and livestock trampling.

A total of 51 artifacts were identified during surface survey including one CCS projectile point fragment (with broken tip) ovate in shape, one *Olivella* shell bead, and 49 pieces of debitage. Debitage included 32 CCS interior flakes, 16 CCS secondary flakes, and 1 fine-grained volcanic (FGV) secondary flake. Sparse freshwater shell fragments were observed intermixed with the soil within the site; however, they did not display cultural modification. While no anthropogenic soils were identified, the site may have buried site potential based on soil consistency and geomorphic context. Table 6 includes additional details for the recorded tools, and a DPR form has been prepared and is included as Confidential Appendix D.

Table 6. Summary of Cultural Material Documented within PJ-S-004

Artifact	Type	Material	Description
A1	Projectile point	CCS	CCS projectile point fragment, tip broken off, ovate in shape
A2	Bead	Shell	*Olivella* shell bead (halved), (1.5 × 1.1 × 0.2 cm)

4.3.2.2 Historic-Era Resources

Two newly recorded historic-era water conveyance ditches (PJ-S-005 and PJ-S-006) were documented within the Project site.

PJ-S-005

This site is a segment of a north–south oriented irrigation ditch that appears on the 1956 aerial image of the Project site. In its current condition, the feature has been co-opted for modern use. Substantial additions have been made to the irrigation network adjacent to the Kern River Channel since the 1950s, resulting in the 1 × 0.5-square-mile grid that encompasses the Project site. PJ-S-005 is approximately 2,900 feet in length and is 11 feet wide at the top, tapering to 2 feet wide at the base. The depth ranges from 5 to 7 feet. A DPR form has been prepared and is included as Confidential Appendix D.

PJ-S-006

This site is a segment of an east–west oriented irrigation ditch that appears on the 1956 aerial image of the Project site. In its current condition, the feature has been co-opted for modern use. Substantial additions have been made to the irrigation network adjacent to the Kern River Channel since the 1950s, resulting in the 1 × 0.5-square-mile

grid that encompasses the Project site. PJ-S-005 is approximately 4,250 feet in length and is 24 feet wide at the top, tapering to 4 feet wide at the base. The depth ranges from 8 to 10 feet. A DPR form has been prepared and is included as Confidential Appendix D.

4.3.2.3 Isolated Resources

A total of 184 isolated resources were identified within the Project site. The artifacts are scattered broadly across the Project site, with the highest density of isolated artifacts documented within the northeast portion (Figures A-1 through A-3 in Confidential Appendix A). A review of historical maps depicting the Project site location, as well as soils data, indicates that this portion of the Project site correlates with the relict shoreline of Tulare Lake (Appendix E). The apparently random distribution of artifacts within this area may be the result of water-transport from shoreline fluctuations. The 1856 GLO map depicting the Project site also depicts Buena Vista Lake Slough as intersecting along a southeast–northwest diagonal (Figure 3, 1856 Map with Project site). The intersection of Buena Vista Lake Slough, with its variable seasonal outflows, with Tulare Lake where the Project site lies was a dynamic landscape prior to the twentieth century, and highly productive from an ecological perspective. In addition to the alluvial activity within the Project site, the entire area has been substantially altered by the development of irrigation and flood infrastructure, as well as agricultural fields, orchards, and rangeland. This has included plowing, discing, and likely deeper ripping of the landscape to facilitate fruit and nut tree growth.

The assemblage of isolated resources included 418 debitage, 17 bifaces, 13 retouched flaked stone tools, 1 utilized flake, 3 CCS unifacial tools, 1 CCS chipped stone crescent, 7 projectile points, 16 ground stone, 5 percussing tools, 2 pieces of fire-affected rock, 1 fine-grained volcanic multi-directional core, 8 shell beads (7 *Olivella*, 1 possible clam shell), and 1 historic glass bottle fragment. Debitage included 6 tested cobbles, 3 primary flakes, 11 secondary flakes, and 404 interior flakes. The lithic material was dominated by CCS (n = 412) with a wide range of colors present from mottled red, blue, and green to milky white and translucent brown. Sparse quartz (n = 2), fine-grained volcanic (n = 2), conglomerate (n = 1), and obsidian (n = 1) was also present. A total of 17 bifaces in various stages of reduction were identified, with 12 CCS, 4 obsidian and 1 quartz. Seven projectile points were identified including 4 CCS, 1 obsidian, 1 white quartz, and 1 fine-grained volcanic. Ground stone included 4 granitic milling stone fragments, 8 hand stones (5 granitic, 2 quartzitic, 1 FGV), 1 granitic pestle, 1 indeterminate granitic ground stone, and 2 charm stones (1 granitic, 1 quartzitic).

A summary of formal isolated resources is provided in Table 7; the full list of isolates are included in Confidential Appendix A.

Table 7. Isolated Resources - Formal Artifact Summary

Resource ID	Artifact No.	Type	Material	Description	Dimensions (cm) L × W × Th
PJ-004	A-1	Biface	Obsidian	Biface fragment, heavily worn	—
	—	Debitage	CCS	Ct: 2	—
PJ-008	A-1	Projectile Point	CCS	Projectile point (wide stemmed dart), tip broken off, ovate cross-section	—
PJ-015	A-1	Biface	CCS	Biface, broken base with patina on unfractured exterior	4 × 1.8 × 1.1
PJ-016	A-1	Biface	CCS	Biface midsection	2.7 × 2.5 × 1

Table 7. Isolated Resources - Formal Artifact Summary

Resource ID	Artifact No.	Type	Material	Description	Dimensions (cm) L × W × Th
	—	Debitage	CCS	Ct: 1; blocky flake	—
PJ-025	A-1	Ground stone	Granitic	Milling stone fragment, 1 polished surface, plow scar damage; no striations from use or pecking to resharpen. Likely from same object as A-2 and A-3	25.9 × 19 × 8
	A-2	Ground stone	Granitic	Milling stone fragment, 1 polished surface, plow scar damage; re-fit with A-3 ; no striations from use or pecking to resharpen	14.5 × 15 × 6
	A-3	Ground stone	Granitic	Milling stone fragment, 1 polished surface, plow scar damage; re-fit with A-2 ; no striations from use or pecking to resharpen	14 × 13 × 6
PJ-034	A-1	Bead	Shell	Spire-lopped *Olivella* shell bead	1.8 × 1.1
	—	Debitage	CCS	Ct: 3; grey/white CCS shatter	—
PJ-039	A-1	Biface	Obsidian	Biface fragment, early stage, heavy patina	2 × 1.8 × 0.6
	—	Debitage	CCS	Ct: 3; 2 grey CCS interior flakes, 1 reddish CCS interior flake	—
PJ-042	A-1	Ground stone	Granitic	Milling stone fragment, part of shoulder present, not heavily polished, no evidence of resharpening	9.6 × 6.7 × 3.5
	A-2	Flaked Stone Tool	CCS	Well-shaped utilized flake, white CCS	2.4 × 2 × 0.9
	—	Debitage	CCS	Ct: 1; white CCS flake	—
PJ-046	A-1	Projectile Point	Quartz	White quartz projectile point (concave base dart)	6.2 × 3 × 1.5
	—	Debitage	CCS	Ct: 6; 3 white interior flakes, 2 grey interior flakes (re-fit), 1 blue-grey primary flake	—
PJ-049	A-1	Crescent	CCS	Crescent, brown CCS, heavy white patina	5.7 × 2.6 × 0.5
PJ-055	A-1	Ground stone	Granitic	Milling stone fragment, no shoulder present, 1 milling surface, no polish	9 × 6 × 6
	—	Debitage		Ct: 1; blue/grey interior flake	—
PJ-068	A-1	Biface	CCS	Late-stage biface, broken base, white CCS	3 × 2.2 × 0.8
	A-2	Biface	Obsidian	Biface fragment, early-mid stage	2.8 × 1.7 × 0.5
	—	Debitage	CCS	Ct: 1; red/blue interior flake, possibly heat treated	—
PJ-075	A-1	Biface	Obsidian	Late-stage biface midsection	2.6 × 2.8 × 0.8

Table 7. Isolated Resources - Formal Artifact Summary

Resource ID	Artifact No.	Type	Material	Description	Dimensions (cm) L × W × Th
PJ-082	A-1	Ground stone	Granitic	A-1 hand stone fragment, 2 polished surfaces,	5.6 × 6.3 × 4.6
	—	Debitage	CCS	Ct: 3; 2 CCS shatter, 1 white CCS interior flake	—
PJ-085	A-1	Projectile Point	CCS	Side-notched projectile point with broken base, light brown with white patina	6.2 × 2.2 × 0.7
PJ-087	A-1	Ground stone	Granitic	Charm stone fragment	H: 9.6 × D: 4
	—	Debitage	CCS	Ct: 1; shatter with white patina	—
PJ-094	A-1	Projectile Point	CCS	Complete projectile point (concave base dart) with chipped tip, basal grinding or notching, brown with heavy white patina	4.7 × 2.4 × 0.7
	—	Debitage	CCS	Ct: 2	—
PJ-105	A-1	Bead	Shell	*Olivella* shell with hole drilled in side, split-end perforated?	2.3 × 1.5 × 0.6
	—	Debitage	CCS	Ct: 1	—
PJ-106	A-1	Ground stone	FGV	Hand stone fragment, rhyolite?, one polished surface, badly fractured	5.6 × 5.5 × 5.4
	—	Debitage	CCS	Ct: 1; shatter, brown with white patina	—
PJ-109	A-1	Ground stone	Quartzite	Hand stone fragment, 1 polished surface	5.2 × 4.3 × 2.4
PJ-117	A-1	Biface	CCS	Mid-stage biface mid-section, brown with white patina	3.6 × 1.9 × 0.9
	—	Debitage	CCS	Ct 3; 2 interior flakes with white patina, 1 grey interior flake	—
PJ-120	A-1	Biface	Obsidian	Late-stage biface tip	2.6 × 2.7 × 0.7
PJ-122	A-1	Biface	Obsidian	Projectile point (concave base dart), bifurcated, broken stem and tip	4 × 2.3 × 0.7
PJ-135	A-1	Core	FGV	Rhyolite core, multi-directional, tested cobble	7.5 × 7 × 3.8
	—	Debitage	CCS	Ct: 2; brown interior flakes	—
PJ-145	A-1	Biface	CCS	Late-stage biface, nearly complete, broken base and tip	3.9 × 2.3 × 0.6
	—	Debitage	CCS	Ct: 2; brown with white patina	—
PJ-147	A-1	Biface	CCS	Late-stage biface mid-section, white	1.9 × 1.7 × 0.6
PJ-149	A-1	Bead	Shell	*Olivella* shell bead, punctured, no bevel or taper from drilling	2 × 1.3 × 0.5

Table 7. Isolated Resources - Formal Artifact Summary

Resource ID	Artifact No.	Type	Material	Description	Dimensions (cm) L × W × Th
	A-2	Bead	Shell	*Olivella* shell bead, punctured, no bevel or taper from drilling	1.7 × 1.1 × 0.5
	—	Debitage	CCS	Ct: 3; interior flakes	—
PJ-152	A-1	Biface	Quartz	Late-stage biface	6.1 × 2.5 × 1.6
PJ-162	A-1	Ground stone	Granitic	Hand stone, 2-polished surfaces, one battered by plow, pecked to form, well-shaped. Possible pecking on polished surface to resharpen	11.5 × 10.5 × 4.2
	—	Debitage	CCS	Ct: 3	—
PJ-165	A-1	Ground stone	Granitic	Hand stone fragment, 2 polished surfaces, well-shaped	4.5 × 4.8 × 5
PJ-178	A-1	Ground stone	Granitic	Hand stone fragment, 2 polished surfaces, possible pecking to resharpen, well-shaped	7.4 × 5 × 4.6
	—	Debitage	CCS	Ct: 1; interior flake, white	—
PJ-180	A-1	Bead	Shell	*Olivella* shell bead, appears drilled, ground exterior to make smooth/round	D: 0.65 × 0.1
	—	Debitage	CCS	Ct: 1; interior flake, white	—
PJ-192	A-1	Ground stone	Quartzite	Ground stone/charm stone (net-sinker?), teardrop shape with vertical pecked groove	8.6 × 6 × 4cm
PJ-198	A-1	Bead	Unknown	White CCS or fossilized shell bead, drilled hole from both sides, flaking on exterior	D: 1.87 × T: 0.45 × DH: 0.3
	—	Debitage	CCS	Ct: 1	—
PJ-207	A-1	Ground stone	Quartzite	Hand stone, 2 sides polished, battered on short sides	12.5 × 9 × 4.7
	—	—	Unknown	Black cobble manuport, no evident use wear, not native stone	—
PJ-212	A-1	Percussion Tool	CCS	Percussing tool, grey CCS	6.2 × 5.3 × 3.6
	A-2	Ground stone	Granitic	Hand stone/pestle fragment, one polished surface	9.2 × 7.1 × 3.6
	A-3	Percussion Tool	Granitic	Percussing tool with one battered end, and battered rim on opposite end	8.1 × 8.3 × 6.6
	—	Debitage	CCS	Ct: 11	—
PJ-214	A-1	Flaked Stone Tool	CCS	Retouched flake tool, brown	4.1 × 3.1 × 1.4
	A-2	Bead	Shell	*Olivella* sidewall bead, hole-punched	2.3 × 1.1 × 0.1 × DH: 0.3

Table 7. Isolated Resources - Formal Artifact Summary

Resource ID	Artifact No.	Type	Material	Description	Dimensions (cm) L × W × Th
PJ-246	A-1	Bead	Shell	*Olivella* sidewall bead, drilled from both sides and ground around edges to shape	0.77 × 0.6 × DH: 0.12

4.4 Tribal Coordination

Kern County has led the Assembly Bill 52 and Senate Bill 18 Native American consultation. Kern County sent a letter in accordance with Assembly Bill 52 on February 22, 2021, requesting review and comments on the potential impacts of the Project to cultural places. The Assembly Bill 52 letter was sent to three Native American tribes including Twenty-Nine Palms Band of Mission Indians, Tejon Indian Tribe, and Torres Martinez Desert Cahuilla Indians. Kern County did not receive a response from any of the three Native American tribes.

On July 7, 2022, the NAHC provided a contact list of tribes with traditional lands or cultural places located in the vicinity of the Project site to Kern County. This list includes six tribes including Big Pine Paiute Tribe of the Owens Valley, Chumash Council of Bakersfield, Kitanemuk & Yowlumne Tejon Indians, Santa Rosa Rancheria Tachi Yokut Tribe, Tejon Indian Tribe, and Tule River Indian Tribe. A records search of the NAHC's Sacred Lands File (SLF) for the Project site and 1 mile buffer was negative. The NAHC response letter is included in Confidential Appendix C.

Based on information provided to Dudek, to date, no tribes have responded with a request for consultation.

4.5 Chronology

Based on temporally diagnostic artifacts identified during the Phase I survey, prehistoric occupation of the Project site appears to have occurred with variable intensity from the Lower Archaic (8550–5550 cal BC) through the Emergent period (cal AD 1100–Historic Contact), with most of the diagnostic material dating to the Upper Archaic period (550 cal BC–cal AD 1100). Diagnostic artifacts identified included 63 shell artifacts and 7 flaked stone artifacts.

A total of 63 shell artifacts were documented as the result of the Phase I survey (Table 8). Of these, 54 shell artifacts had temporally diagnostic attributes which were used to assign types and develop a chronology of the shell artifacts according to previous analyses conducted by Gifford (1947), Bennyhoff and Hughes (1987), and Milliken and Schwitalla (2016). A total of 13 types of shell beads were identified, pertaining to five time ranges spanning from the Middle Archaic (>3400–2200 BC) into the transition between the Emergent period and Ethnohistoric period (AD 1510–1770). However, the vast majority of the assemblage (n = 45) consists of *Olivella* shell bead types C and D which date from 210 BC–AD 420, within the Upper Archaic, and from AD 1010–1210, during the Upper Archaic/Emergent period transition.

Table 8. Shell Artifact Summary

Resource ID	Artifact ID	Visual type	Type Description	Cal AD/BC AMS Results	Temporal Unit
PJ-034	A-1	A1	Simple Spire-Lopped	n/a	n/a
PJ-105	A-1	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition

Table 8. Shell Artifact Summary

Resource ID	Artifact ID	Visual type	Type Description	Cal AD/BC AMS Results	Temporal Unit
PJ-149	A-1	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-149	A-2	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-180	A-1	G1	Tiny Saucer	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-198	A-18	V	Clamshell Disc	n/a	n/a
PJ-214	A-21	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-246	A-1	F	Saddles	AD 420–1010	Upper Archaic
PJ-S-001	A-2	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-6	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-7	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-10	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-11	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-12	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-13	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-14	D1b	Split, Small Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-001	A-15	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-16	C2	Split Drilled	210 BC– AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-17	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-20	D1b	Split, Small Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition

Table 8. Shell Artifact Summary

Resource ID	Artifact ID	Visual type	Type Description	Cal AD/BC AMS Results	Temporal Unit
PJ-S-001	A-23	D	Split Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-001	A-26	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-29	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-001	A-30	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-001	A-31	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-32	E	Lipped	AD 1510–1770	Emergent Period/Ethnohistoric Period Transition
PJ-S-001	A-33	D1b	Split, Small Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-001	A-34	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-35	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-001	A-36	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-002	A-4	A1	Simple Spire-Lopped	n/a	n/a
PJ-S-002	A-5	split	Split	n/a	n/a
PJ-S-002	A-9	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-002	A-12	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-002	A-13	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-002	A-14	split	Split	n/a	n/a
PJ-S-002	A-16	D1b	Split, Small Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-002	A-17	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-002	A-18	H2aII	Keyhole Limpet	n/a	n/a
PJ-S-002	A-22	F2	Rough Saddle	AD 420–445	Upper Archaic

Table 8. Shell Artifact Summary

Resource ID	Artifact ID	Visual type	Type Description	Cal AD/BC AMS Results	Temporal Unit
PJ-S-002	A-24	E	Lipped	AD 1510–1770	Emergent Period/Ethnohistoric Period Transition
PJ-S-002	A-29	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-002	A-30	n/a	Clam	n/a	n/a
PJ-S-003	A-2	B2	End-Ground	>3400–2200 BC and AD 1210–1510	Middle Archaic and Emergent Period
PJ-S-003	A-4	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-5	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-6	B2	End-Ground	>3400–2200 BC and AD 1210-1510	Middle Archaic and Emergent Period
PJ-S-003	A-7	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-8	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-9	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-10	B2	End-Ground	>3400–2200 BC and AD 1210–1510	Middle Archaic and Emergent Period
PJ-S-003	A-11	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-13	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-15	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition
PJ-S-003	A-16	AV	Tube	n/a	n/a
PJ-S-003	A-18	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-21	A1	Simple Spire-Lopped	n/a	n/a
PJ-S-003	A-23	C2	Split Drilled	210 BC–AD 420 and AD 1010–1210	Upper Archaic and Upper Archaic/Emergent Period Transition

Table 8. Shell Artifact Summary

Resource ID	Artifact ID	Visual type	Type Description	Cal AD/BC AMS Results	Temporal Unit
PJ-S-003	A-24	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-25	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-27	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition
PJ-S-003	A-29	E	Lipped	AD 1510–1770	Emergent Period/Ethnohistoric Period Transition
PJ-S-004	A-1	D1a	Split, Shelved Punched	AD 1010–1210	Upper Archaic/Emergent Period Transition

Note: Shell types and chronology based on Gifford (1947), Bennyhoff and Hughes (1987), and Milliken and Schwitalla (2016).

Diagnostic flaked stone artifacts identified during the Phase I survey included six projectile points and one crescent. The projectile point assemblage included one stemmed point (PJ-008), three concave-base dart points (PJ-046, PJ-094, PJ-122), a crescent (PJ-049), a side-notched or corner-notched dart point (PJ-085), and a contracting stem point (PJ-S-003, A12). The stemmed point and crescent are consistent with those used to define the Buttonwillow Complex at sites in the area surrounding the project site, which may represent a local variant of the Western Stemmed Tradition dating to the Lower Archaic period (Sutton 2019). The concave-base darts lack the characteristic fluting of Clovis and Clovis-like points (Rondeau and Hopkins 2008), but similar points are documented from surface contexts in the Tulare Lake Basin and are generally attributed to Early Holocene occupation in the region. Finally, the contracting stem and notched dart forms are consistent with Middle and Upper Archaic assemblages. Taken as a whole, the flaked stone assemblage suggests continued use of the Project site and its surrounds beginning in at least the Lower Archaic period, providing insight into the early occupation of the southern San Joaquin Valley.

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5 Summary and Recommendations

This study consisted of a SSJVIC records search, NAHC Sacred Lands File Search, intensive-level pedestrian survey, and recordation and evaluation of cultural resources. The SSJVIC records search identified no previously recorded cultural resources within the Project site and four cultural resources within a 1-mile surrounding area. These resources report the presence of human remains, habitation debris, and lithic material, along with a historic freeway.

Dudek conducted a Phase I Inventory intensive-level pedestrian survey of the Project site to document sites and features. Dudek archaeologists intensively surveyed the entire Project site and associated access roads, walking transects spaced no more than 20 meters apart and oriented along cardinal directions. Evidence of buried cultural deposits were opportunistically sought through inspection of natural or acritical erosion/excavation exposures and the spoils from rodent burrows.

Phase I Inventory efforts resulted in the identification of a general low-density scatter of prehistoric debitage throughout the Project site. Approximately 1,151 fragments of debitage were identified in total. This distribution of debitage is understood to be partially the result of an extended history of agricultural activities, which have spread artifacts from their original location(s) of deposition across a large area. Within this broader distribution of debitage that is present throughout the Project site, there is a patterning of more discrete concentrations of formal artifacts that meet the definition of an archaeological site. These four sites (PJ-S-001, PJ-S-002, PJ-S-003, and PJ-S-004) have a higher frequency of artifacts, assemblages of greater variation and complexity, and higher potential for subsurface deposits than the surrounding areas. Formal artifacts with additional data and/or diagnostic potential identified during survey include 63 shell beads and 82 stone tools.

Historically, portions of the Project site would have been seasonally inundated by Lake Tulare; the site falls immediately west of the historic route of the Buena Vista Slough that channeled water northward from Buena Vista Lake. These features represented a resource-rich environment. Further, they would have acted as a physical impediment to further passage by prehistoric peoples when traveling along the western peripheries of the Central Valley, and therefore the project site would have presented a natural stopping point. The area has been subject to substantial alluvial soil deposition through reoccurring events; these conditions have potential to result in capping of underlying ground surfaces and the development/preservation of subsurface archaeological deposits. At present, it is unclear if the substantial history of agricultural discing and other activities has completely disturbed any potential subsurface deposits that may have been present, or if residual deposits may remain.

As presently designed, the Project would intersect six archaeological sites and features, including two historic-era ditch features and four prehistoric sites. The historic-era ditch features (PJ-S-005 and PJ-S-006) have been documented and evaluated; they are recommended not eligible for listing on the NRHP/CRHR under any criteria. As such, disturbance of these ditches would not constitute a significant impact. The four prehistoric archaeological sites were subject to intensive-level documentation. The sites appear to lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A, B, or C or CRHR under Criteria 1, 2, or 3. Criterion D/4 is most appropriately applied to an assessment of the sites' eligibility. Given the geomorphic context, the sites have potential for buried archaeological resources. Surface and potential subsurface artifacts have potential to contribute additional data relating to prehistoric use, chronology, and other important research themes. As such, these sites are recommended eligible for listing on the NRHP/CRHR under Criterion D/4, for their potential to yield

information important in prehistory or history. The preferred management strategy should include avoidance or other methods of preservation in place. Should avoidance be determined infeasible, mitigation required to address potential impacts to these significant resources should require archaeological data recovery prior to disturbance by construction activities. In addition, a cultural resources monitoring program is recommended to occur during initial subsurface disturbing activities throughout the Project site.

An additional 184 isolated resources were identified within the Project. Isolated artifacts lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A, B, or C or CRHR under Criteria 1, 2, or 3. In addition, they do not provide sufficient data potential to be considered for eligibility under Criterion D/4. None of the recorded isolates meet the definition of "unique" archaeological resource or tribal cultural resource under CEQA. While not significant under CEQA, management recommendations provided below do include collection of diagnostic isolates prior to construction since they may contribute additional analytical potential.

5.1 Resource Significance

According to CEQA and the National Environmental Policy Act, a project with an effect that may cause a substantial adverse change in the significance of a historical resource (historic property) is a project that may have a significant effect (adverse effect) on the environment and the cultural resource itself. A substantial adverse change in the significance of a historical resource/historic property would be constituted by physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. Significance, under these conditions, is to be interpreted in terms of the resource's eligibility for listing in the NRHP and/or CRHR. To best mitigate the effects of a project on cultural resources, a reasonable, good faith effort must be applied to determining those resources' archaeological character and eligibility for CRHR/NRHP listing.

The significance criteria used to evaluate a project's impacts to cultural resources under CEQA are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to cultural resources would occur if the project would:

a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5.
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
c. Disturb any human remains, including those interred outside of dedicated cemeteries.

PJ-S-001

This prehistoric site consists of an extensive lithic scatter measuring 732 m north–south by 597 m east–west and includes 21 *Olivella* shell beads, 10 bifaces (8 CCS, 2 obsidian), 2 retouched flake tools (1 CCS, 1 obsidian), 1 CCS core, 1 steatite vessel fragment, and 216 pieces of debitage. Three potential features are present with the site, characterized by visibly distinct soils, possibly thermally altered dense shell concentrations, and fire-affected rocks. The features indicate possible cultural levels below surface exposed through rodent burrows. Extensive ground disturbance associated with historic- and modern-era agricultural use of the land and bioturbation seems to have affected the site.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criteria D is most appropriately applied to an assessment of the site's NRHP/CRHR

eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of temporally diagnostic artifacts, including projectile points, obsidian material, and shell beads. The artifact assemblage indicates regional trade, providing potential information relating to broader archaeological patterns, as well as potential habitation/processing activities, as indicated by the presence of ground stone. Given the geomorphic context, intact cultural deposits may occur below the soils disturbed by agricultural activities. It is recommended that the archaeological site be considered eligible for NRHP/CRHR listing under Criterion D/4.

PJ-S-002

Site PJ-S-002 is a sparse artifact scatter (411 m × 584 m) consisting of lithic and ground stone scatter with percussing tools, and *Olivella* shell beads. Artifacts include 12 shell beads (11 *Olivella*, 1 clam), 6 ground stone fragments (4 coarse-grained volcanic milling stone fragments and 2 steatite vessel fragments), 3 granitic percussion tools, 5 CCS bifaces, 3 flaked stone tools (2 CCS, 1 obsidian), 1 CCS multi-directional core, and 1 anomalous shell without discernable modification by field-level technology. Extensive ground disturbance associated with historic- and modern-era agricultural use of the land and bioturbation seems to have affected the site.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criteria D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of temporally diagnostic artifacts, including bifaces, obsidian material, and shell beads. The artifact assemblage indicates regional trade, providing potential information relating to broader archaeological patterns, as well as potential habitation/processing activities, as indicated by the presence of ground stone. Given the geomorphic context, intact cultural deposits may occur below the soils disturbed by agricultural activities. It is recommended that the archaeological site be considered eligible for NRHP/CRHR listing under Criterion D/4.

PJ-S-003

Site PJ-S-003 is a sparse prehistoric artifact scatter extending 360 m east–west by 241 m north–south. Artifacts include 18 *Olivella* shell beads, 5 ground stone fragments (3 steatite vessel fragments and 2 granitic milling stone fragments), 2 CCS bifaces, 2 CCS projectile points, 1 CCS core, 1 CCS flaked stone tool, 1 unknown object (possible manuport), and 200 pieces of debitage. The area has been highly disturbed by agriculture, bioturbation, and livestock trampling.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criteria D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of temporally diagnostic artifacts, including projectile points and shell beads. The artifact assemblage indicates regional trade, providing potential information relating to broader archaeological patterns, as well as potential habitation/processing activities, as indicated by the presence of ground stone. Given the geomorphic context, intact cultural deposits may occur below the soils disturbed by agricultural activities. It is recommended that the archaeological site be considered eligible for NRHP/CRHR listing under Criterion D/4.

PJ-S-004

Site PJ-S-004 is a sparse artifact scatter measuring 460 m east–west by 250 m north–south. Artifacts of note included one CCS projectile point fragment and one *Olivella* shell bead. Sparse freshwater shell fragments were observed intermixed with the soil within the site; however, they did not display cultural modification and no anthropogenic soils were identified. The area is utilized for agriculture, which greatly contributed to the site disturbance along with bioturbation and livestock trampling.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criteria D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of a temporally diagnostic lithic artifact and a shell bead. In addition, as indicated by the presence of freshwater shell, the area was likely within a location subject to seasonal inundation, and therefore naturally occurring soil development. This suggests that below the soils disturbed by agricultural activities, intact cultural deposits may occur. Given the geomorphic context, intact cultural deposits may occur below the soils disturbed by agricultural activities. It is recommended that the archaeological site be considered eligible for NRHP/CRHR listing under Criterion D/4.

PJ-S-005

This site is a segment of a north–south oriented irrigation ditch that appears on the 1956 aerial image of the Project site. In its current condition, the feature has been co-opted for modern use. Substantial additions have been made to the irrigation network adjacent to the Kern River Channel since the 1950s, resulting in the 1 × 0.5-square-mile grid that encompasses the Project site. PJ-S-005 is approximately 2,900 feet in length and is 11 feet wide at the top, tapering to 2 feet wide at the base. The depth ranges from 5 to 7 feet.

Archival research suggests this ditch dates to a time period later than potential early irrigation projects in the region and, thus, is not associated. As such, research has failed to indicate any associations with important events that have contributed to the broad patterns of California or Kern County history. Therefore, the ditch does not appear eligible under NRHP/CRHR Criterion A/1. Archival research failed to indicate any associations with significant persons. Therefore, the ditch does not appear eligible under NRHP/ CRHR Criteria B/2. The irrigation ditch is a common earthen ditch and does not embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction. As such, the ditch does not appear eligible under NRHP and CRHR Criterion C/3. There is no evidence to indicate that the subject ditch is likely to yield any information important in prehistory or history, beyond what has already been identified as a result of the current study. Therefore, the ditch does not appear eligible under NRHP/ CRHR Criterion D/4.

PJ-S-006

This site is a segment of an east–west oriented irrigation ditch that appears on the 1956 aerial image of the Project site. In its current condition, the feature has been co-opted for modern use. Substantial additions have been made to the irrigation network adjacent to the Kern River Channel since the 1950s, resulting in the 1 × 0.5-square-mile grid that encompasses the Project site. PJ-S-005 is approximately 4,250 feet in length and is 24 feet wide at the top, tapering to 4 feet wide at the base. The depth ranges from 8 to 10 feet.

Archival research suggests this ditch dates to a later time period than potential early irrigation projects in the region and, thus, is not associated. As such, research has failed to indicate any associations with important events that have contributed to the broad patterns of California or Kern County history. Therefore, the subject property does not appear eligible under NRHP/CRHR Criterion A/1. Archival research failed to indicate any associations with significant persons. Therefore, the subject property does not appear eligible under NRHP/ CRHR Criteria B/2. The irrigation ditch is common earthen ditch and does not embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction. As such, the ditch does not appear eligible under NRHP and CRHR Criterion C/3. There is no evidence to indicate that the subject ditch is likely to yield any information important in prehistory or history, beyond what has already been identified as a result of the current study. Therefore, the subject property does not appear eligible under NRHP/ CRHR Criterion D/4.

5.2 Effects/Impacts Analysis

5.2 Cultural Resources

Threshold a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

The term "historical resource" is being applied here as a reference to historic built environment buildings, features, or structures that are over 45 years in age. As presently designed, the Project would intersect two historic-era ditch features that appear to date to the early 1950s. The historic-era ditch features (PJ-S-005 and PJ-S-006) have been documented and evaluated; the features do not appear eligible for the NRHP under Criteria A, B, C, or D or CRHR under Criteria 1, 2, 3, or 4. They are recommended not eligible for listing on the NRHP/CRHR under any criteria. They are not related to the early nineteenth century irrigation projects or twentieth century water conveyance projects, such as the State Water Project, that are important to the history of the Central Valley. While the ditches were created at approximately the same time as the channelization of the Kern River, these are opportunistic field ditches created for utilization purposes and do not appear directly related to the larger river channelization project. Project impacts are understood to be constrained to the direct Project site and for the purposes of County review for CEQA compliance. Impacts to historical resources are considered **less than significant**.

Threshold b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

While the majority of the project site is flat and would require minimal to no grading, it is understood that some grading will be required for concrete inverter foundations and access roads, as well as trenching for underground collector lines, such that, due to the regular, linear orientation required for utility-scale PV solar generation facilities, complete avoidance or preservation in place by way of open space, conservation easement, or capping for the four identified prehistoric archaeological sites PJ-S-001, PJ-S-002, PJ-S-003, and PJ-S-004is not feasible. As a consequence, the Project would impact resources considered eligible for NRHP/CRHR listing, which would represent a potentially significant impact (adverse effect). However, reasonable and feasible mitigation is available to reduce impacts to less than significant.

Archaeological sites PJ-S-001, PJ-S-002, PJ-S-003, and PJ-S-004 appear to have eligibility for NRHP/CRHR listing under Criterion D/4 for their potential to yield information important in prehistory or history. Given the geomorphic

context, the Project site has potential for buried archaeological resources. Surface cultural material and potential subsurface deposits have potential to contribute additional data relating to prehistoric use, chronology, and other important research themes.

Impacts to Criterion D/4 can be mitigated through archaeological processes meeting best practice standards. Where feasible, the preferred mitigation strategy should include avoidance or other methods of preservation in place.

Where preservation in place is determined to be infeasible, mitigation required to manage impacts to these potentially significant resources must require archaeological data recovery prior to disturbance by construction activities. In addition, a cultural resources monitoring program is recommended to occur during initial subsurface disturbing activities throughout the Project site. Affects to Tribal Cultural Resources, as a separate category of resources under CEQA, will be assessed through the government-to-government consultation process and implementation of the mitigation measures described here.

With implementation of **Mitigation Measure (MM) CUL-1**, requiring developing and implementing a Worker Environmental awareness Program (WEAP) to ensure workers are sensitive to and properly respond to the unanticipated discovery of cultural resources; **of MM-CUL-2** requiring preparation of a Cultural Resources Management plan (CRMP) to address the proper handling and recovery of cultural resources identified at the Project site; **of MM-CUL-3**, requiring data recovery of significant cultural resources discovered during construction of the Project that cannot be avoided; of **MM-CUL-4**, specifying the proper treatment of any human remains discovered during construction; and, **MM-CUL-5**, requiring monitoring of initial ground-disturbing activities by cultural resources specialists to ensure detection of cultural resources encountered during construction, impacts to archaeological resources would be reduced to **less than significant with mitigation**.

Threshold c. Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Human remains and associated grave goods are protected under California law. No human remains were observed during archaeological survey. Three sites with reported human burials have been documented within 1 mile of the Project site (P-15-000593, P-15-000594, and P-15-000726). While these sites will not be affected, the presence of documented prehistoric burials within 1 mile of the Project site does indicate that the Project site has an elevated potential for human remains to be present. Further, survey work has documented an assemblage of observed formal artifacts, as well as a moderate-high potential for buried archaeological deposits within the Project site. Methods for management of any possible human remains that may be encountered will be outlined in a cultural resources management plan required by **MM-CUL-2** and must occur in compliance with appropriate regulatory requirements, per **MM-CUL-4**. Archaeological monitoring is recommended for all initial ground disturbing activities within the Project site. Specific strategies for implementation of this program will be included in the cultural resources management plan, which is to be reviewed by the lead agency and consulting tribes and finalized prior to construction. This plan will provide specific requirements for the treatment of human remains, should they be encountered. With implementation **MM-CUL-1, MM-CUL-2, MM-CUL-3, MM-CUL-4**, and **MM-CUL-5**, impacts to the discovery of archaeological resources containing human remains would be reduced to **less than significant with mitigation for the same reasons described above with regard to significance Threshold b**.

5.3 Tribal Cultural Resources

Threshold a. Would cause a substantial adverse change in the significance of a tribal cultural resource , defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is

geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

The Project is subject to compliance with AB 52 and SB 18, which require consultation with California Native American Tribal representatives requesting consultation in response to notifications sent by local governments as well as the proper treatment of any tribal cultural resources potentially affected by activities triggering such consultation. Pursuant to AB 52 and SB 18, the County sent Project notification letters on to NAHC-listed Native American tribal representatives. The letters contained a project description, outline of AB 52 and SB 18 timing, request for consultation, and contact information for the appropriate lead agency representative. Specific details relating to consultation are on file with the County.

A project with an effect that may cause a substantial adverse change in the significance of tribal cultural resource is a project that may have a significant effect on the environment (Pub. Resources Code, § 21084.2.). An appropriate approach to potential impacts to tribal cultural resources or other resources of traditional Native American cultural value is developed based on the processes outlined by AB 52 and SB 18. Dudek is not aware of the government to government consultation initiated by the County, which was implemented in good faith and after a reasonable effort, having resulted in the identification of a tribal cultural resource (as defined by PRC Section 21074) within or near the Project site.

Nonetheless, archaeological investigations have identified cultural resources of Native American origin and/or association at the Project site. The distribution of archaeological material demonstrates a potential pattern of intensive and/or extended indigenous use relative to the natural prehistoric landscape, most specifically, Tulare Lake and Buena Vista Slough. Additional, yet-identified, buried cultural resources do have potential to be encountered through project-related earth-disturbing activities. Known and unanticipated cultural resources, if present, have the potential to meet definitions of tribal cultural resources.

To address potential impacts to tribal cultural resources caused by the Project, **Mitigation Measure (MM) CUL-1**, requiring developing and implementing a Worker Environmental awareness Program (WEAP), would include appropriate strategies for management of tribal cultural resources; **MM-CUL-2,** requiring preparation of a Cultural Resources Management plan (CRMP), would include provisions for tribal notification in the event of discovery of a potential tribal cultural resource; **MM-CUL-3**, requiring data recovery of significant cultural resources, would include the opportunity for tribes that requested consultation under SB 18 and/or AB 52 to be present during data recovery field work; and **MM-CUL-4**, summarizing existing regulations and codes pertaining to required treatment of human remains already specifies contact and coordination with a Native American Most Likely Descendant (MLD) in the event remains are of Native American origin. By ensuring consideration of tribal cultural resources and notification to consulting tribes in the event of inadvertent discovery and/or proposed data recovery of potential tribal cultural resources encountered during Project construction, implementation of these measures, along with implementation

of existing regulations governing the treatment of human remains, will ensure impacts to tribal cultural resources would be **less than significant with mitigation**.

5.3 Recommendations

With the following mitigation implemented, impacts to archaeological resources and human remains would be less than significant.

MM-CUL-1 Workers Environmental Awareness Program (WEAP) Training: All construction personnel and monitors who are not trained archaeologists shall be briefed regarding unanticipated cultural resource discoveries prior to the start of construction activities. The purpose of the WEAP training is to provide specific details on the kinds of archaeological materials that may be identified during construction of the proposed Project and explain the importance of and legal basis for the protection of significant archaeological resources. Each worker shall also learn the proper procedures to follow in the event that cultural resources or human remains are uncovered during ground-disturbing activities. These procedures include work curtailment or redirection, and the immediate contact of the site supervisor and archaeological monitor. The appropriate management requirements relating to inadvertent discovery of a potential tribal cultural resources will also be addressed as part of the WEAP training. These procedures shall be summarized in a handout to be provided to all personnel working on the proposed Project after completing their WEAP training.

MM-CUL-2 Cultural Resource Management Plan (CRMP): The applicant shall prepare a CRMP for the mitigation of impacts to known and inadvertently encountered historical, unique archaeological, and tribal cultural resources. The CRMP shall be reviewed and approved by Kern County prior to finalization prior to the issuance of building and grading permits. Consistent with the requirements of AB 52 and SB 18, the County, based on information and/or requests received through the process of consultation, shall determine if review and input from the consulting tribes shall occur. The CRMP shall, at a minimum, include and expand upon the following components:

- The CRMP shall define the requirements for addressing inadvertent discoveries, for communication and notification to the lead agency and consulting parties in the event of such discoveries, for the preparation of daily monitoring logs, and for the preparation of a final culutral resources construction monitoring report after completion of construction.
- The CRMP shall include methods for preservation in place to the extent feasible of known, and/or future inadvertant discoveries of historical or unique archaeological or tribal cultural resources, such as through avoidance, incorporation within undisturbed areas of the Project site, covering with a layer of chemically stable soil before building parking lots, staging areas, or other similar improvements on the Project site, or deeding the site into a permanent conservation easement as part of project decommissioning. Avoidance areas shall be delineated as environmentally sensitive areas (ESAs) around avoidable sites to the extent feasible. The ESAs shall be clearly delineated and marked using methods that do not conflict with other resource or construction styles. The ESAs shall not detail the cultural nature of that avoidance area on signage or plans. The ESAs shall be maintained through the duration of construction.
- The CRMP shall include the specific data recovery requirements detailed in MM-CUL-3 for those portions of the four areas mapped as prehistoric archaeological sites by the Project's

Archaeological Resources Inventory Report where avoidance is infeasible, as demonstrated by the Applicant's project design plans and confirmed by Kern County.

- When artifacts are collected or otherwise recovered, the CRMP shall outline specific methods required to assess, document, and preserve the archaeological assemblage. This data is directly tied to the "data potential" and, as such, efforts require that artifacts be subject to archaeological collection, laboratory analyses, and curation (unless other agreements occur with consulting tribes relating to handling of artifacts).
- To the extent construction activities uncover previously unknown or unanticipated cultural resources, all such activities will stop in the vicinity of the resource until the significance of the resources is determined. An appropriate ESA buffer for avoidance during construction is typically 100 feet, which may be adjusted at the recommendation of a qualified archaeologist meeting Secretary of the Interior Qualifications, so that the exclusion buffer allows key areas of construction to proceed while ensuring that no ongoing project activities will affect the find during assessment of the resources significance. The CRMP shall provide for archaeological evaluation to occur, as approved by the lead agency. Where approved, resources shall be evaluated by a qualified archaeologist through an archaeological testing phase that consists of systematic excavations of a sample of areas within the area to be disturbed by the Project to determine the integrity of the archaeological deposits, the horizontal and vertical extent of the deposits, the quantity and diversity of artifacts contained within the deposits, and the potential for human remains. The Applicant may use the information from the testing phase as described in the resulting report to refine or revise the project impact area for purposes of avoidance where feasible. The goal is to avoid or minimize impacts to significant deposits based on the results of the test excavations. The qualified archaeologist shall assess if the archaeological site qualifies as a historical resource or unique archaeological or tribal cultural resource under the criteria of California Environmental Quality Act, in consultation with the lead agency, who may request review by consulting tribes. The feasibility of avoidance of any cultural resources shall be reviewed by the project proponent based on project needs and communicated to the lead agency for review. Preservation in place shall be the preferred manner of mitigating impacts to historical and unique archaeological and tribal cultural resources. However, data recovery through excavation may be the only feasible mitigation for such resources at times; therefore, this contingency should be provided for as well in the CRMP, consistent with the terms of MM-CUL-3.
- The final construction monitoring report shall be submitted to the lead agency and Southern San Joaquin Valley Information Center. Distribution to consulting tribes will be determined by the lead agency, as informed through the process of government-to-government consultation. The intent of this report should be to document compliance with approved mitigation and regulations, as well as to provide a full documentation of cultural resources identified. The results of data recovery efforts may be documented in a separate report, or included as a component of this construction monitoring report, subject to confidentiality limitations.

MM-CUL-3 Data Recovery Mitigation: Where preservation in place of an archaeological site qualifying as a historical or unique archaeological or tribal cultural resource is not feasible (as that term is defined

under CEQA), the CRMP shall provide that a qualified archaeologist, in consultation with the County and the Project applicant, shall:

1. Prepare a research design and archaeological data recovery plan prior to the issuance of grading permits for the recovery of known and unanticipated historical or unique archaeological or tribal cultural resources discovered in unavoidable sites. The plan will include provisions for capturing those categories of data within those parts of the potentially historical or unique archaeological or tribal cultural resource that would be damaged or destroyed during development of the site. Given the broad distribution of low-density, formal artifacts that may have potential to contribute data to the archaeological record, collection of isolates and archaeological material within archaeological sites and analysis of all temporally diagnostic or important artifacts, including projectile points, crescents, charm stones, beads, and other formal artifacts shall occur (unless other agreements occur with consulting tribes relating to handling of artifacts).
2. Standard archaeological excavation units shall be used, consistent with standard practice. This shall include a combination of hand-excavated units– Shovel Test Pits (STPs), Shovel Test Units (STU), Control Units (CU), or other appropriate methods, and collection of surface artifacts. Mechanical trenching is also appropriate given the geomorphic conditions. The levels of field effort required for various areas within the Project site will be dependent on the relative spatial density, frequency, complexity, and depth of archaeological material and deposits. In general, STPs are small (0.25 × 0.5 m) subsurface probes meant to provide a presence-absence measure of subsurface archaeological deposits. STPs are commonly used to test subsurface site boundaries as well. Other units may be used to gather information on the structure and composition of archaeological assemblages, depending on the nature of the deposits. STU (1 × 0.5 m) and CU (1 × 1 m) are used to obtain samples of subsurface deposits or to further explore deposits identified in an STP; STU and CU can provide more detailed information on stratigraphic profiles and depositional integrity.
3. Following completion of the test excavations, all cultural materials shall be washed, cataloged, and analyzed. Technical analyses may include artifact analysis, radiocarbon dating, obsidian hydration, pollen and protein residue, and other analyses as needed to describe the cultural materials and archaeological deposits. A data recovery report shall be prepared and filed with the Southern San Joaquin Valley Information Center.
4. Unless other agreements occur with consulting tribes relating to handling of artifacts, the Project applicant shall provide for the permanent curation of recovered materials. Following completion of the data recovery program and or collection of artifact during construction monitoring, the Project applicant shall enter into an agreement with an agency approved facility for permanent curation of the collections. CEQA additionally provides for alternative management strategies to occur, based on consultation with tribes.

MM-CUL-4 Treatment of Human Remains: If human remains are found during evaluations, data recovery, construction monitoring, or any project-related ground-disturbing activity, the remains shall be treated with appropriate dignity pursuant to the requirements of California Public Resources Code Section 5097.98 and the CEQA Guidelines Section 15064.5(e). Project-specific requirements will be included in the CRMP.

MM-CUL-5 Construction Monitoring: A qualified archaeologist shall monitor initial "first-pass" grading, subsurface disturbances, or other ground-disturbing activities at and near recorded archaeological site locations. If unanticipated cultural resources are encountered during construction, the procedures required by MM-CUL-2 for unanticipated discoveries shall be applied. General responsibilities of the archaeologist monitor shall include monitoring construction, preparation of daily monitoring logs, reporting and assessing inadvertent discoveries, communication with tribal representatives, guiding installation and tracking maintenance of environmentally sensitive area marking, and generally ensuring implementation of the CRMP and approved mitigation. The final construction monitoring report shall act as a record of compliance with guiding documents and mitigation.

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6 References

Allen, E. B. 1972. Fresno State College Archaeological Site Record Card for P-15-000594. On file at Southern San Joaquin Valley Information Center.

Basgall, M.E. 1987. "Resource Intensification Among Hunter-Gatherers: Acorn Economies in Prehistoric California." *Research in Economic Anthropology* 9, no. 198, p. 21–52.

Bennyhoff, James A. and Richard E. Hughes. 1987. "Shell Bead and Ornament Exchange Networks Between California and the Western Great Basin." Anthropological Papers of the American Museum of Natural History. Volume 64, part 2, pages 79-175.

Bennyhoff, J.A., and D.A. Fredrickson. 1994. Toward a New Taxonomic Framework for Central California Archaeology: *Essays by James A. Bennyhoff and David A. Fredrickson* (R. E. Hughes, Ed.).

BLM (Bureau of Land Management). 2004. "The Foundations for Managing Cultural Resources." Section 8100 in the *BLM Manual*. Release no. 8-72. December 3, 2004.

Boey, P.D. 1995. Final Report on the Archaeological Analysis of the CA-SAC-43, Cultural Resource Mitigation for the Sacramento Urban Area Levee Reconstruction Project, Sacramento County, California. Report on file North Central Information Center, Department of Anthropology, California State University Sacramento.

Broughton, J.M. 1994. "Late Holocene Resource Intensification in the Sacramento Valley, California: The Vertebrate Evidence." *Journal of Archaeological Science* 21 (4), 501–514.

Caltrans (California Department of Transportation). 2007. A Historical Context and Archaeological Research Design for Agricultural Properties in California. Division of Environmental Analysis, Caltrans, Sacramento.

Cook, S. F. (1960). "Colonial Expeditions to the Interior of California: Central Valley, 1800-1820." *University of California Anthropological Records* 16(6): 239-292.

Derby, G. H., and Farquhar, F. P. 1932. The Topographical Reports of Lieutenant George H. Derby. California Historical Society Quarterly, 11(2), 99–123. https://doi.org/10.2307/25178135.

Fenenga, G.L. 1992. *Regional Variability in the Early Prehistory of the American Far West*. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California Berkeley.

Fenenga, G.L. 1993. Test Excavations at the Witt Site (CA-KIN-32), In: *Finding the Evidence: The Quest for Tulare Lake's Archaeological Past*, edited by W.J. Wallace and F.A. Riddell, The Tulare Lake Archaeological Research Group, Redondo Beach, California, pp. 25-38.

Gayton, A. H. (1948). "Yokuts and Western Mono Ethnography I: Tulare Lake, Southern Valley, and Central Foothill Yokuts." *University of California Anthropological Records* 10 (1): 1-142.

Gifford, E. W. 1947. "Californian Shell Artifacts." Anthropological Records Vol. 9, No. 1, University of California Press, Berkeley and Los Angeles.

GLO (General Land Office). 1856. "Original Survey Township 025.0S Range 021.0E." Accessed October, 2022. https://glorecords.blm.gov

GLO (General Land Office). 1868. "Original Survey Township 025.0S Range 021.0E." Accessed October 25, 2022. https://glorecords.blm.gov

Golla, V. 2007. "Linguistic prehistory" In *California prehistory: Colonization, culture, and complexity*, 71-82.

Golla, V. 2011. *California Indian Language*s. University of California Press, Berkeley, California.

Groza, R.G. 2002. *An AMS Chronology for Central California Olivella Shell Bead*s. Unpublished Masters thesis, California State University, San Francisco.

Grunsky, F.R. 1989. Pathfinders of the Sacramento Region: They Were There Before Sutter. Sacramento County Historical Society.

Hartzell, L. L. 1992. Hunter-gatherer adaptive strategies and lacustrine environments in the Buena Vista Lake Basin, Kern County, California. Unpublished PhD. Dissertation, University of California, Davis.

Heizer, R.F. 1949. "The Archaeology of Central California I: The Early Horizon." *University of California Anthropological Records* 12. 1–84.

Hopkins, J. N. (2008). "A Reconstruction Attempt of Tulare Lake's Paleoindian Tool Kit." In: *Ice-Age Stone Tools From the San Joaquin Valley*, edited by J.N. Hopkins and A.P. Garfinkel. Tulare Lake Archaeological Research Group**:** 1-58.

Kroeber, A. 1925. *Handbook of the Indians of California.* Washington D.C.: Smithsonian Institution.

Latta, Frank. 1977. *Handbook of Yokut Indians.* Santa Cruz, California: Bear State Books.

Lightfoot, K.G. 2005. Indians, Missionaries, and Merchants: The Legacy of Colonial Encounters on the California Frontiers. Berkeley, California: University of California Press.

Meyer, J., Young, D.C., and Rosenthal, J.S. 2010. Volume I: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9.

Milliken, Randall T. and Al W. Schwitalla. 2016. California and Great Basin Olivella Shell Bead Guide. Routledge, New York, New York.

Moratto, M.J. 1984. *California Archaeology*. San Diego: Academic Press.

NETR (Nationwide Environmental Title Research). 2022a. "Historical Topographical Maps of the Project boundary, Twisselman Road, Kern County, California, dating from 1932, 1935, 1936, 1940, 1942, 1943, 1947, 1950, 1956, 1957, 1962, 1974, 1975, 1976, 1978, 1982, 2012, 2015, and 2018." Accessed November 4, 2022. https://www.historicaerials.com/viewer.

NETR. 2022b. “Historical Aerial Photographs of the Project boundary, Twisselman Road, Kern County, California, dating from 1956, 1984, 1994, 2005, 2009, 2010, 2012, 2014, 2016, 2018 and 2020.” Accessed November 4, 2022. https://www.historicaerials.com/viewer.

NPS (National Park Service). 2009. *Archeology and Historic Preservation: Secretary of the Interior’s Standards and Guidelines*. As Amended and Annotated. September 29, 183. Accessed March 19, 2009. http://www.nps.gov/history/local-law/arch_stnds_0.htm.

NPS and ACHP (National Park Service and the Advisory Council on Historic Preservation). 1998. *The Secretary of the Interior’s Standards and Guidelines for Federal Agency Historic Preservation Programs Pursuant to the National Historic Preservation Act*. Published jointly by the National Park Service of the U.S. Department of the Interior and the Advisory Council on Historic Preservation.

OHP (Office of Historic Preservation). 1995. “Instructions for Recording Historical Resources.” California State Parks, Office of Historic Preservation. March 1995. http://ohp.parks.ca.gov/pages/1054/files/manual95.pdf.

Osborne, Richard. 1992. “An Ethnographic Overview of the Southern Valley Yokuts.” *Kern County Archaeological*

Preston, W. L. 1981. Vanishing landscapes: Land and life in the Tulare Lake Basin. Univ of California Press. Ritchie, C. W. 1972. Fresno State College Archaeological Site Record Card for P-15-000593. On file at Southern San Joaquin Valley Information Center.

Rolle. 1998. California: A History. Illinois: Harlan Davidson PublishersRondeau, M. F. and J. N. Hopkins 2008. "A Reevaluation of Reported Clovis Points from Tulare Lake, California." In: *Ice-Age Stone Tools From the San Joaquin Valley*, edited by J.N. Hopkins and A.P. Garfinkel. Tulare Lake Archaeological Research Group. 99-108

Rosenthal, J.S., G.G. White, and M.Q. Sutton. 2007. “The Central Valley: A View from the Catbird’s Seat.” In *California Prehistory: Colonization, Culture, and Complexity,* edited by T.L. Jones and K.A. Klar, 147–163. New York, New York: Altamira Press.

Schiffman, 1975. State of California Resources Agency Department of Parks and Recreation Archaeological Site Survey Record for P-15-000726. On file at Southern San Joaquin Valley Information Center.

Schulz, P. 1981. *Osteoarchaeology and Subsistence Change in Prehistoric Central California*. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California Davis.

Smith, A.R. 1964. Geologic Map of California, Bakersfield Sheet, Scale 1:250,000.

Sutton, M. Q. 2019. "The Buttonwillow Complex: A Proposed Western Stemmed Tradition Variant in the Southern San Joaquin Valley, California." California Archaeology 11 (2): 235-266.

Tretinjak, Christina, and Gregory T. Farrand. 2022. *Geological Desktop Assessment: Pelicans Jaw Hybrid Solar Project, Kern County, California.* Prepared by Ninyo & Moore Geotechnical and Environmental Sciences Consultants for Dudek.

Urbana Preservation and Planning LLC. 2019. Department of Parks and Recreation Primary Record for P-15-020558. On file at Southern San Joaquin Valley Information Center.

Urbana Preservation and Planning LLC. 2020. Department of Parks and Recreation Building, Structure, and Object Record for P-15-020558. On file at Southern San Joaquin Valley Information Center.

U.S. Climate Data. 2022. "Weather Averages Kettleman City, California." Accessed November 3, 2022. https://www.usclimatedata.com/climate/kettleman-city/california/united-states/usca1431.

USDA (U.S. Department of Agriculture). 2022. Web Soil Survey. Survey Staff, Natural Resources Conservation Service, U.S. Department of Agriculture. Accessed October 31, 2022. http://websoilsurvey.sc.egov.usda.gov/.

Wallace, W. J. 1978. Southern Valley Yokuts. In *Handbook of North American Indians*, R. F. Heizer. Washington, D.C., Smithsonian Institute. 8**:** 448-470.

Wallace, William J., and F. A. Riddell, Eds. 1993. *Finding the Evidence: The Quest for Tulare Lake's Archaeological Past.* Contributions to Tulare Lake Archaeology. Redondo Beach, California, The Tulare Lake Archaeological Research Group.

Wohlgemuth, E. 1996. "Resource Intensification in Prehistoric Central California: Evidence from Archaeobotanical Data." *Journal of California and Great Basin Anthropology* 18, No. 1, 81–103.

Wohlgemuth, E. 2004. *The Course of Plant Food Intensification in Native Central California*. Unpublished Ph.D. Dissertation. Department of Anthropology, University of California Davis.

Appendix A (Confidential)

APE and Resource Location Maps

Appendix B (Confidential)

Records Search Maps and Information

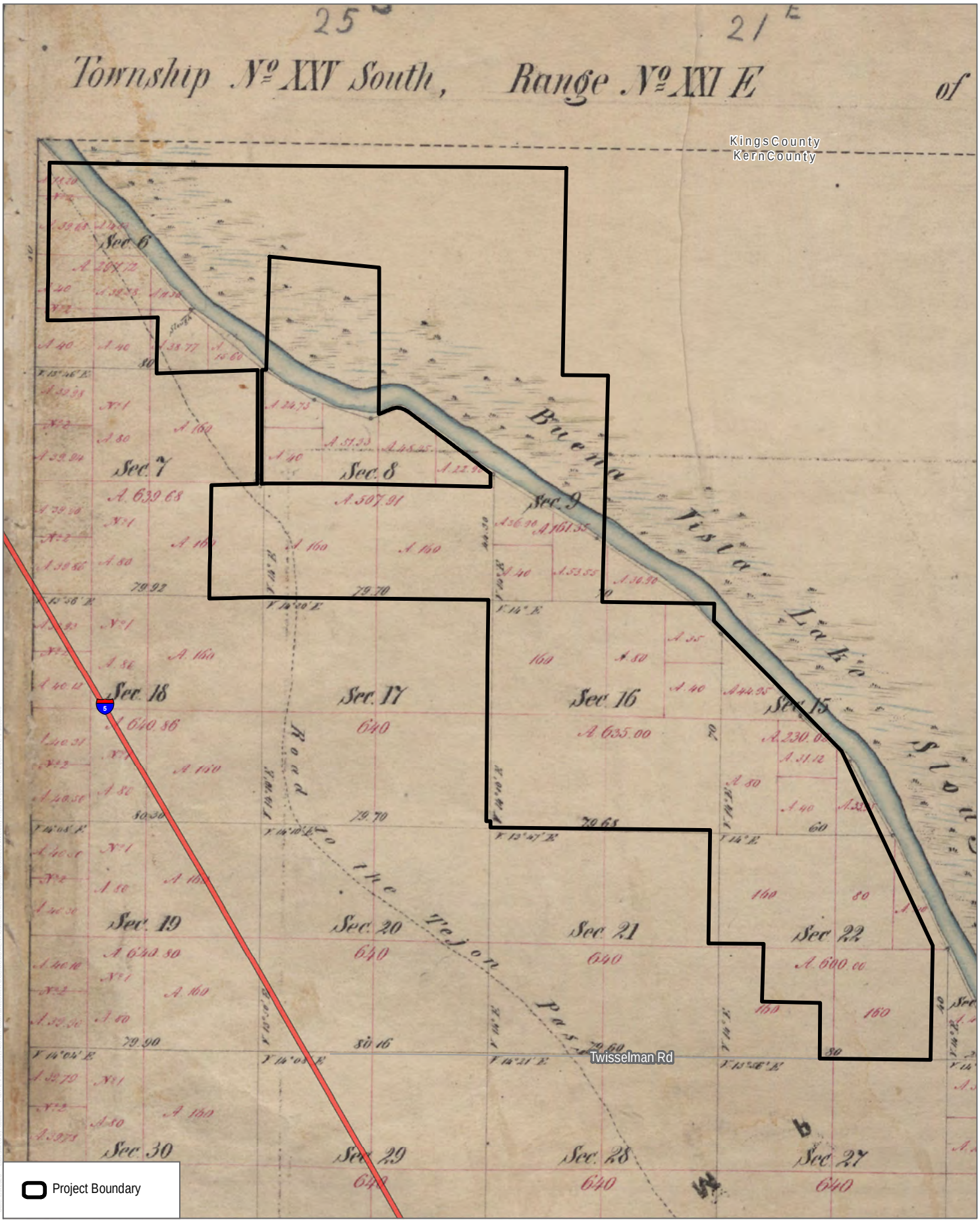
Appendix C (Confidential)

NAHC Sacred Lands File Search

Appendix D (Confidential)

Newly Recorded Resources

Appendix E
Historic Maps of the Project Site



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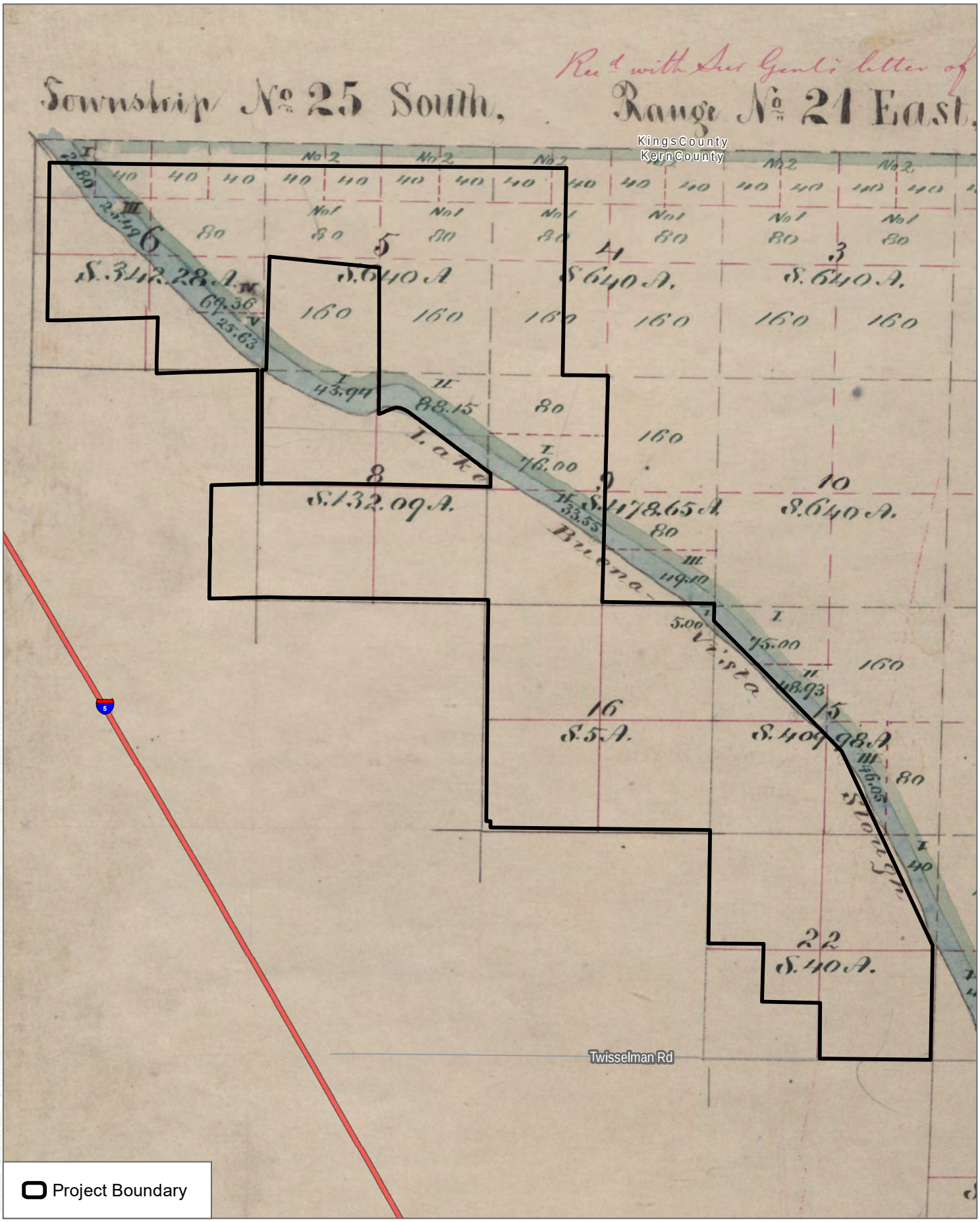
APPENDIX E-1

1856

Pelicans Jaw Hybrid Solar Project, Kern County, California



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APPENDIX E-2

1868

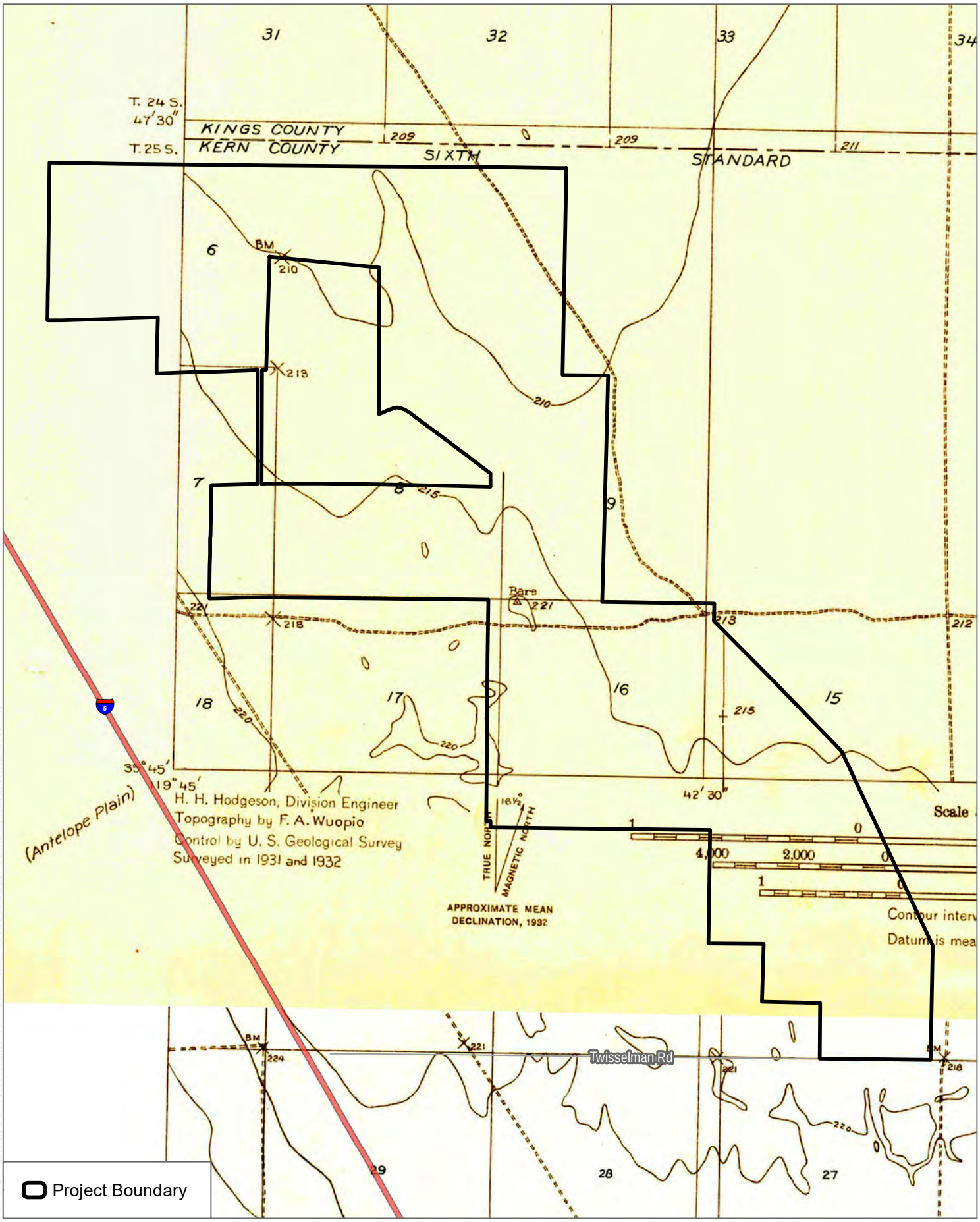
Pelicans Jaw Hybrid Solar Project, Kern County, California

SOURCE:

APPENDIX E-3

1873

Pelicans Jaw Hybrid Solar Project, Kern County, California



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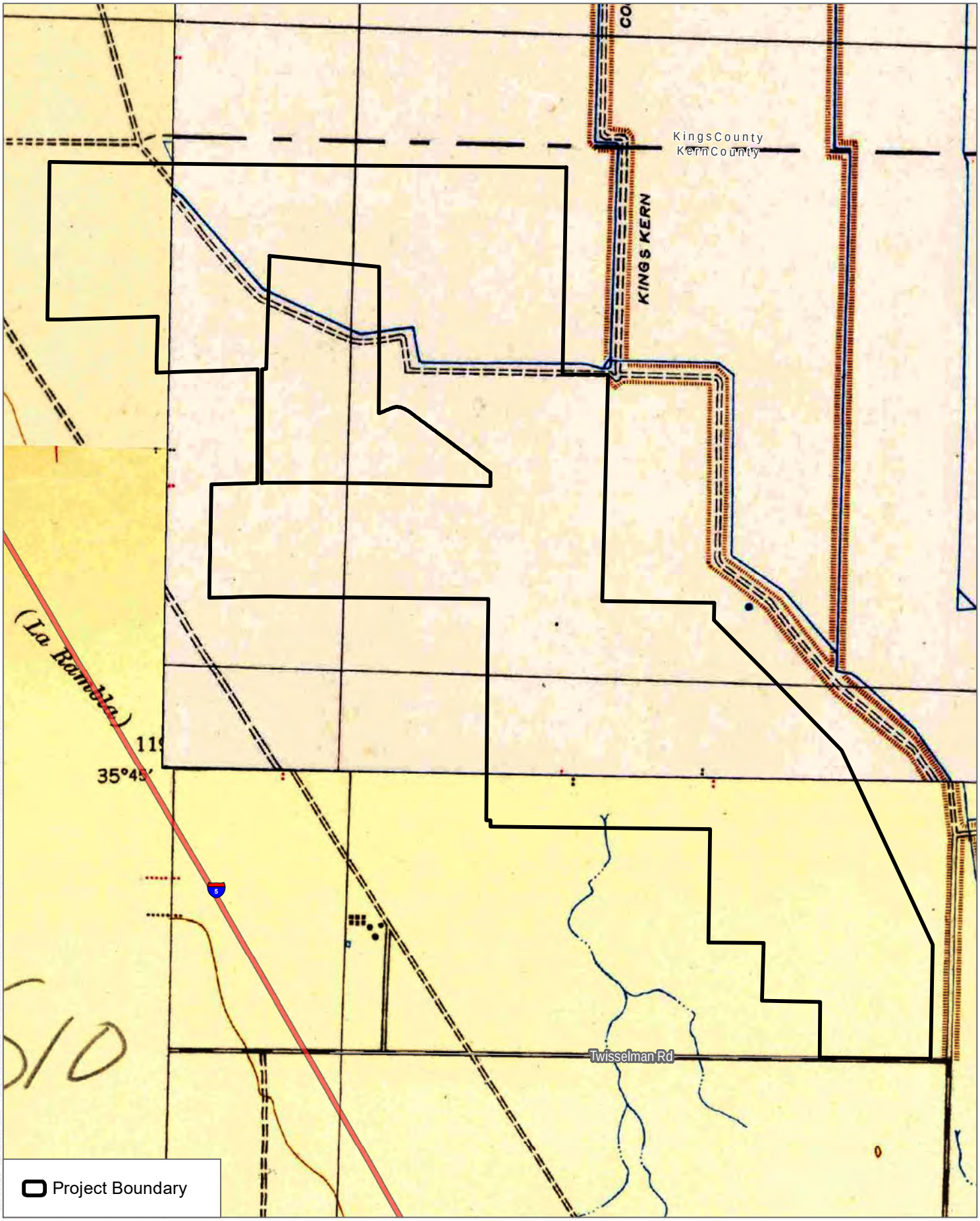

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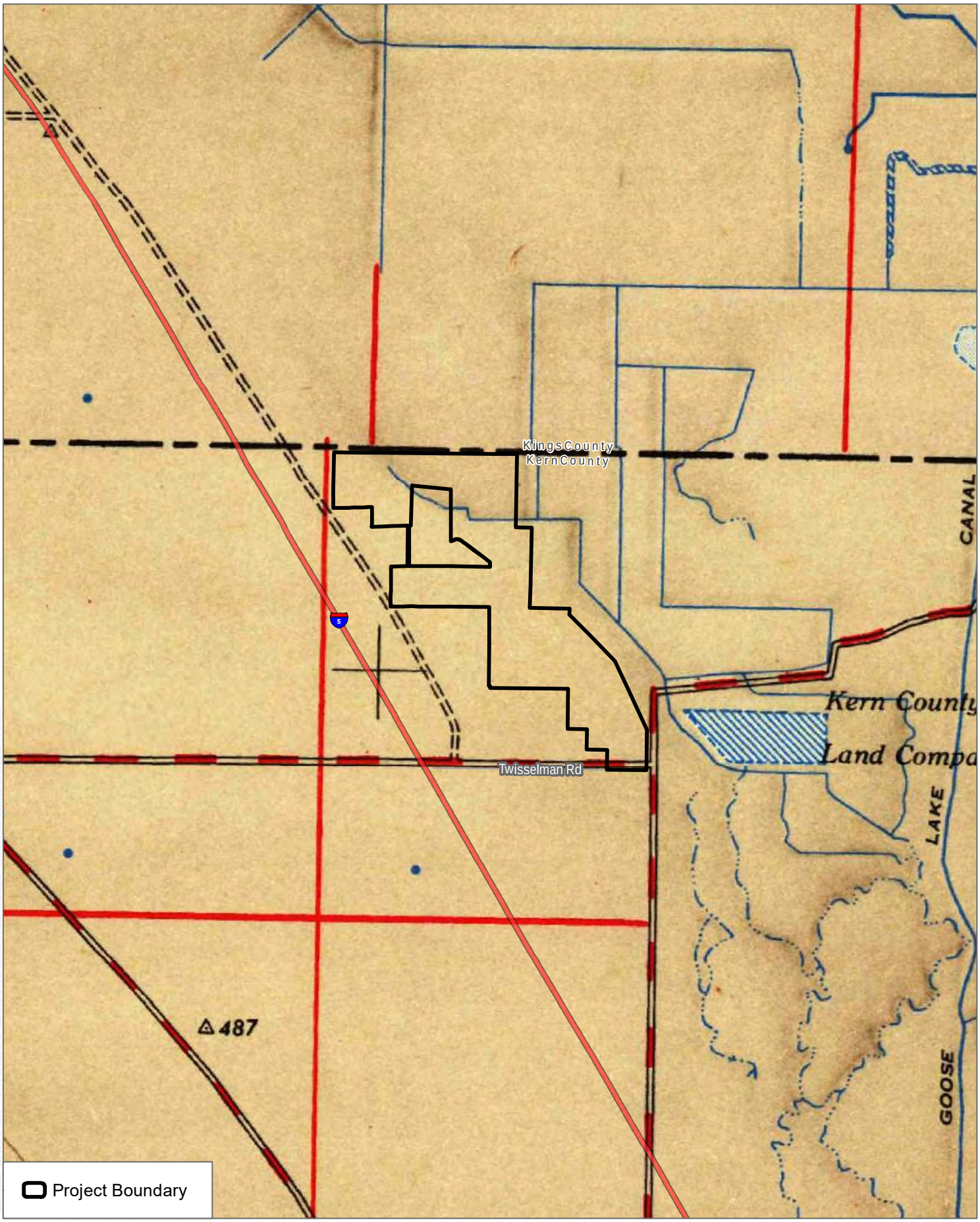

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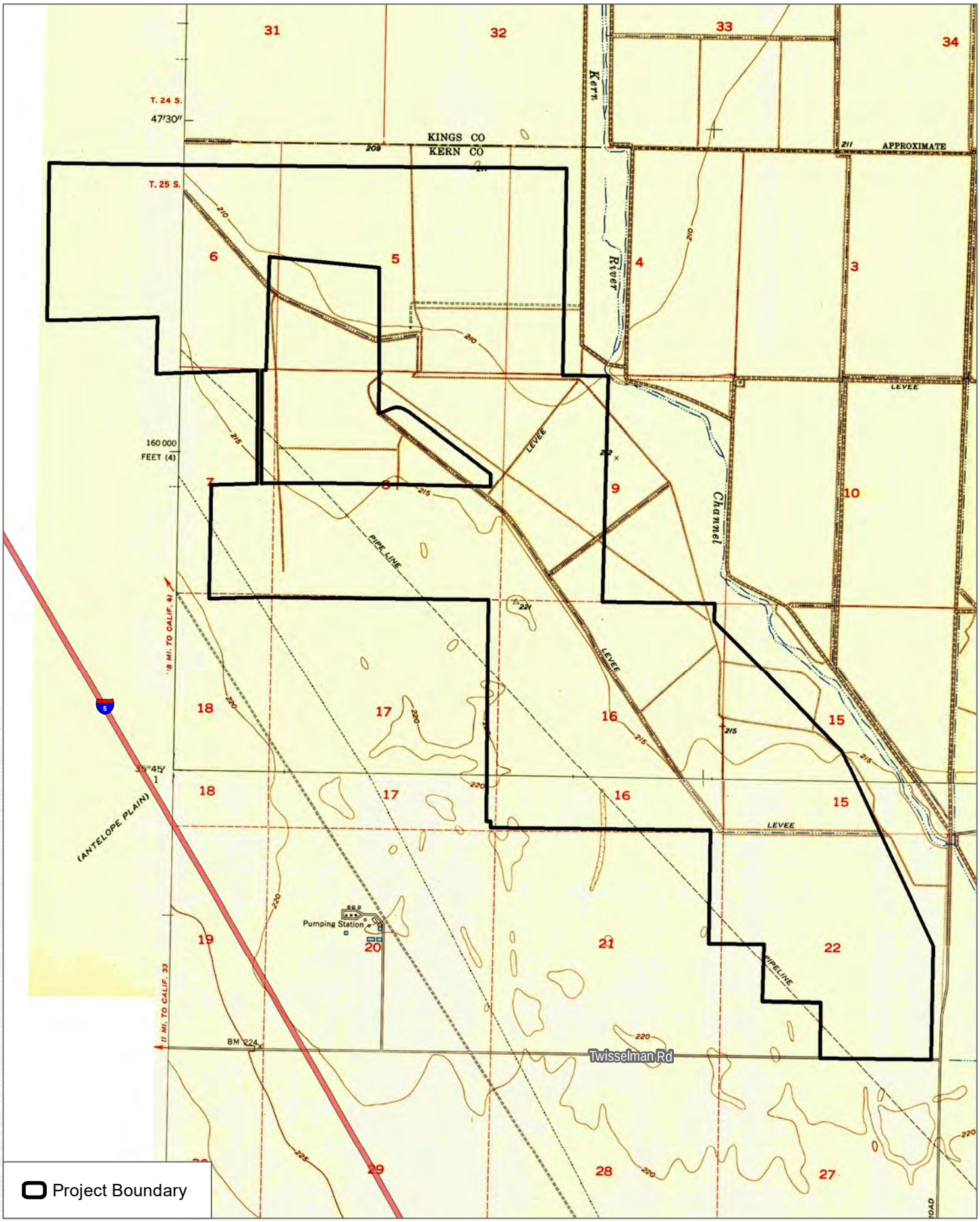
APPENDIX E-6

1948

Pelicans Jaw Hybrid Solar Project, Kern County, California



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APPENDIX E-7

1954

DUDEK

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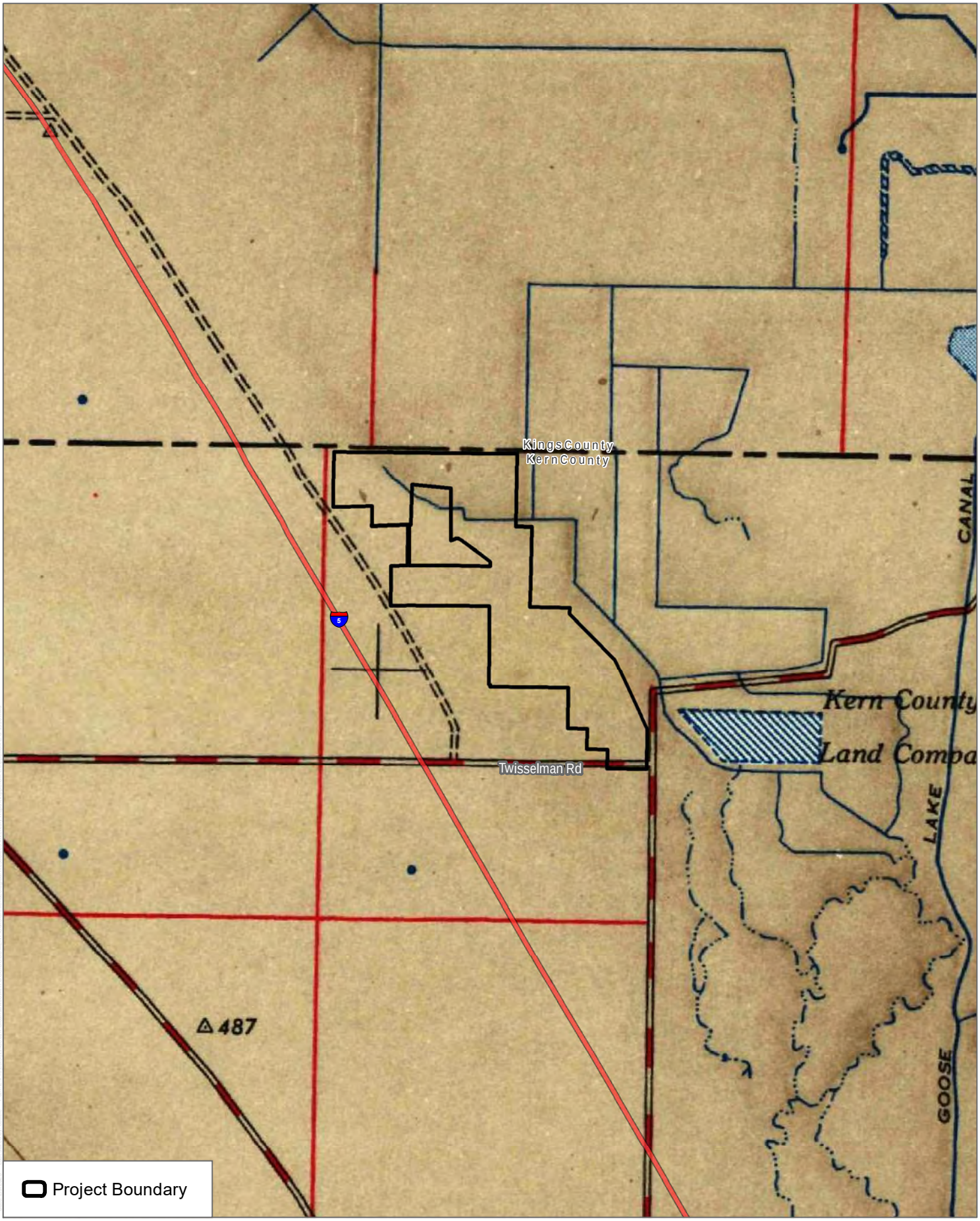
Pelicans Jaw Hybrid Solar Project, Kern County, California



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APPENDIX E-8

1956

Pelicans Jaw Hybrid Solar Project, Kern County, California

Appendix F

Resumes for Key Cultural Personnel

Adam Giacinto, MA, RPA

Archaeologist

Adam Giacinto is an archaeologist with more than 17 years' experience preparing cultural resource studies and environmental documents, and managing archaeological survey, evaluation, and data recovery-level investigations. His research interests include prehistoric hunter-gatherer cultures and contemporary conceptions of heritage. His current research focuses on the social, historical, archaeological, and political mechanisms surrounding heritage values.

Adam Giacinto

Professional Affiliations

Register of Professional Archaeologists

Society for California Archaeology American Anthropological Association Institute of Archaeomythology

American Anthropological Association

Selected Project Experience

Gonzaga Wind and Transmission Line Project, Pacheco State Park, California. As principal archaeological investigator, Mr. Giacinto coordinated more cultural resources inventory of more than 1,500 acres. This included a CHRIS records search, NAHC Sacred Lands file search, archaeological survey with 5 crew for a month, and preparation of two technical report s for CEQA (State Parks) and Section 106 (Bureau of Reclamation). Included evaluation of Pacheco Ranch Historical District components and recordation of multiple prehistoric and historic-era archaeological resources.

California High Speed Rail, Fresno-Bakersfield, California. As principal investigator, oversees, implements, and reports upon cultural inventory, evaluation, data recovery and compliance efforts under Section 106 of the NHPA, Federal Rail Authority, CEQA, and local Guidelines for Fresno to Bakersfield section. Oversight of Native American monitors, built environment specialists and archaeologists, management of cultural monitoring implementation and site treatment, client reporting, meetings and report preparation. Implementation of mitigation included exploratory archaeological investigations at multiple NAHC-eligible resources.

Tres Amigos Solar, Los Banos, California. As principal archaeological investigator, Mr. Giacinto oversaw cultural resources inventory of more than 1,500 acres. This included a CHRIS records search, NAHC Sacred Lands file search, archaeological survey with 4 crew for a month, and preparation of a technical report for CEQA (State Parks) and Section 106 (USACE).

South Lake Solar Project, Fresno County, California. As principal investigator, Mr. Giacinto coordinated a San Joaquin Valley Information Center (SJVIC) records search, Native American Heritage Commission (NAHC), review of existing information, and preparation of a Critical Issues Analysis.

Proxima Solar Project, Fresno County, California. As principal investigator, Mr. Giacinto coordinated a SJVIC records search, paleontological investigations, a NAHC search, review of existing information, coordination of over 1,000 acres of survey, and preparation of a Critical Issues Analysis, technical report, and MND update.

UC Merced Student Housing Project, Merced County, California. As principal investigator, Mr. Giacinto coordinated a CHRIS records search, NAHC and Native American correspondence (AB 52 and SB 18), archaeological and historic architectural survey, and preparation of a technical report. Mr. Giacinto prepared and reviewed management recommendations for CEQA considerations and Section 106 compliance.

Yokohl Ranch Development Project, The Yokohl Ranch Company, LLC, Tulare County, California. As co-principal investigator and field director, managed 15 archaeologists in conducting significance evaluation of 118 historical and prehistoric cultural resources throughout the 12,000 acre Yokohl Valley area. Operated as tribal interface, and facilitated the respectful handling and reburial of sensitive cultural material with the tribes, applicant, and NAHC.

Operations and Maintenance On-Call, Department of Water Resources. As primary Dudek archaeological and tribal resources consultatant, Mr Giacinto manages cultural resources projects for DWR. These inlude the Cultural Resources Inventory for the B.F. Sisk Dam Safety of Dams Modification Project, Delta Dams Raise Project (three reservoirs), MP 230 Project, and Upper Feather River Projects (three dam locations), preperation of a Programattic Agreement for Cultural resources for DWR, and a number of other Central Valley projects.

McCoy Solar Energy Project and Blythe Solar Power Project, Blythe, California. As principal investigator, Mr. Giacinto supervised, implemented, and reported upon compliance efforts for construction of more than 4000 acres of solar work under Section 106 of the NHPA, BLM Guidelines, CEQA, California Energy Commission, and County of Riverside Guidelines. Mr. Giacinto was the lead multiple formal trainings with monitors and council members from the Colorado River Indian Tribes regarding federal and state regulations relating to human remains, County and BLM guiding documents, identification of cultural material, and the multiple understandings of "cultural resources".

Wildlife Services Program EIR-EIS, CDFA/USDA. Dudek has developed template letters to be used for tribal notification, follow up, and consultation for this project. Dudek drafted, and mailed letters on behalf of CDFA, letters to all 216 NAHC-listed contacts in the state of California. Responses received are tracked, reviewed with the agency, and responded to. In addition, outreach letters prepared by the USDA were reviewed and modified for the purposes of Section 106 consultation.

AB 52 Support. Since helping to establish the present process of AB 52 consultation with City of Los Angeles in 2015, Mr Giacinto has been contracted to prepare dozens of TCR reports. The goal of these investigations is to review the archaeological, historical, academic, and ethnographic record for potential TCR information, then gound contemporary AB 52 consultation information in this context while providing recommendations related to reasonable approaches for Management. In addition, Mr. Giacinto provides on-call suppport for helping a number of agencies work through challenginf AB 52 issues. The most reocurring include the Cities of Danville, Rohnert Park, Auburn, and Novato.

North 16th Street Improvement Project, Sacramento, California. As Principal archaeological investigator, Mr. Giacinto coordinated a NCIC records search, NAHC and Native American information outreach, archaeological and historic architectural survey, DPR 523 building forms, and preparation of a technical report under CEQA regulatory context. An appropriate mitigation strategy was developed for this cultural inventory.

Pacific Gas& Electric Vegetation Management, Central Valley and Western Central Sierras, California. As Co-Principal archaeological investigator, Mr. Giacinto collaboratively coordinates a team in completing survey, monitoring , cultural reviews, tribal coordination, and other related documentation required for PG&E vegetation management projects throughout the Central Valley and western Sierra Nevada's. To date, 350 task orders for individual projects have been completed.

Ross Owen, MA, RPA

Archaeologist

Ross Owen is an Archaeologist with 6 years' experience conducting Phase I and II archaeological surveys. Working on identification-level surveys Mr. Owen has acclimated to working on a diverse range of site types and landforms which has contributed to his knowledge of material culture, site formation processes, and soil development, primarily in the mid-Atlantic region, California, and Nevada.

In his role as a field/lab technician and as a field director, Mr. Owen has been involved in all stages of completing Phase I and II surveys and evaluation for compliance with Section 106 of the NHPA as well as CEQA. He also carries experience in records searches and archival work, tribal consultation, data management, field excavation, and laboratory processing. Outside of work he has sought out opportunities to present research in academic settings, speak with the public about archaeology to better communicate archaeological significance to the public.

Education

Indiana University of Pennsylvania
MA, Applied Archaeology

Boston University
BA, Archaeology

Certifications

Register of Professional Archaeologists (RPA), No. 18014

Professional Affiliations

Society for American Archaeology

Project Experience

Martis Wildlife Area Restoration Project, Placer County, California. Performed demarcation of Environmentally Sensitive Areas (ESAs) in advance of construction association with wetland restoration efforts for the U.S. Army Corps of Engineers, Sacramento District and Truckee River Watershed Council. Archaeological monitoring during construction. Fieldwork to prepare a Performance Work Statement (PWS) for the Army Corps of Engineers to assess impacts to CA-PLA-5. Preparation of reports documenting monitoring and PWS efforts and results.

Martis Valley Trail Segment 3F, Placer County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Robinson Mine Conditional Use Permit Modification, Placer County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area.

El Dorado Irrigation District Pacific Tunnel Rehabilitation, El Dorado County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings, and DPR update to portion of the Mormon-Carson Emigrant Trail re-located but not impacted by project design. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Fish Springs Ranch Solar Energy Center Project, Washoe County, Nevada. Performed 4 months of monitoring. Completed survey and recordation of archaeological sites. Attribute analysis in field of prehistoric and historic resources. Conducted records search review and compilation for report. Reporting of field survey results for Nevada Bureau of Land Management, and preparation of Intermountain Antiquities Computer System (IMACS)

forms documenting new sites and updates to previously recorded sites. Guided field view of resources recorded on private lands with Next Era and Pyramid Lake Paiute Tribal Historic Preservation Officer.

Nevada Street Phase II, City of Auburn, Placer County, California. Performed archaeological monitoring of intersection realignment and utility work along Nevada Street in Auburn, California. Reported monitoring actions and results to City of Auburn and NexGen.

Round Mountain Area Project – Table Mountain Site, Butte County, California. Conducted archaeological survey and reporting for a proposed power generation facility in Butte County.

Heartland Solar Development Project, Fresno County, California. Led crew for survey of 2,000+ acre archaeological survey of a proposed solar energy project.

Gonzaga Wind Repowering Project, Merced County, California. Performed archaeological survey for California Department of Parks and Recreation Four Rivers District proposed wind farm, associated access roads and transmission lines.

Dodge Flat Solar Energy Center, Washoe County, Nevada. Prepared and reviewed BLM submission packet containing final drafts of report and BLM-required digital data. Submitted to Nevada BLM Sierra Front Field Office.

Blythe Solar Power Project, Riverside County, California. Compiled monitoring logs and weekly monitoring summaries to submit to client.

J. Chen Stone Ave Tech Studies 4050 Grange Road, Sonoma County, California. Conducted in-person records search and review at the Northwest Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Cloverdale Unified School District Project, Sonoma County, California. Conducted archaeological survey and reporting for proposed athletic facilities for the Cloverdale Unified School District. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

California State University – Chico Master Plan EIR, Butte County, California. Conducted archaeological survey and reporting of survey results. Assisted in compilation of archaeological report for Master Plan EIR document.

Woodland Community College Performing Arts and Culinary Services Facility Project, Yolo County, California. Conducted archaeological survey and reporting for a proposed university facilities expansion in Yolo County.

Arlington Solar Energy Project, Riverside County, California. Assisted in relocating, sketching and sub-meter accuracy GPS recording of WWII-era military training features as required by a Historic Preservation Treatment Plan drafted to mitigate adverse effects on National Register-eligible archaeological resources.

Dowdell Industrial Park, City of Rohnert Park, Sonoma County, California. Conducted records search review and integrated results into report meeting United States Army Corps of Engineers standards for Section 106 and CEQA compliance.

Ebbetts Pass Reach 1 Water Transmission Pipeline Capital Improvement Project, Calaveras County, California. Performed archaeological monitoring during construction of waterline by Calaveras County Water District. Conducted an evaluation for eligibility for the National Register of Historic Places for an unanticipated discovery found during construction. Prepared DPR site form and report documenting the site and site evaluation efforts. Consultation with the Calaveras Band of Mi-Wuk Indians and Caltrans District 10 throughout monitoring and site evaluation efforts.

William Burns, RPA

PROJECT ARCHAEOLOGIST

William Burns (*WILL-ee-em BURNS; he/him*) is an archaeologist with 18 years' experience in cultural resource management. Mr. Burns is highly knowledgeable about the California Environmental Quality Act, the National Environmental Policy Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act, particularly the Section 106 process. He evaluates buildings and districts for archaeological sensitivity and possible inclusion on the National Register of Historic Places. Mr. Burns assesses project and building plans for archaeological sensitivity and reviews archaeological reports on the state government regulatory end of the process.

Mr. Burns possesses expertise about pre-contact archaeological sites, paleocoastline reconstruction, and artifact identification and analysis. He applies this expertise to archaeological report writing and editing for Section 106 projects. He also serves on field crews and as a supervisor on archaeological projects, overseeing surveys, site examinations, data recoveries, and artifact database creation and maintenance. For precise site mapping, Mr. Burns uses GPS devices, primarily Trimble GEO XH, ArcGIS, and Maptitude.

Education

University of York
MS, Coastal and Marine Archaeology, 2010,

University of Massachusetts at Amherst
BA, Anthropology (Mathematics minor), 2004

Certifications

Register of Professional Archaeologists (RPA)

Divemaster (National Association of Underwater Instructors)

Occupational Safety and Health Administration (OSHA) HAZWOPER (40-hour)

Basic First Aid/BBP (American Heart Association)

Adult CPR/AED (American Heart Association)

Dudek Project Experience

Alameda County Advanced Meter Infrastructure Project, Alameda County, California. The project proposed to upgrade existing traditional water meter reading systems within its service area with an Advanced Metering Infrastructure system across 84,200 existing meters. As project archaeologist, performed the records search and reviewed and summarized the data of the approximately 41,000-acre project area. Reviewed geomorphological data for the project site and developed a sensitivity model and monitoring plan for the project.

Solar Panel Installation Project, Santa Clara County, California. The project consisted of the installation of solar facilities at 14 sites across the County of Santa Clara. Conducted surveys and site visits to all 14 work sites, documenting existing conditions on several historic structures. Prepared the cultural resources report.

Advanced Meter Infrastructure Project, Santa Clara County, California. Served as project archaeologist on this countywide project to upgrade metering systems for the San Jose Water Company at 16 locations. Tasks included conducting the records search, performing a survey at each of the 16 sites, and preparing the cultural resources report. Two historic structures were identified during the study.

Delta Dams Burrow Remediation Project, California Department of Water Resources, Alameda and Contra Costa Counties, California. Project consisted of maintenance conducted at three separate reservoirs to repair damage cause by rodent burrowing. As project archaeologist, performed the cultural survey at each location, conducted records searches, and prepared the cultural resources report.

B.F. Sisk Dam Safety of Dams Project, California Department of Water Resources, Merced County, California. The B.F. Sisk Dam Safety of Dams Project consisted of repairs and maintenance of the historic dam. The vicinity around the dam contained many historic features of the dam's construction, as well as prehistoric sites including reported burials. Performed the cultural survey documenting these resources, conducted records search, and prepared cultural resources report.

San Geronimo Treatment Plant Emergency Generator Project, Woodacre, California. Performed the cultural survey of local municipal water treatment plant in anticipation of the installation of plant-wide upgrades. Additionally conducted records search and prepared cultural resources report.

Rohnert Park Water Tank Project, City of Rohnert Park, California. As project archaeologist and field director, led crew for an extended phase I field survey, including subsurface testing around a newly discovered prehistoric resource. Prepared the cultural resources report for the extended phase I.

El Dorado Irrigation District Flume Replacements, El Dorado Irrigation District, El Dorado County, California. Conducted field survey of system of flumes, historic and recent, for a series of repairs and upgrades. Resources located included mining camps and features, historic logging roads and retaining walls, and Native American milling sites. Prepared the proper Department of Parks and Recreation (DPR) site forms and the cultural resources report.

Las Gallinas Valley Sanitary District Secondary Treatment Upgrade Project, Las Gallinas Valley Sanitary District, Marin County, California. Conducted field survey and prepared the cultural resources report for water treatment plant improvements.

Mission College Plaza Completion Project, Santa Clara, California. Conducted the records search, performed pedestrian survey, and prepared cultural resources report for university redevelopment project.

San Carlos Fuel Management Project, California Department of Forestry and Fire Protection, San Carlos, California. Project consisted of the California Department of Forestry and Fire Protection's controlled burn of vegetation to control potential wildfires in the San Carlos area. As project archaeologist, performed the cultural survey, conducted records search, and prepared cultural resources report.

Selected Publications

Burns, W., K. Haley, and A. Giacinto. 2021. *Cultural Resources Assessment Report, County of Santa Clara Solar Panel Installation Project.* Dudek No. 12853, County of Santa Clara, California.

Burns, W., R. Owen, and A. Giacinto. 2020. *Cultural Resources Inventory for the Advanced Meter Infrastructure Project, Santa Clara County, California.* Dudek No. 11567, Santa Clara County, California.

Giacinto, A., W. Burns, N. Hanten, F. Steffen, and K. Haley. 2019. *Cultural Resources Inventory and Monitoring Plan for the Alameda County Water District Advanced Metering Infrastructure Project.* Dudek No. 11567, Alameda County, California.

Nicholas Hanten, MA

Archaeologist

Nicholas Hanten is an archaeologist with 12 years' experience conducting and leading archaeological projects including archaeological survey, evaluation, and data recovery investigations, construction monitoring in addition to laboratory procedures including artifact cataloging, analysis, and curation preparation. He also has experience with technical report writing for compliance with local, state, and federal regulations. Mr. Hanten's research interests include prehistoric hunter-gatherer subsistence and settlement systems, prehistoric land use, and human behavioral ecology.

Education

University of California, Davis
BS, Anthropology, 2011
University of California, Davis
MA, Anthropology, 2011
University of California, Davis
PhD, Anthropology, in progress

Selected Project Experience

Sacramento International Airport Cargo Facility Project, Sacramento County, California. As field lead, coordinated and performed archaeological survey; co-author of technical report

Carson Creek Environmental Impact Report. El Dorado County, CA As archaeologist conducted pedestrian survey.

Cultural Resources Inventory, Extended Phase I and Phase II for the Hunter Subdivision Project. As archaeologist, assisted with field excavations; coauthor of technical report

Rancho Seco Solar II Project, Herald CA, As archaeological monitor, monitored the installation of solar energy facility in collaboration with Native American monitors

Martis Wildlife Area Resoration Project, Truckee, CA. As archaeologist, duties included construction monitoring, assisting with field excavations, laboratory analysis. Co-author of technical report/site impacts assessment

Phase II Archaeological Significance Evaluations for the Strauss Wind Energy . As lab director and artifact analyst, supervised cataloging of and performed analysis on large archaeological assemblage. Also assisted with field excavation and was coauthor of technical report

El Dorado Hills Wastewater Collection Facility Relocation Project, El Dorado County, California As archaeologist, conducted pedestrian survey and resource documentation for the project

Cultural Resources Study for Kings Beach Elementary School Modernization, Kings Beach, Placer County, California As field archaeologist, conducted pedestrian survey and resource documentation for archaeological and built environment studies for the project

Cultural Resources Inventory for the City of Woodland Recycled Water Project, Yolo County, California As archaeologist, conducted pedestrian survey and resource documentation for project. Co-author of technical letter report

Truckee High School Track and Field Improvements Project, Truckee, Placer County, CA As archaeologist, conducted pedestrian survey and resource documentation for project. Co-author of technical report

Camp 5 Notice of Emergency Timber Operations Project, El Dorado County, CA As archaeologist, conducted pedestrian survey of the project area. Co-author of technical report

Yokohl Ranch Cultural Resources, The Yokohl Ranch Company, LLC, Tulare County, California. As field director, managed and conducted surface mapping, surface collection, and excavation of 95 prehistoric and historical period sites throughout the Yokohl Valley. As lab director, managed and conducted the cataloging and analysis of all material recovered during excavation and authored laboratory portions of the technical report.

Phase II Evaluation of 85 Archaeological Sites on Edwards Air Force Base, CH2M HILL/JT3, Kern and Los Angeles Counties, California. As crew chief, assisted in test excavations, pedestrian survey, and GPS data collection with a Trimble GPS unit. Also assisted with laboratory analysis and curation preparation.

Phase I Cultural Resources Inventory of 7650 acres on Edwards Air Force Base, CH2M HILL/JT3, Kern County, California. As crew chief, assisted in pedestrian survey and GPS data collection with a Trimble GPS unit, and wrote portions of report.

Winchester 1800 – Saba Property, French Valley Acres LLC, Riverside, California. As field director, conducted pedestrian survey of 40 acres for a proposed housing development; prepared a letter report of findings.

Poseidon Wetland Mitigation Area, Poseidon Water LLC, San Diego, California. As lab director, managed the cataloging and analysis of artifacts recovered from excavations; assisted in authoring final report of findings.

Alessandro Business Park, Western Realco, Riverside, California. As archaeological monitor and crew chief, monitored the excavation of potholes and trenches in collaboration with Native American monitors; recorded and excavated five prehistoric archaeological sites

Evaluation of SDI-13,077H and Data Recovery at SDI-13,078 for the Rhodes Crossing Project, San Diego County, California. As part of crew, assisted in test excavation and pedestrian survey.

St. John Garabed Church Environmental Services, St. John Garabed Apostolic Church Trust, San Diego, California. As crew chief and lab director, assisted in conducting test excavations for one prehistoric site; managed the cataloging and analysis of recovered artifacts; assisted in preparing a report of findings.

Lady of Peace Academy Parking Structure Cultural Monitoring, T.B. Penick & Sons Inc., San Diego, California. As crew chief and lab director, assisted in conducting test excavations for one historic site for during project monitoring. Managed the cataloging and analysis of recovered artifacts.

Cultural Resource Study for the Kearny High School Athletic Field Redevelopment, BRG Consulting, San Diego, California. As crew chief, conducted pedestrian survey and wrote report.

Significance Evaluation of SDI-20363 for the San Marcos High School Expansion Project, San Marcos Unified School District, San Diego County, California. As crew chief, assisted in test excavations and GPS data collection for a buried prehistoric site.

Ocotillo Wind Energy Project, Bureau of Land Management (BLM), Imperial County, California. As third-party monitor, monitored construction activities and archaeological monitors to ensure that all activities were in compliance with BLM regulations.

Block 12 Development, Aera Energy, LLC., Bakersfield, California. As field director, conducted a pedestrian survey of 32 acres for a proposed oil field expansion; prepared a letter report of findings

Solar Site Development Environmental Services, Soitec Solar, San Diego, California. As field director, conducted pedestrian survey of 12 acres for a proposed solar generation facility.

Archaeological Evaluation for the Rugged Solar Project, County of San Diego, California. As crew member, assisted in test excavation, pedestrian survey, and GPS data collection with Trimble GPS unit.

Silurian Valley Wind Project, Iberdrola Renewables, San Bernardino County, California. As monitor, conducted pedestrian survey of access routes and monitored construction activities.

Gold Basin Project Meteorological Mast Construction, LH Renewables, San Diego County, California. As monitor, conducted pedestrian survey of the project area and monitored construction activities.

Significance Evaluation of Four Prehistoric Archaeological Sites for the GCL/Rosendin Sol Focus Project, RBF Consulting, Borrego Springs, California. As crew chief, assisted in test excavations at prehistoric temporary camps.

Phase I Cultural Resources Pedestrian Survey of Various Parcels for the Sol Orchard Solar Project, RBF Consulting, San Diego County, California. Serving as crew chief, conducted intensive pedestrian survey of multiple parcels for solar development.

Class II and Class III Cultural Resources Inventory for the Tule Wind Alternative Energy Project, HDR Engineering for Iberdrola Renewables, San Diego County, California. Serving as field technician, assisted in pedestrian survey and site recordation.

Sunrise-Powerlink Project, San Diego Gas and Electric, San Diego County, California. As crew chief, conducted small pedestrian surveys and monitoring for utility pole replacement.

Cultural Resource Monitoring for the Red Beach Mobile Mount Project, Marine Corps Base (MCB) Camp Pendleton, San Diego County, California. Serving as monitor, conducted small pedestrian survey and monitored construction activities.

Archaeological Investigations at SDI-9824, MCB Camp Pendleton, San Diego County, California. Serving as crew chief, assisted in archaeological excavation, ground-penetrating radar, and X-ray fluorescence study of a late prehistoric archaeological site.

Section 106 Evaluations of Two Prehistoric Sites for Firebreak Maintenance, Vandenberg Air Force Base, Santa Barbara County, California. As student assistant, assisted in test excavations at complex prehistoric habitation sites for the University of California, Davis, Field School.

Carlsbad Desalination Plant Cultural and Biological Monitoring, Poseidon Resources, Carlsbad, California. As archaeological monitor, monitored trenching, grading, and the installation of water lines.

Cultural Resources Testing for the Silver Strand State Beach Project, California State Parks, San Diego County, California. As crew chief, conducted pedestrian survey and test excavations, and assisted in report production.

Archaeological Survey and Evaluations for the Star Ranch Project, County of San Diego Department of Planning and Land Use, San Diego County, California. As lab technician, cataloged and analyzed the assemblage recovered from a previous testing of the project area.

Julie Royer, MA

ARCHAEOLOGIST

Julie Royer is an archaeologist with 6 years' experience conducting archaeological projects throughout California and more recently in Nevada, Virginia, and Wyoming. Her involvement includes archaeological survey, evaluation, and data recovery-level investigations; construction monitoring; and laboratory procedures including artifact cataloging and analysis.

In her role as a crew lead and field director, Ms. Royer has been managing large-scale data recovery investigations and monitoring efforts. She also carries experience in records searches, tribal consultation, data management, and technical report writing for compliance with local, state, and federal regulations. Additionally, Ms. Royer creates digital content for reports, including unit profile drawings and various sketches.

Ms. Royer's background is in European archaeology, and she has been involved with Medieval and Gallo-Roman projects in France.

Education

University of Nantes
MA, Archaeology, 2013

Cardiff University
MA, Anthropology, 2012

University of Nantes
BA, History of Art and Archaeology, 2011

Certifications

CPR/First Aid

Hazardous Waste Operations and Emergency Response 24-hour Course

Incident Command System 100

Roadway Worker Protection (RWP)

Professional Affiliations

GRAF'O – Society for River Archaeology in Western France

Society for California Archaeology

Relevant Project Experience

Energy

Confidential Solar Project, Nevada. Participated in the archaeological investigation of a 8,800-acre project by performing pedestrian survey and recording dozens of archaeological resources.

Confidential Wind Energy Project, Santa Barbara County, California. As a field director, managed field crews for data recovery-level investigations at three large prehistoric sites. Tasks included field logistics, crew coordination and management, and the creation and implementation of a field research plan. Also conducted a cultural resource assessment of the proposed wind turbine farm installation. Tasks included a Phase I survey, using Trimble Geo 7X, ESRI Collector, and a compass.

Confidential Solar Project, Wyoming. Led crew to perform a 1,550-acre pedestrian survey and participated in the preparation of a cultural resources report.

Confidential Solar Project, Virginia. Participated in the archaeological investigation of a 2,980-acre project by performing pedestrian survey and excavation of shovel test probes. Recorded archaeological sites and participated in the reporting effort.

Archaeological Site Monitoring Program for the Pit 3, 4, and 5 (FERC No. 233), Hat Creek (FERC No. 2661), and Pit 1 (FERC No. 2687) Hydroelectric Projects, Pacific Gas & Electric, Shasta County, California. Since 2018, participated in the Section 106 reporting for the results of the yearly monitoring program of over 140 archaeological sites related to the Pit 1 (FERC No. 2687), Hat Creek (FERC No. 2661), and Pit 3, 4 and 5 (FERC No. 233) Hydroelectric Projects. Tasks also included conducting archaeological monitoring for road maintenance and gate installation work for the Pit 1 Project.

Infrastructure

Cultural Resources Inventory for the Spectrum Charter Fiber Optic Lines, California Department of Transportation, Monterey County, California. Conducted an archaeological survey along 6 miles of State Route (SR) 1, 14 miles of SR-68, and 3.1 miles of SR-183; recorded 3 sites and 2 isolates; updated 16 previously recorded resources; tested excavations at 2 sites along SR-183.

Resource Management

Highway 17 Shaded Fuel Break Project, Santa Clara County FireSafe Council and California Department of Forestry and Fire Protection, Santa Clara County, California. Participated a 494-acre archaeological survey; recorded 38 sites and 11 isolates; updated two previously recorded site records; met with representatives from California Department of Forestry and Fire Protection, California Department of Transportation, and Santa Clara FireSafe Council to help the principal investigator organize and facilitate project activities; monitored work areas within archaeological sites; and participated in the reporting effort.

McArthur Swamp Stock Tank and Cross Fencing Improvement Project, Fall River Resource Conservation District, Shasta County, California. Conducted a 66-acre Phase I survey and participated in the site record documentation and report writing.

Vegetation Management Cultural Reviews, Pacific Gas & Electric, Santa Cruz, Monterey, Mariposa, Fresno, and Madera Counties, California. Conducted cultural reviews, survey, and monitoring for various Pacific Gas & Electric vegetation management projects.

Transportation

Caltrain Peninsula Corridor Electrification Project, Peninsula Corridor Joint Powers Board, San Francisco, San Mateo, and Santa Clara Counties, California. As field director, managed archaeological monitoring needs, provided monitor trainings, and coordinated with Native American monitors and construction crews. Conducted archaeological testing and post-field processing of archaeological excavations along the Caltrain corridor. Post-field tasks included analyzing historic glass, completing site record forms for 30 sites, and participating in the reporting effort.

Spectrum Charter Line Hwy 1 and Hwy 68 Project, Charter Communications, Monterey County, California. Conducted a Phase I survey and completed primary site records for newly identified resources.

High Speed Rail Geotechnical Project, Dragados-Flatiron Joint Venture, Corcoran, California. Participated in the Phase III data recovery of a disturbed human burial at Whitley Avenue in Corcoran.

Water/Wastewater

Purissima Hills Water Main Project, Purissima Hills Water District, Los Altos Hills, California. Provided WEAP training for construction workers and conducted archaeological monitoring.

San Felipe Creek Restoration Project, Habitat Restoration Sciences, Santa Clara County, California. Conducted archaeological survey, monitoring, and reporting of historic ranching features and prehistoric isolates for a wetland restoration project.

ERC Stormwater Upgrades Area Project, University of California, Santa Cruz, California. Provided WEAP training for construction workers and conducted archaeological monitoring.

Appendix H

Geological Desktop Assessment

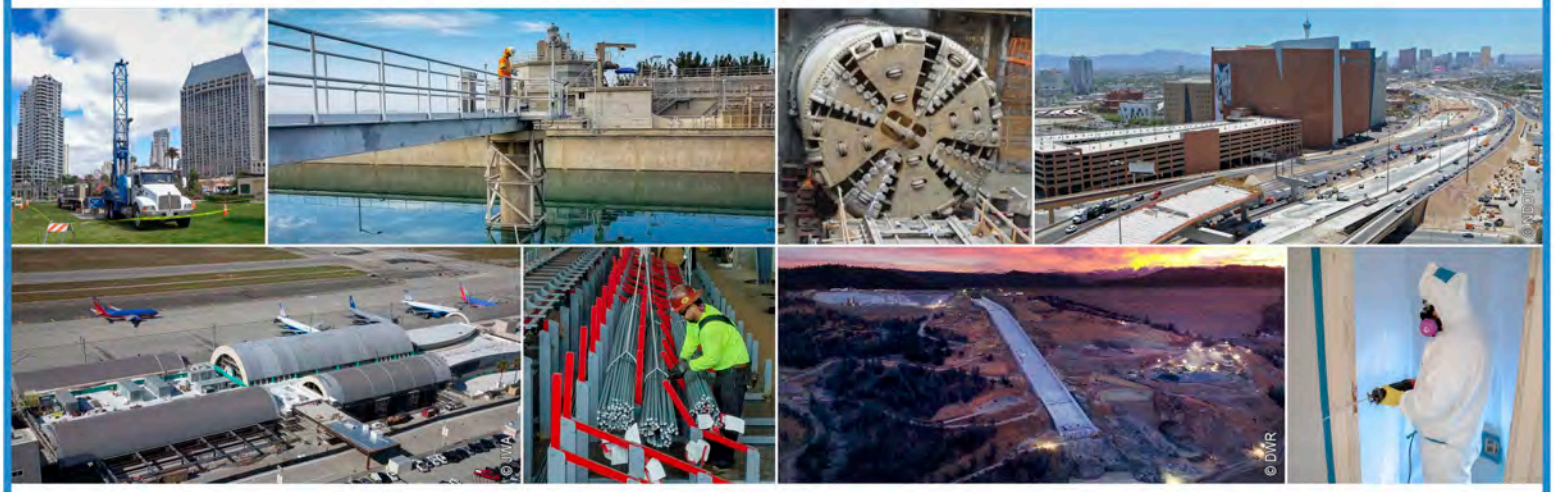
Geological Desktop Assessment

Pelicans Jaw Hybrid Solar Project

Kern County, California

Dudek
605 Third Street | Encinitas, California 92024

February 13, 2023 | Project No. 109436001



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35+ YEARS

Geological Desktop Assessment

Pelicans Jaw Hybrid Solar Project

Kern County, California

Mr. Keith Carwana
Dudek
605 Third Avenue | Encinitas, California 92024

February 13, 2023 | Project No. 109436001

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EXECUTIVE SUMMARY

The proposed Pelicans Jaw Hybrid Solar Project is located approximately 8 miles north of Lost Hills, a census-designated place, in unincorporated Kern County in the San Joaquin Valley in central California. The solar generation site (project site) is bounded by the Kern County and Kings County line to the north, the Kern River to the east, Twisselman Road to the south, and Interstate 5 to the west. Specifically, the project site consists of an area approximately 3,371-acres in size. Elevations across the site range from approximately 210 feet above mean sea level (MSL) in the eastern portion of the site to approximately 220 feet above MSL in the northwestern portion of the site.

The project area is generally undeveloped, with the exception of a few farm-related structures located near the southwestern portion of the project area. The site is currently privately-owned and is being used for livestock grazing.

Based on the geologic and geotechnical considerations at the project site presented in this desktop study, we recommend further geotechnical evaluation of the project site, including subsurface evaluation and laboratory testing, with specific recommendations to be addressed in the project's 90% design construction drawings prior to issuance of grading and building permits, as follows:

- Surface and near-surface soils at the project site are mapped as alluvial basin and fan deposits (Smith, 1964). Fill materials associated with the construction of the existing roadways utilities as well as agricultural topsoil are also anticipated at the project. Geotechnical constraints related to soils at the project are:
  - *Soft Ground* – Areas with soft ground or loose soils can be found throughout the project.
  - *Expansive Soils* – The project soils are expected to have a moderate potential for expansion.
  - *Fill Soils* – Man-made fill soils placed without engineering supervision may be loosely or inadequately compacted, may contain oversize materials unsuitable for reuse in engineered fills, and may contain unsuitable organic or expansive materials and debris that may preclude their use in engineered fills.
- The closest known major active fault is the Great Valley 14 Fault, which is located approximately 20 miles west of the project. Geotechnical constraints related to faulting and seismic events at the project are:
  - *Ground Shaking* – The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults.
  - *Liquefaction* – Fan or basin deposits (where shallow groundwater is present) may be subject to seismic settlement or liquefaction during a nearby seismic event.
- Shallow groundwater or perched water may occur beneath portions of the project site.
- The potential for landsliding at the project site is considered low.
- Portions of the project site adjacent to the Kern River Channel are located within an area considered subject to inundation by the 1% annual chance flood.
- Based on previous work in the general vicinity of the project area, the soils at the project site may be corrosive.

The conditions related to soils and geology, identified in conjunction with the Desktop Geological Assessment, would increase the cost and duration of grading and construction of the project but would not preclude the feasibility of development of the project.

1. INTRODUCTION

Ninyo & Moore has completed a geological desktop assessment for the proposed Pelicans Jaw Hybrid Solar project located in unincorporated Kern County, California (Figure 1). Our evaluation is based on review of published and non-published reports, aerial photographs, in-house data, and the assessment of the potential geologic hazards in the project area. The purpose of this geologic reconnaissance was to evaluate the potential for existing environmental impacts related to geologic or soils conditions to affect the project site and adjoining areas, and to discuss measures that can be implemented to reduce or mitigate the potential impacts with respect to the design and construction of the proposed project.

2. SCOPE OF SERVICES

Ninyo & Moore's scope of services for this geologic reconnaissance have included the activities listed below:

- Review of readily available regional, local, and site-specific geologic and geotechnical reports.
- Review of readily available background information including topographic, soils, mineral resources, geologic, and seismic and geologic hazard maps, and stereoscopic aerial photographs.
- Compile and analyze the data obtained from our background review.
- Prepare report presenting our findings, conclusions, and preliminary recommendations regarding potential geologic and soil impacts at the site.

3. SITE DESCRIPTION AND PROJECT DESCRIPTION

The proposed Pelicans Jaw Hybrid Solar project (Project) is located approximately 8 miles north of Lost Hills, a census-designated place, in unincorporated Kern County in the San Joaquin Valley in central California. The 3,371-acre project is proposed to be located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 (I-5) located approximately two miles to the west. The site of the proposed Pelicans Jaw Hybrid Solar project is located approximately 8 miles north of the City of Lost Hills in unincorporated Kern County in the San Joaquin Valley in central California. The project site is bounded by the Kern County and Kings County line to the north, the Kern River to the east, Twisselman Road to the south, and Interstate 5 to the west. Specifically, the project site consists of an area approximately 3,371-acres in size. Elevations across the site ranges from approximately 210 feet above mean sea level (MSL) in the eastern portion of the site to approximately 220 feet above MSL in the northwestern portion of the site. The project area is generally undeveloped, with the exception of a few farm-related structures located near the southwestern portion of the project area. The site is currently privately-owned and is being used for livestock grazing.

Based on our review of the project description and information provided to Ninyo & Moore, it is understood that the project would consist of the development of a solar photovoltaic (PV) power generating project. Specifically, the project will consist of photovoltaic (PV) panels, a single-axis tracker system, inverters and transformers, electrical cabling and communication lines, on-site switchgear, a collector substation, generation interconnection (gen-tie) line, access roads, security fence, an operations and maintenance (O&M) facility, and a supervisory control and data acquisition (SCADA) system. The Project would also include a Pacific Gas and Electric (PG&E) switching station that would interconnect with the existing PG&E 230-kilovolt (kV) overhead transmission lines that traverse the Project site. The PG&E switching station would be located on-site, generally towards the northwest corner of the Project site.

4. GEOLOGIC AND SUBSURFACE CONDITIONS

Our findings regarding regional and site geology and groundwater conditions at the project site are provided in relation to three topics: regional geologic setting; site geology, and groundwater.

4.1. Regional Geologic Setting

The project area is situated in the southern portion of the Great Valley Geomorphic Province (Figure 4). This geomorphic province encompasses an area between the Sierra Nevada and Coastal Ranges that extends approximately 500 miles from the Transverse Ranges in the south to the Klamath Mountains and Cascades in the north (Norris and Webb, 1990). The province varies in width from approximately 30 to 70 miles. In general, the province consists of a relatively flat-floored valley consisting of alluvial materials overlying relatively undeformed Cenozoic sedimentary rocks, which in turn are underlain at depth by Sierran basement rocks.

Structurally, the Great Valley is an asymmetrical synclinal trough, bounded by the generally northwest-southeast trending Sierra Nevada Mountains on the east, and the Coast Ranges on the west. The trough is bisected by the Stockton Fault in the Stockton arch, and the White Wolf Fault, south of the Bakersfield arch. Other prominent structural features include the Kern Front Fault, north of Bakersfield, the Buena Vista thrust, on the east margin of the Coast Range, and Sutter Buttes, north of Sacramento. In addition, several valley fold structures, which are notable for their oil and gas reserves, are evident near the Great Valley and Coast Range boundary, including Elk Hills, Lost Hills, Buena Vista Hills, Kettleman Hills, McKittrick, and Wheeler Ridge. Significant fold structures have also been mapped near Sutter Buttes, Dunnigan, Lodi, Willows, and Rio Vista. Much of the structural deformation is thought to be the result of compression due to the bend in the active San Andreas Fault. North of the bend, major tectonic activity associated with this fault consists of primarily right-lateral, strike-slip movement. Further

discussion of faulting relative to the site is provided in the Faulting and Seismicity section of this report and a map depicting faults in the site vicinity is presented on Figure 2.

4.2. Site Geology

Based on our review of published geologic maps and our site reconnaissance, surficial soils at the project site consist of fill, agricultural topsoil, and Quaternary-aged basin and fan deposits (Figure 3). No significant geologic features are anticipated on the site that will be impacted by the project. A brief description of these units, as described in the cited literature or as observed on the site, is presented below.

4.2.1. Fill

Fill soils are anticipated to underlie portions of the site area due to previous land use, roadway construction, and burial of utility lines. The fill soils are generally anticipated to be composed of clay, silt, sand, and gravel.

4.2.2. Agricultural Topsoil

Agricultural topsoil is anticipated to mantle portions of the site that were previously used as farmland and is anticipated to be on the order of 1 to 2 feet in thickness. These soils are generally anticipated to consist of clay, silt, and sand. And may contain organic material.

4.2.3. Basin Deposits

Quaternary-age basin-derived alluvial deposits of the Great Valley (Smith, 1964) underlie the fill and agricultural topsoil at the site. These soils are generally anticipated to consist of light brown to dark brown, clay, silt, and sand.

4.2.4. Fan Deposits

Quaternary-age fan-derived alluvial deposits of the Great Valley (Smith, 1964) underlie the fill and agricultural topsoil in the western portion of the site. These soils are generally anticipated to consist of light brown to dark brown, clay, silt, sand, and gravel.

4.3. Groundwater

Sources provided by the California Water Data Library Resources (DWR) and the California State Water Resources Control Board (SWRCB) were reviewed for information pertaining to groundwater

quality and occurrence in the vicinity of the project. According to the State of California Regional Water Quality Control Plan for the Tulare Lake Hydrologic Basin, the project is located within the Antelope Plain Hydrologic Area in the South Valley Floor Hydrologic Unit.

Information on the SWRCB GeoTracker (GeoTracker, 2022) website for groundwater monitoring well data in the vicinity of the project site and the California Department of Water Resources Water Data Library Website (CDWR, 2020) were reviewed and considered in the characterization of groundwater conditions for the project site. Numerous irrigation and observation wells are located around the project site. The depth to groundwater has been measured in the irrigation wells at depths of 172 feet below ground surface ([bgs] CDWR, 2020). However, measurements taken in observation wells indicate perched zones of groundwater depths of 6 to 20 feet. Potential beneficial uses of groundwater have been designated for agricultural purposes.

5. GEOLOGIC HAZARDS

In general, potential geologic hazards at the site include faulting and seismicity as they relate to seismic design of structures. These considerations and other geologic hazards such as liquefaction, landsliding, slope failure, and tsunamis, are discussed in relation to seven environmental considerations: faulting and seismicity; ground rupture; ground motion; liquefaction and seismically induced settlement; landslides and slope failure; tsunamis and seiches; regional and subsidence; flood hazards; expansive soils; corrosive soils; soils; and mineral resources.

5.1. Faulting and Seismicity

As shown on Figure 2, there are several active faults in the region. Therefore, like most of central California, the project area is considered to be seismically active. The closest known active fault is the Great Valley 14 Fault, which is capable of generating an earthquake magnitude of 7.2 (California Geological Survey [CGS], 2016c). The Great Valley 14 Fault is located approximately 20 miles west of the proposed project site.

5.2. Ground Rupture

Ground surface rupture due to active faulting is not considered likely in the project area due to the absence of known active faults underlying the site. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible. Proposed structures should be designed to mitigate ground shaking.

5.3. Ground Motion

The 2019 California Building Code (CBC) specifies that the Risk-Targeted, Maximum Considered Earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. The M_{CER} ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits for near-source effects. The horizontal peak ground acceleration (PGA) that corresponds to the MCE_R for the site was calculated as 0.45g using the Structural Engineers Association of California (SEAOC/OSHPD, 2022) seismic design tool (web-based).

The 2019 CBC specifies that the potential for liquefaction and soil strength loss be evaluated, where applicable, for the Maximum Considered Earthquake Geometric Mean (MCE_G) peak ground acceleration with adjustment for site class effects in accordance with the American Society of Civil Engineers (ASCE) 7-16 Standard. The MCE_G peak ground acceleration is based on the geometric mean peak ground acceleration with a 2 percent probability of exceedance in 50 years. The MCE_G peak ground acceleration with adjustment for site class effects (PGA_M) was calculated as 0.55g using the SEAOC (SEAOC/OSHPD, 2022) seismic design tool that yielded a mapped M_{CEG} peak ground acceleration of 0.45g for the site and a site coefficient (F_{PGA}) of 1.2 for Site Class D. Proposed structures should be designed to mitigate strong ground motion.

5.4. Liquefaction and Seismically Induced Settlement

Liquefaction of cohesionless soils can be caused by strong vibratory motion due to earthquakes. Research and historical data indicate that loose granular soils and non-plastic silts that are saturated by a relatively shallow groundwater table are susceptible to liquefaction. Based on the anticipated shallow water table and presence of loose, unconsolidated basin and fan deposits, there may be a potential for liquefaction. Therefore, liquefaction may be a design consideration. It is the responsibility of the geotechnical engineer of record to verify the potential for liquefaction and dynamic settlement and to provide appropriate design recommendations.

5.5. Landsliding and Slope Failure

Landslides are not mapped at the site. Based on this information, landslides are not a design consideration. Based on our background review, the project area is located in a relatively flat-lying region and slope failure is not a design consideration.

5.6. Tsunamis and Seiches

Tsunamis are long wavelength seismic sea waves (long compared to the ocean depth) generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity. Based on the inland location and elevation of the project, the potential for a tsunami to impact the site is not a design consideration.

Seiches are oscillations of enclosed or partially enclosed bodies of water often generated by seismic activity. Based on the elevation of the site and the absence of nearby bodies of water, the potential for seiches to impact the site is considered low.

5.7. Regional Land Subsidence

Land subsidence is characterized as a shrinking of the ground surface relative to surrounding areas, and can generally occur where deep alluvial deposits are present in valley areas. Subsidence in alluvial valley areas is typically associated with groundwater withdrawal or other fluid withdrawal from the subsurface such as oil and/or natural gas. Extraction of these geologic fluids can cause subsidence, which can result in the development of surface ground cracks and fissures, particularly near valley margins. Cracks and earth fissures can cause damage to improvements including roads, transmission lines, foundations, structures, and pipelines. Review of the USGS Central Valley: Drought Indicators website indicate that 25 millimeters of land subsidence has occurred in the region (USGS, 2022).

5.8. Flood Hazards

Based on review of Federal Emergency Management Agency (FEMA) Mapping Information Platform website (2022), portions of the project site adjacent to the Kern River Channel are located within the mapped Flood Zone A. Flood Zone A is considered subject to inundation by the 1% annual chance flood. Based on review of the flood maps, the potential for significant flooding to impact should be considered in the design of the project. In addition, the IPCC (Intergovernmental Panel on Climate Change) has noted, it is increasingly clear that climate change “has detectably influenced” several of the water-related variables that contribute to floods, such as rainfall and snowmelt (https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap3_FINAL-1.pdf). In a report prepared to analyze potential long-term implications of climate change on the National Flood Insurance Program for the Federal Insurance and Mitigation Administration of FEMA, it was found that at the end of the 21st century the 1% annual chance floodplain area would increase in area by about 30%, with larger changes in the Northeast and Great Lakes regions and smaller changes in the central part of the country and the Gulf Coast (https://science2017.globalchange.gov/chapter/8/).

A design-level drainage plan should be completed for the project, which would include runoff calculations and design features developed in accordance with Kern County Development Standards, the Kern County Grading Ordinance, the Kern County Floodplain Ordinance, and the Kern County Code of Building Regulations. The drainage plain would ensure appropriate drainage for the project site and that any proposed development within the flood area (Zone A) would be designed to limit obstructions and impacts related to the floodplain. Specifically, the drainage plan would ensure that design of the solar arrays include 1 foot of freeboard clearance above the calculated maximum flood depths for the solar arrays or the finished floor of any permanent structures. Solar panel sites located within a 100-year floodplain would also be graded to direct potential flood waters without increasing water surface elevations more than 1 foot or as required by Kern County's Floodplain Ordinance.

5.9. Expansive Soils

Expansive soils generally result from specific clay minerals that have the capacity to shrink or swell in response to changes in moisture content. Shrinking or swelling of foundation soils can lead to damage to slabs, foundations, and other engineered structures, including tilting and cracking. Clayey fill and agricultural soils may be expansive. Additionally, the fan deposits may contain lenses of clay, which can be expansive. In general, the soils and earth materials at the project may be expected to have a moderate potential for expansion. Expansive soils can be mitigated through selective grading techniques.

5.10. Corrosive Soils

Caltrans corrosion (2021) criteria define as soils with more than 500 parts per million (ppm) chlorides, more than 0.2 percent sulfates, or a pH less than 5.5. Based on laboratory testing performed on soil samples from Ninyo & Moore projects near the project area and Caltrans corrosion (2021) criteria, soils in the general vicinity of the project site have been classified as corrosive. The potential for similar soils to occur at the project is considered high. If corrosive soils exist on the site, a corrosion engineer may be required to assist in the design of improvements in contact with the soil.

5.11. Soils

Based on the interactive map using the Web Soil Survey website (USDA, 2022), the predominant different soil units mapped on the project site include: Houser fine sandy loam, Nahrub clay, Twisselman sandy loam, and Twisselman clay. Based on the previous agricultural site use and the surrounding paved and unpaved roadways, preexisting native soils are anticipated to have been

removed and/or disturbed on the project site. Mineral Resources

According to the Kern County General Plan (2009) the project area is not located within a mineral resource location. The nearest active mine, Archer Mine, is a gypsum mine located approximately 14 miles northwest of the project site (https://mrdata.usgs.gov/mineplant/map-us.html#homev.). There are three oil and gas wells on the project site: a canceled oil and gas well within APN 044-150-070, a plugged oil and gas well within APN 044-150-050, and a plugged dry hole well (an exploratory or development well found to be incapable of producing either oil or gas in sufficient quantities to justify completion as an oil or gas well) within APN 044-102-050:

(https://maps.conservation.ca.gov/doggr/wellfinder/#openModal/-118.94276/37.12009/6).

6. CONCLUSIONS

Based on our review of the referenced background data and our geologic field reconnaissance it is our opinion that the following geological characteristics of the project site will require specific consideration when designing the project.

Surface and near-surface soils at the project are mapped as basin and fan deposits. Fill materials associated with the construction of the existing roadways and utilities and agricultural topsoil associated with the site's previous use as farmland are also anticipated to be present at the project site. Geotechnical constraints related to soils at the project are:

- *Soft Ground* – Areas with soft ground or loose soils can be found in areas underlain by existing fill and agricultural topsoil.
- *Expansive Soils* – The project soils are expected to have a moderate potential for expansion.
- *Fill Soils* – Man-made fill soils placed without engineering supervision may be loosely or inadequately compacted, may contain oversize materials unsuitable for reuse in engineered fills, and may contain unsuitable organic or expansive materials and debris that may preclude their use in engineered fills.

Shallow groundwater or perched water may occur beneath portions of the project.

The closest known major active fault is the Great Valley 14 Fault, which is located approximately 20 miles west of the project. Geotechnical constraints related to faulting and seismic events at the project are:

- *Ground Shaking* – The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults.
- *Liquefaction* – Basin and fan deposits may be subject to seismic settlement and/or liquefaction during a nearby seismic event.

The potential for landsliding in the project area is considered low.

The site is mapped in a flood zone associated with the adjacent Kern River Channel.

Based on previous work in the project area, some soils at the project site may be expansive and corrosive.

7. IMPACT ANALYSIS

Based upon the results of our geologic desktop assessments, our findings, conclusions, and recommendations regarding potential geological impacts to the project are summarized in the following sections.

7.1. Significance Thresholds

In evaluating the significance of potential environmental concerns in a particular study area, the criteria to consider, as they relate to geologic and soil conditions, are presented in the CEQA Guidelines. In accordance with the scope of work, the findings of this study were evaluated with respect to selected Geology and Soils, selected Hydrology and Water Quality thresholds of significance, and Mineral Resources within Appendix G of the CEQA Guidelines (2019).

7.2. Project Impacts and Significance

Based on the above criteria and the results of the evaluation, the potential impact by geologic and soil conditions at the project have been identified, and are discussed below.

VI. GEOLOGY AND SOILS

A. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of known fault?

The potential for ground surface rupture due to active faulting is considered low in the project area due to the absence of known active faults underlying the site (less than significant impact). However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

ii. Strong seismic ground shaking?

The project has a moderate potential for strong ground motions due to earthquakes on nearby active faults (less than significant impact with construction methods and specifications incorporated).

iii. Seismic related ground failure, including liquefaction?

Based on the presence of shallow groundwater and underlying unconsolidated basin and fan deposits, the potential for liquefaction and differential settlement at the project site are anticipated to be design considerations. Liquefaction should be evaluated further. However, we consider this impact to be less than significant with construction methods and specifications incorporated.

iv. Landslides?

Our review of geologic literature, aerial photos and topographic maps, does not indicate the presence of mapped landslides on the project site. Additionally, landslides were not mapped by others adjacent to the project site. Therefore, the potential impact of existing landslides is considered low (less than significant impact). Nevertheless, the potential presence for landslides, the potential for deep-seated movement, and recommended construction methods and specifications should be evaluated during a subsurface geotechnical evaluation of the site.

B. Would the project result in substantial soil erosion or the loss of topsoil?

If the site is developed in accordance with current building codes and industry standards, the potential for substantial soil erosion is considered to be low (less than significant impact). The potential for substantial loss of topsoil due to the proposed development is considered low due to previous agricultural use and current livestock grazing of the site.

C. Would the project be located on geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The basin and fan deposits underlying the project site may be subject to seismic settlement or liquefaction during a nearby seismic event. The site is not considered prone to landsliding or slope instability issues. Based on these items, we consider this impact to be less than significant with construction methods and specifications incorporated. Land subsidence is anticipated to be a design consideration at the site.

D. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

The fill, agricultural soil, basin and fan deposits on the project site are expected to have a moderate potential for expansion. However, we consider this impact to be less than significant with construction methods and specifications incorporated.

E. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

The soils on the project site are expected to be able to support adequately designed septic tanks or alternative waste water disposal systems. We consider this impact to be less than significant with construction methods and specifications incorporated.

X. HYDROLOGY AND WATER QUALITY

A. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

We consider this to be a less than significant impact. Project construction would have the potential to result in the discharge of wastewater and runoff pollution. Best management practices (BMPs) and compliance with applicable regulations would reduce the potential to impact water quality and prevent soil erosion caused by stormwater runoff. The proposed project would prepare a Stormwater Pollution and Prevention Plan (SWPPP), which would include BMP erosion-control measures and site-specific BMPs to ensure compliance with relevant local, state, and federal regulations.

B. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

We consider this to be a less than significant impact. Potable water would be brought to the proposed project site for drinking and domestic needs during construction. Non-potable water would be used during construction for soil compaction and dust-suppression purposes. Water would be delivered via truck or pipeline from an off-site source. The proposed project Applicant has prepared a Water Supply Assessment (WSA) to determine if the proposed project would substantially decrease groundwater supplies or interfere with groundwater recharge. The WSA concluded that there are sufficient water supplies to serve the project's construction and operational water demands under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year period (as well as the project's operational lifetime) and has identified sufficient backup sources of water to give the applicant the flexibility to respond to unanticipated events or constraints.

C. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river through the addition of impervious surfaces, in a manner which would:

i. result in substantial erosion or siltation on- or off-site;

We consider this to be a less than significant impact. A hydrology flood report and hydrology study will be prepared for the proposed project in accordance with Kern County requirements. Compliance with the Kern County Development Standards, the Kern County Grading Ordinance, the Kern County Floodplain Ordinance, and the Kern County Code of Building Regulations will reduce impacts to existing drainage patterns and flooding conditions on site to below the level of significance

ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

We consider this to be a less than significant impact. Please see response to threshold (c)(i).

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources or polluted runoff; or

We consider this to be a less than significant impact. Although the project site would install impervious surfaces; the majority of the project site would remain as pervious surfaces. The design of the proposed project is expected to allow stormwater infiltration to occur similar to existing conditions, and no alterations to municipal stormwater drainage systems are likely to be needed as part of the project.

iv. Impede or redirect flood flows?

We consider this to be a less than significant impact. Portions of the project site are located in a 100-year flood area (Zones A, 1 percent annual chance of flooding) as shown on Figure 7, FEMA Floodplain Zone Hazards. A hydrology flood report/hydrology technical study will be prepared for the proposed project, and further analysis of the project site to view location of floodplains as delineated by FEMA will be provided. A design-level drainage plan would be completed for the project, which would include runoff calculations and design features developed in accordance with Kern County Development Standards, the Kern County Grading Ordinance, the Kern County Floodplain Ordinance, and the Kern County Code of Building Regulations.

D. Would the project in flood hazard, tsunami, or seiche zones, risk release of

pollutants due to project inundation??

We consider this to be no impact. The proposed project is not located near an enclosed body of water and would not be subject to inundation by seiche or tsunami.

E. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

We consider this to be a less than significant impact. A water supply assessment has been prepared for the proposed project to analyze the potential impacts to groundwater resources and determine if the proposed project would conflict with any relevant plans. Based on the water supply assessment, the water demand of the project can be served without having adverse impacts on groundwater resources, including the six sustainability indicators established by the Sustainable Groundwater Management Act (i.e., groundwater levels decline, aquifer storage reduction, water quality degradation, land subsidence, surface water depletion and groundwater-dependent ecosystems).

XI. MINERAL RESOURCES.

A. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No impact. The project site is not located within an area designated as a Mineral Resource Zone (MRZ). However, areas designated as MRZ-1, which are defined as areas with little likelihood for the presence of significant mineral resources, are located approximately 10 miles southeast of the project site. MRZ-2, which include significant mineral deposits, are located within the County but are not located in the vicinity of the project site. The nearest MRZ-2 area is located approximately 30 miles southeast of the project site. Further, the project site is not located on parcels designated by the Kern County General Plan as 8.4 – Mineral and Petroleum or 8.5 - Natural Resources and is not within NR (Natural Resources) or PE (Petroleum Extraction) zone districts. Therefore, the potential for mineral resources to occur on the project site is not likely. The nearest active mine, Archer Mine, is a gypsum mine located approximately 14 miles northwest of the project site (USGS 2022). At this distance, the project would not adversely affect operations at the mine. Therefore, there would be no impacts.

B. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No impact. The project site is not located within an area designated as a Mineral Resource Zone (MRZ). However, areas designated as MRZ-1, which are defined as areas with little likelihood for the presence of significant mineral resources, are located approximately 10 miles southeast

of the project site. MRZ-2, which include significant mineral deposits, are located within the County but are not located in the vicinity of the project site. The nearest MRZ-2 area is located approximately 30 miles southeast of the project site. Further, the project site is not located on parcels designated by the Kern County General Plan as 8.4 – Mineral and Petroleum or 8.5 - Natural Resources and is not within NR (Natural Resources) or PE (Petroleum Extraction) zone districts. Therefore, the potential for mineral resources to occur on the project site is not likely. The nearest active mine, Archer Mine, is a gypsum mine located approximately 14 miles northwest of the project site (USGS 2022). At this distance, the project would not adversely affect operations at the mine. Therefore, there would be no impacts.

8. RECOMMENDATIONS

Based on the geologic and geotechnical considerations at the project site presented in the previous section, we recommend further geotechnical evaluation of the project site, including subsurface evaluation and laboratory testing, with specific recommendations to be addressed in the project's 90% design construction drawings prior to issuance of grading and building permits, as follows:

Soft Ground – Soils in areas with soft ground or loose soils in the area of the proposed project may be subject to settlement. Recommendations to mitigate this condition can typically include removal and/or replacement of soils as engineered compacted fill. The extent of soft soils and recommended removals may be evaluated by subsurface exploration and laboratory testing.

Land subsidence – Land subsidence may cause ground cracks or earth fissures which may lead to damage to foundations and engineered structures. The proposed structures should be designed to accommodate vertical movement associated with long-term ground subsidence. The PV structures can also be provided with mechanisms so they can be readily realigned in response to subsidence as needed.

Expansive Soils – Expansive soils may lead to damage to foundations and engineered structures. If expansive soils exist on site, the following recommendations may be implemented during construction: the soils may be removed from sensitive areas and placed in deeper fill areas; the soils may be excavated and removed from the site; or the expansive soils may be treated (i.e., lime treatment) to mitigate their potential for expansion. The extent of expansive soils and recommended mitigation measures may be evaluated by subsurface exploration and laboratory testing.

Ground Shaking – Proposed structures should be designed appropriately to mitigate strong ground shaking in the event of an earthquake on a nearby fault.

Liquefaction – The site may be considered susceptible to liquefaction and dynamic settlement based on the measured shallow groundwater in a nearby groundwater monitoring wells. Prior to development, a geotechnical evaluation involving subsurface exploration and laboratory testing should be performed to specifically evaluate the potential for liquefaction on the project site. If such an evaluation finds that a potential for liquefaction to exist, the following recommendations may be implemented during construction: removal and replacement of soils susceptible to seismic settlement and/or liquefaction; densification of these soils; or utilization of special foundations to mitigate liquefaction and seismic settlement.

Shallow groundwater – Shoring and dewatering may be required if construction is proposed in areas of shallow groundwater.

Landsliding – Landslides have not been mapped on the site or reported in the available literature.

Corrosive Soils – If corrosive soils exist on the site, a corrosion engineer may be required to assist in the design of improvements in contact with the soil. The extent of corrosive soils and recommended mitigation measures may be further evaluated by subsurface exploration and laboratory testing.

The conditions related to soils and geology, identified in conjunction with the Desktop Geological Assessment, would increase the cost and duration of grading and construction of the project but would not preclude the feasibility of development of the project.

9. LIMITATIONS

The field evaluation and geotechnical analyses presented in this report have been conducted in accordance with current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No warranty, implied or expressed, is made regarding the conclusions, recommendations, and professional opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered. Our preliminary conclusions and recommendations area based on an analysis of the observed conditions and the referenced background information.

The purpose of this study was to evaluate geologic and geotechnical conditions within the project site and to provide a preliminary geotechnical evaluation report to assist in the preparation of environmental impact documents for the project. A comprehensive geotechnical evaluation, including subsurface exploration and laboratory testing, should be performed prior to design and construction of structural improvements.

10. REFERENCES

California Department of Water Resources, 2022, Water Data Library Website: http://www.water.ca.gov/waterdatalibrary: accessed in April.

California Geological Survey, 1999, Seismic Shaking Hazard Maps of California: Map Sheet 48.

California Geological Survey, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, CGS Special Publication 117A.

California Geological Survey, 2010, Interactive Fault Activity Map of California, http://maps.conservation.ca.gov/cgs/fam/.

Google Inc., 2022, www.googleearth.com: accessed in April.

Harden, D.R., 2004, *California Geology* – 2nd ed.: Prentice Hall, Inc.

Hart, E.W., and Bryant, W.A., 1997, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zone Maps: California Department of Conservation, Division of Mines and Geology, Special Publication 42, with Supplements 1 and 2 added in 1999.

Historic Aerials, 1947-2022, Aerial Photographs, http://www.historicaerials.com/: accessed in April.

Kern County Planning Department, 2009, General Plan: dated September 22.

Kings County Planning Commission, 2010, General Plan 2035: adopted January 26.

Ninyo & Moore, In-house proprietary information.

Ninyo & Moore, 2022, Proposal for Geological Desktop Assessment, Proposed Pelicans Jaw Solar Project, Kern County, California, Proposal No 02-02710: dated March 18.

Norris, R.M. and Webb, R.W., 1990, Geology of California: John Wiley & Sons.

SEAOC/OSHPD, 2022, Seismic Design Maps, https://seismicmaps.org/: accessed in April.

Smith, A., 1975, Geologic Map of the California Bakersfield Sheet 30' x 60' Quadrangle, Kern County, California, Scale 1:100,000.

Smith, A.R., 1964, Geologic Map of California, Bakersfield Sheet, Scale 1:250,000.

State of California Department of Water Resources, 2022, website: http://www.water.ca.gov/waterdatalibrary/: accessed in April.

State of California Regional Water Quality Control Board, 1986, Central Valley Region (5), Tulare Lake Hydrologic Basin Planning Area (TL): dated August.

State of California Water Resources Control Board (SCWRCB), 2022; website: http://geotracker.waterboards.ca.gov/: accessed in April.

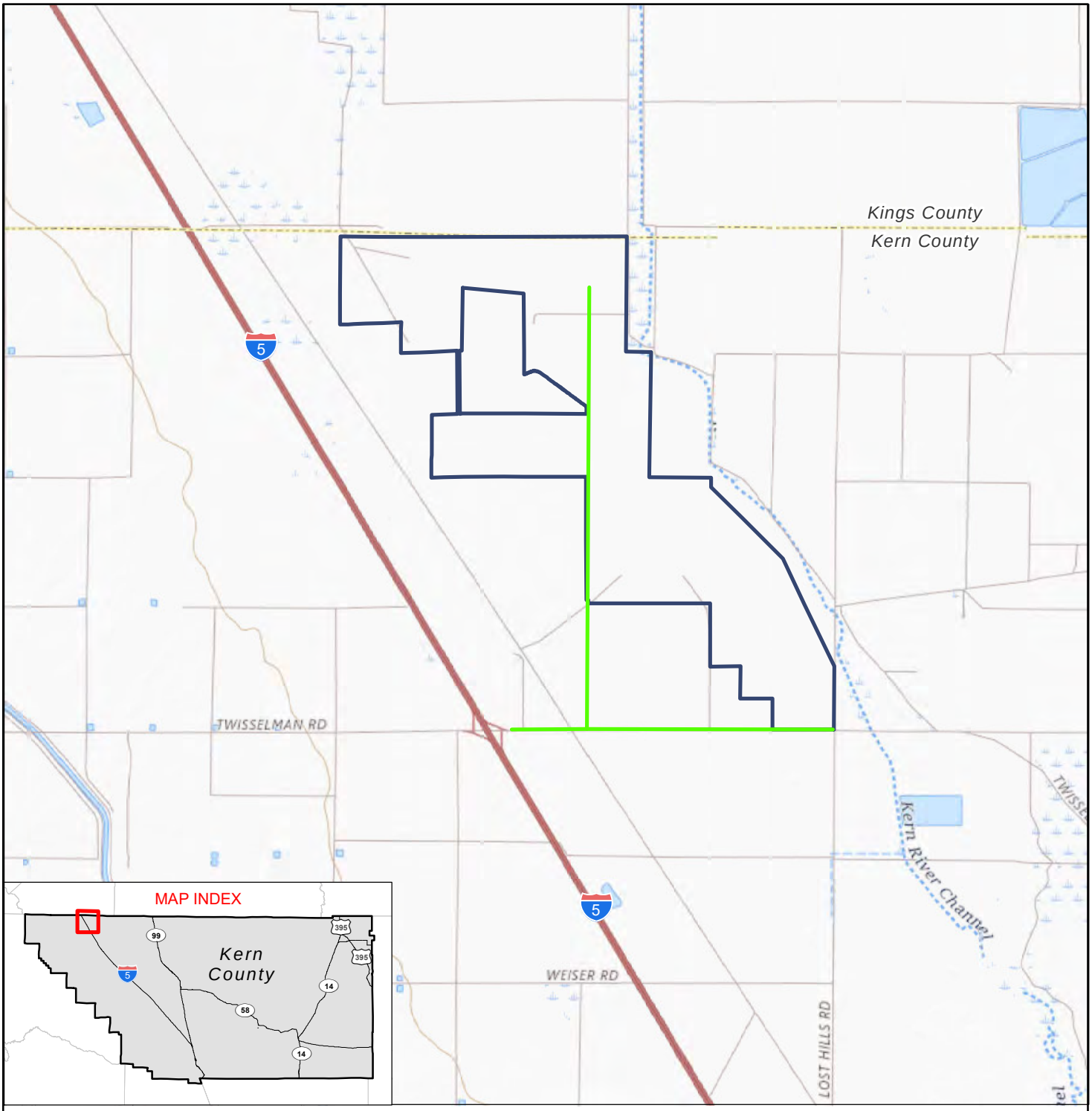
United States Federal Emergency Management Agency (FEMA), 2012, Flood Insurance Rate Map (FIRM), Map Number 06073 co 778G, Panel 778 pf 2375: dated May 16

United States Geological Survey, 2018, Lost Hills NW, California Quadrangle Map, 7.5 Minute Series: Scale 1:24,000.

United States Geological Survey (USGS), 2022, 2008 National Seismic Hazard Maps – Fault Parameters; http://geohazards.usgs.gov/efusion/hazardfaults_search/hf_search_main.efm: accessed in April

USGS, 2022, Central Valley: Drought Indicators, California Water Science Center, http://ca.water.usgs.gov/land_subsidence/central-valley-subsidence-data.html.

FIGURES



LEGEND

ASSESSOR'S PARCEL BOUNDARY (PROJECT SITE)

ACCESS ROAD

N

FEET

0 6,000 12,000

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: ESRI - USGS THE NATIONAL MAP, 2023

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FIGURE 1

SITE LOCATION

PELICANS JAW SOLAR PROJECT
KERN COUNTY, CALIFORNIA

109436001 | 2/23

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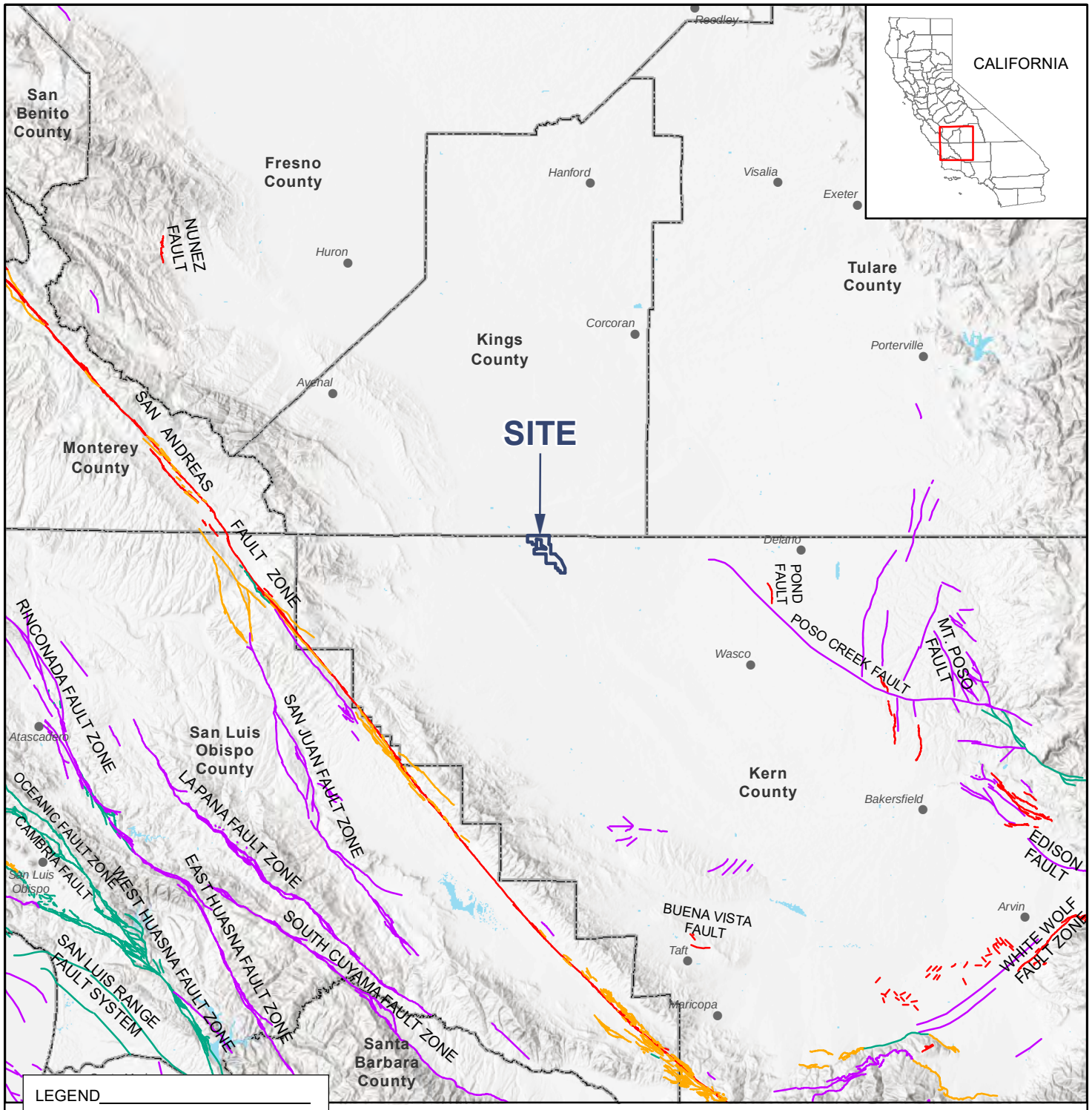

SOURCES: FAULTS - U.S. GEOLOGICAL SURVEY AND CALIFORNIA GEOLOGICAL SURVEY, QUATERNARY FAULT AND FOLD DATABASE FOR THE UNITED STATES, 2014, FROM USGS WEB SITE: HTTP//EARTHQUAKES.USGS.GOV/REGIONAL/QFAULTS/

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 2

FAULT LOCATIONS

PELICANS JAW SOLAR PROJECT
KERN COUNTY, CALIFORNIA

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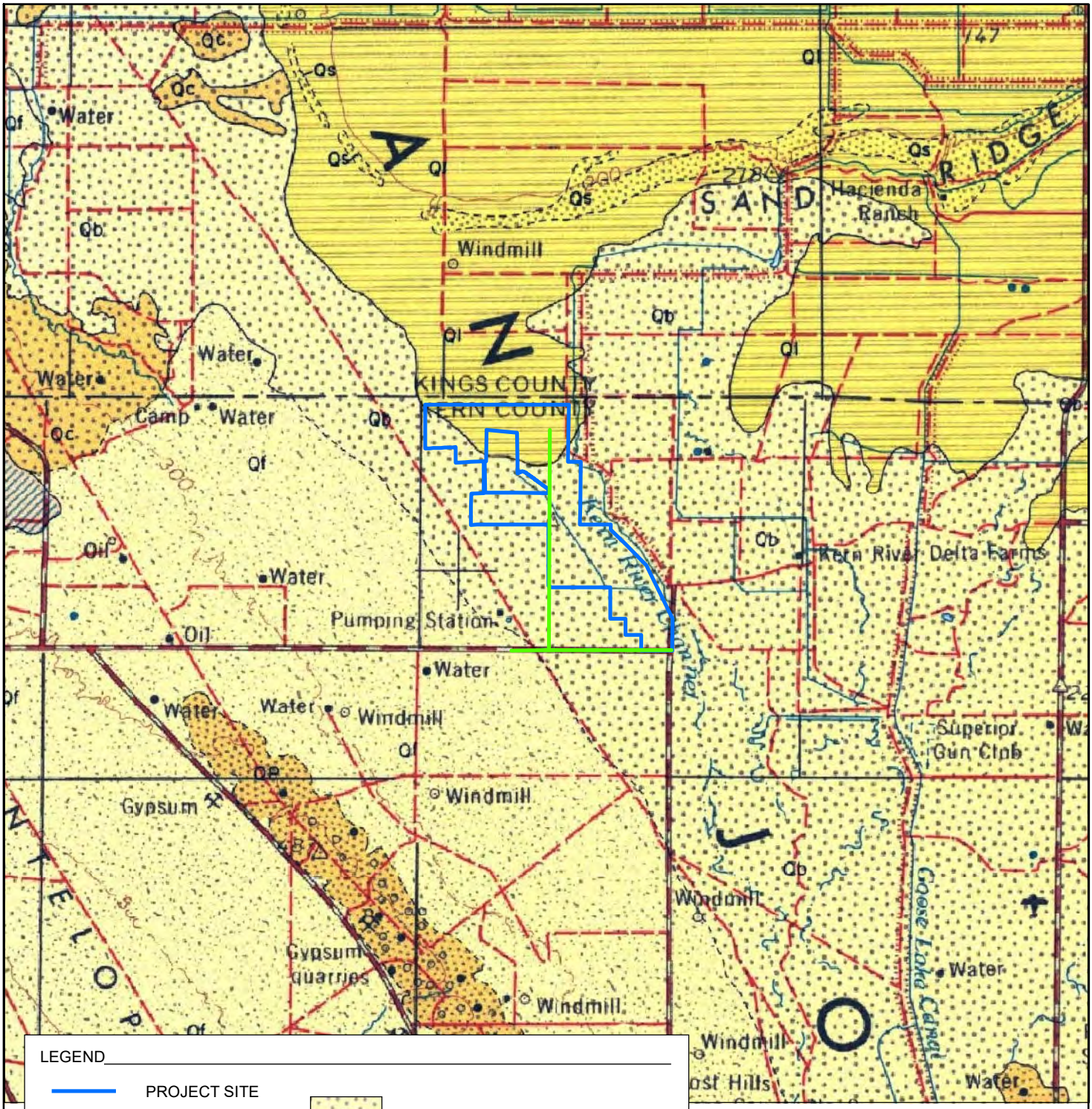

LEGEND

	PROJECT SITE	Qb	BASIN DEPOSITS
	ACCESS ROAD	Ql	QUATERNARY LAKE DEPOSITS
Qs	DUNE SAND	QP	PLIO-PLEISTOCENE NONMARINE
Qf	FAN DEPOSITS		

N

FEET

0 12,000 24,000

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: SMITH, A.R, 1964, GEOLOGIC MAP OF CALIFORNIA, CALIFORNIA DIVISION OF MINES AND GEOLOGY

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FIGURE 3

GEOLOGY

PELICANS JAW SOLAR PROJECT
KERN COUNTY, CALIFORNIA

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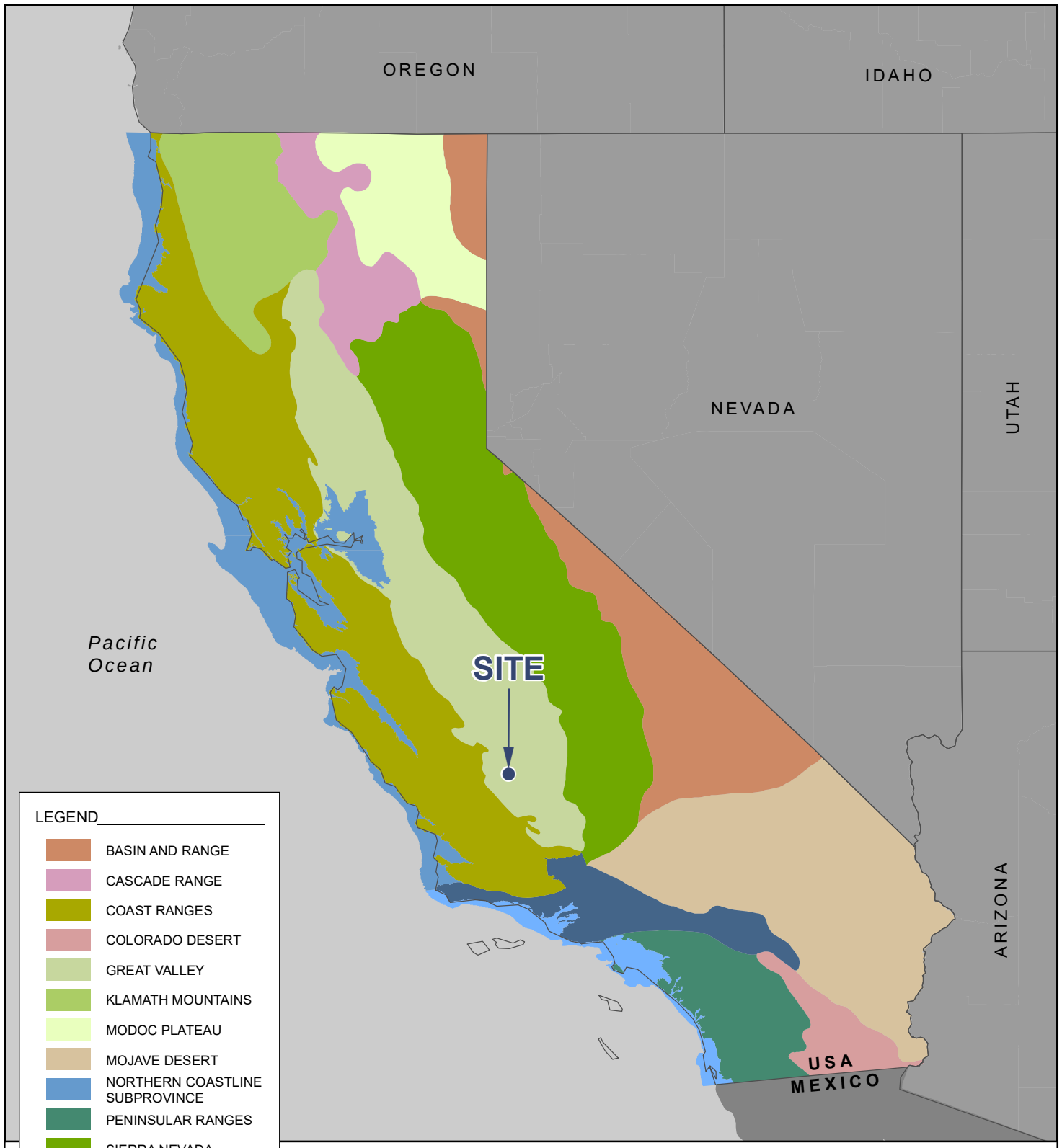

NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE. | SOURCE: GEOMORPHIC PROVINCES - CALIFORNIA GEOLOGICAL SURVEY, WEB SITE: https://gis.conservation.ca.gov/server/rest/services/CGS/GeoGems/MapServer/

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FIGURE 4

GEOMORPHIC PROVINCES

PELICANS JAW SOLAR PROJECT
KERN COUNTY, CALIFORNIA

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Appendix I

Paleontological Resources Review

MEMORANDUM

To:	Tandy McMannes – Pelicans Jaw Solar, LLC
From:	Sarah Siren, Paleontologist and Michael Williams, PhD, Paleontologist; Dudek
Subject:	Paleontological Resources Review – Pelicans Jaw Hybrid Solar Energy Project
Date:	February 20, 2023
cc:	Keith Carwana, Dudek
Attachment(s):	A: Project Location Map; B: Records Search Results Letter (*confidential*); C: Field Photographs

Dudek is providing this memorandum (memo) after completing a review of the potential for impacts to paleontological resources during construction activities for the Pelicans Jaw Hybrid Solar Energy Project (project) located in the Kern County, California (Attachment A). General language regarding protection of cultural, archeological, and historic resources, as well as the cultural/historic resources protection policies is listed in the Cultural Resources section of the Kern County General Plan (County of Kern, 2009). Paleontological resources are protected on state lands under the California Environmental Quality Act (CEQA) and on Kern County lands according to Policy 25 of the Kern County General Plan (County of Kern 2009). Published geological mapping by Smith (1964) at a scale of 1:250,000 indicates that the Project area is underlain by Holocene (~< 11,800 years ago) basin deposits (map unit Qb) and Quaternary (~ 2.6 million years ago [mya] – recent) lake deposits (map unit Ql) (Cohen et al., 2021).

Dudek paleontologist Sam Allen, BS, inspected the Project site on May 17, 2022. On February 2, 2023, Ross Owen, MA, RPA inspected assessor's parcel number 044-101-16, which was added to the project (Attachment C- Field Photographs). Ground visibility was generally good (Attachment B, Photograph 1). Stata within the lake sediments were observed in the northern portion of the project area during the survey, but were low sensitivity in nature (Attachment B, Photograph 2). The focus of the survey was to determine whether paleontological resources are present on the ground surface and to field check the published geological mapping and records search results. No paleontological resources were observed during the survey.

According to the records search results letter provided by the Natural History Museum of Los Angeles County (NHMLA) on April 16, 2022, no fossils are documented within the project area (NHMLA, 2022 - Confidential Attachment B). However, many localities are known from similarly aged sedimentary deposits as those underlying the Project area, as summarized here. Approximately 250 invertebrate localities are known from the Kettleman Hills that were recovered from the San Joaquin Formation at the ground surface (Confidential Attachment B). Several localities (Los Angeles County Museum [LACM] Vertebrate Paleontology [VP] 4526, 5458, 5914, 5763, and 7434) were recovered from the north dome of Kettleman Hills within the Tulare Formation (Confidential Attachment B). These localities yielded fish (Osteichthyes, Teleostei), pack rat (*Neotoma*), earred seal (Otariidae), in addition to invertebrates such as oysters and other mollusks (Confidential Attachment B). Another set of localities, LACM VP 7844-7845, are known from the south side of Bluestone Ridge and northwest of Keck's Corner, near the mouth of Antelope Valley, where specimens of iguanid lizard (Iguanidae), common snakes (Colubridae), bird (Aves), rabbits (*Lepus* and *Sylvilagus*), pocket gopher (*Thomomys*), pocket mouse (*Perognathus*), kangaroo rat (*Dipodomys*), and

deer (*Odocoileus*) were recovered (pers. comm. McLeod 2020; Confidential Attachment B). Southeast of Visalia and east of Terra Bella, LACM VP 4087 produced a fossil specimen of mammoth (*Mammuthus*) (Confidential Attachment B). Another locality, LACM VP 6701, located between Fountain Springs and the White River produced a fossil specimen of mammoth (*Mammuthus*) (pers. comm. McLeod 2020; Confidential Attachment B). LACM VP (CIT) 117, located east of Angiola, yielded a fossil specimen of horse (*Equus*) during drilling at a depth of 425 feet below the ground surface (Confidential Attachment B).

The Society of Vertebrate Paleontology (SVP) categorizes rock units as having high, low, undetermined, or no paleontological sensitivity (SVP 2010). Based on the criteria outlined in SVP (2010), the basin and lake deposits have low paleontological sensitivity on the surface due to the young age of the sediments; however, paleontological sensitivity increases with depth where the sediments are old enough to contain and preserve fossils. Areas of the project underlain by Pleistocene nonmarine sediments have a high potential to yield significant paleontological resources. Pleistocene, or Ice Age, fossils are well documented throughout California. In his compilation of Quaternary vertebrates from California, Jefferson (1991) lists fossil fishes, reptiles, birds, and mammals from Kings County. Some of the mammals include extinct taxa, such as giant ground sloths (*Paramylodon harlani*), dire wolves (*Canis dirus*), American lion (*Panthera atrox*), mammoth (*Mammuthus columbi*), horses (*Equus occidentalis*), camels (*Camelops hesternus*), and bison (*Bison antiquus*).

No paleontological resources were identified within the project area as a result of the institutional records searches, field surveys, or desktop geological review. However, intact paleontological resources may be present below the original layer of younger, Holocene age alluvial deposits within the project area. Given the proximity of past fossil discoveries in the surrounding area and the underlying older Pleistocene age deposits, the project area is moderately to highly sensitive for supporting paleontological resources at depth. In the event that intact paleontological resources are located on the project area, ground-disturbing activities associated with construction of the proposed project, such as grading during site preparation, have the potential to destroy a unique paleontological resource or site. Without mitigation, the potential damage to paleontological resources during construction would be a potentially significant impact. However, upon implementation of **MM-GEO-1**, impacts would be reduced to below a level of significance. Impacts of the proposed project are considered less than significant with mitigation incorporated during construction.

MM-GEO-1 Prior to commencement of any grading activity on-site, the applicant shall retain a qualified paleontologist per the Society of Vertebrate Paleontology (SVP) (2010) guidelines. The paleontologist shall prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the project. The PRIMP shall be consistent with the SVP (2010) guidelines and should outline requirements for preconstruction meeting attendance and worker environmental awareness training, where monitoring is required within the project area based on construction plans and/or geotechnical reports, procedures for adequate paleontological monitoring and discoveries treatment, and paleontological methods (including sediment sampling for microvertebrate fossils), reporting, and collections management. The qualified paleontologist shall attend the preconstruction meeting and a paleontological monitor shall be on-site during all rough grading and other significant ground-disturbing activities in previously undisturbed, fine-grained older Quaternary (e.g., Pleistocene age) alluvial deposits. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow recovery of paleontological resources. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will remove the rope and allow grading to recommence in the area of the find.

References

Cohen, K.M., S.C. Finney, P.L. Gibbard, and J.-X. Fan. 2021. The ICS International Chronostratigraphic Chart. Episodes 36: 199–-204. 2013; updated. Available at: https://stratigraphy.org/ICSchart/ChronostratChart2021-05.jpg.

County of Kern. 2009. Kern County General Plan. Adopted September 22, 2009. https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf.

Jefferson, G.T. 1991. A Catalog of Late Quaternary Vertebrates from California. Natural History Museum of Los Angeles County, Technical Reports 7:1-174. Unpublished revision: 18 May 2012.

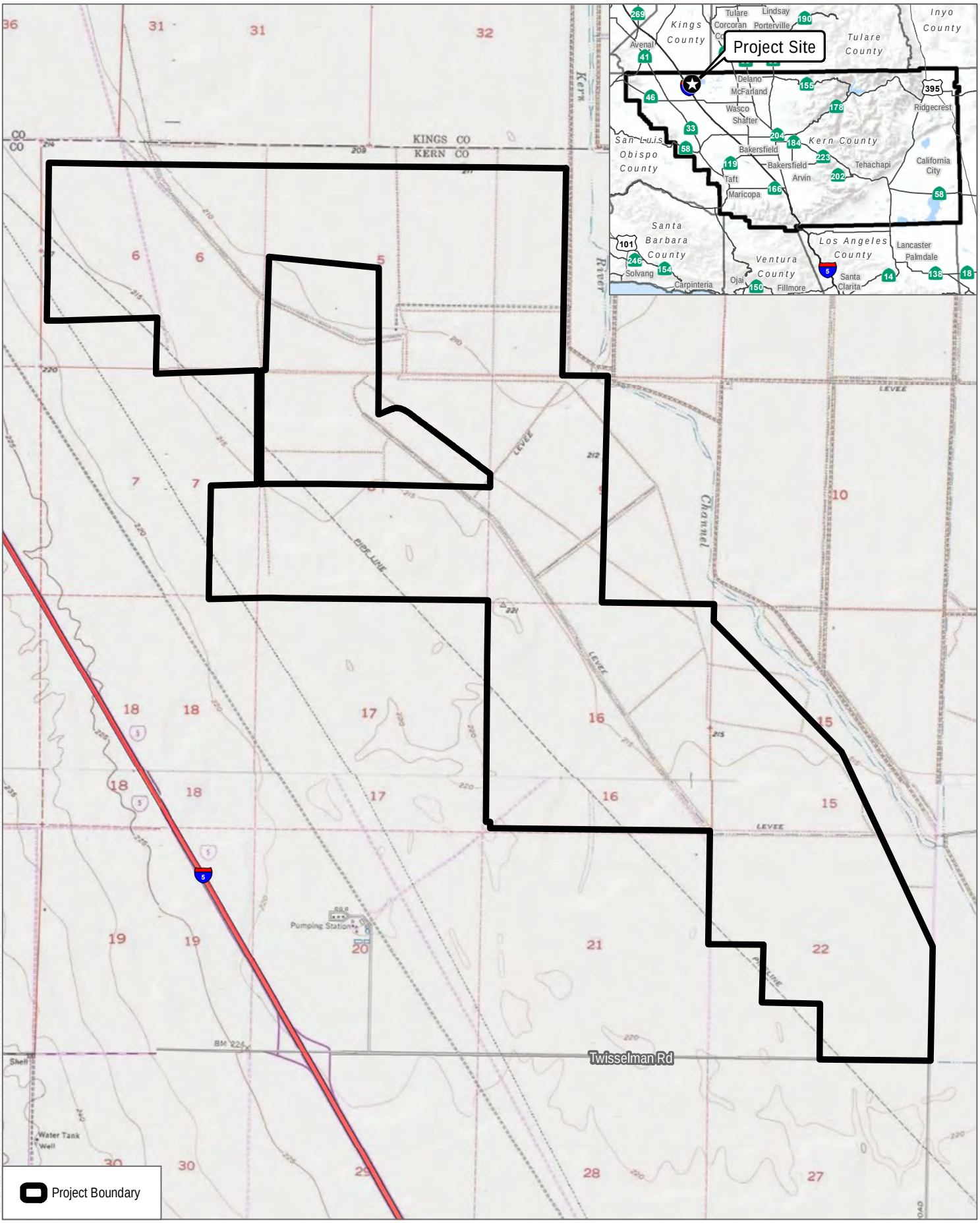
Natural History Museum of Los Angeles County (NHMLA). 2022 (Confidential Attachment B). Paleontological Resources for the Pelican Jaws Solar Project (PN 11438). Unpublished Records Search Results Letter from A. Bell with the Natural History Museum of Los Angeles County, Los Angeles, California, dated April 16, 2022.

Smith, A.R. 1964. Geologic map of California: Bakersfield sheet: California Division of Mines and Geology, scale 1:250,000.

Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. 11 p. Available; http://vertpaleo.org/Membership/MemberEthics/SVP_Impact_Mitigation_Guidelines.aspx.

Attachment A

Project Location Map



SOURCE: USGS 7.5 minute series West, Camp, Lone Tree, and Lost Hills NW quadrangles

DUDEK

0 1,500 3,000 Feet

FIGURE 1

Project Location

Pelicans Jaw Hybrid Solar Project, Kern County, California

Attachment B

Paleontological Records Search Results Letter
(*Confidential*)

Attachment C
Field Photographs

Photograph 1: Overview photograph of the northwestern portion of the Project site, towards the transmission line to the south (photograph taken by S. Allen).

Photograph 2: Exposures of fine-grained sedimentary deposits mapped in the northeastern portion of the Project site as lake sediments (Ql) by Smith (1964), view looking north (photograph taken by S. Allen).

Appendix J-1

Phase 1 Environmental Site Assessment

PHASE I ENVIRONMENTAL SITE ASSESSMENT

PELICANS JAW HYBRID SOLAR PROJECT
TWISSELMAN ROAD
LOST HILLS, CA 93249

REPORT DATE: OCTOBER 7, 2022

PREPARED FOR

Samsung Solar Energy 2 LLC &
Pelicans Jaw Solar LLC
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Mark Larocque
PRESIDENT

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APPENDIX

Appendix A Database Report & Legal Descriptions
Appendix B Qualifications of Environmental Professional
Appendix C Historical Report from Pipeline
Appendix D Photographs

1.0 EXECUTIVE SUMMARY

Practical Environmental Solutions (PES) was authorized by Samsung Solar Energy 2 LLC (Samsung Solar) & Pelicans Jaw Solar LLC to conduct a Phase I Environmental Site Assessment (ESA) of the parcels for the Pelicans Jaw Hybrid Solar Project located along Twisselman Road in Lost Hill, Kern County, California ("the Site"). This report was prepared to add three new parcels to the project area (044-101-11, 16, & 044-102-23). PES has conducted this ESA in general accordance with the scope and limitations of ASTM Designation E1527-21, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process."

The Site consists of 26 parcels totaling 3446.31 acres (Table 1). The parcels are owned by Wonderful Nut Orchards LLC. The Site area is currently developed as farm land. The Site is farm/cattle land with a irrigation ditches, and a few areas of debris piles. There are cattle water/feed stations on some of the parcels. There is a cattle corral, four grain silos, and a building located in the southwest section of Parcel #044-150-17. Additionally, there is a small electrical power station located to the northeast of Parcel #044-103-06, that is used for the irrigation control structures. Vehicle access to the Site is provided off of Twisselman Road. There is an existing solar field and two cell towers located to the southwest of Parcel 044-150-09 (not on the proposed Site) along the main access road for the project. There is a gas pipeline further to the west of the Site and power lines that border the northwest portion of the proposed project area (not on the proposed Site). The October 2022 site visit covered only the new Parcels #044-101-11, 16, & 044-102-23). No environmentally significant surface features were noted on the Site during the review.

The Site is situated within a rural & agricultural area of Lost Hills. The Site is bound to the north by undeveloped farm land; to the south by undeveloped farm land; to the east by undeveloped farm land; and to the west by undeveloped farm land, power lines, a Shell gas pipeline (further west from the Site) and then a solar farm. Based upon topographic map interpretation and site observations, groundwater flow beneath the Site is inferred to be in a northeasterly direction.

The Site is not listed in the regulatory databases reviewed in Section 4.1.1 of this report.

CONCLUSIONS

PES has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-21 of the parcels for the Pelicans Jaw Hybrid Solar Project located along Twisselman Road in Lost Hill, Kern County, California. Any exceptions to or deletions from this practice are described in Section 2.4 of this report. This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the Site. No further actions or investigations are warranted at this time.

2.0 INTRODUCTION

Practical Environmental Solutions (PES) was retained by Samsung Solar to conduct a Phase I Environmental Site Assessment of the parcels for the Pelicans Jaw Hybrid Solar Project located along Twisselman Road in Lost Hill, Kern County, California. This report was prepared to add three new parcels to the project area (044-101-11, 16, & 044-102-23). The protocol used for this assessment is in general conformance with ASTM E1527-21, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process scope of work for Phase I Environmental Site Assessments."

PES assessed the possible presence of petroleum products and hazardous materials at the Site. PES's investigation included review of aerial photos, review of adjoining properties, background research, and review of available local, state, and federal regulatory records regarding the presence of petroleum products and/or hazardous materials at the Site.

PES contracted Environmental Data Resources of Shelton, CT (EDR) to perform a computer database search for local, state, and Federal regulatory records pertaining to environmental concerns for the Site and properties in the vicinity of the Site (see Section 4.0).

2.1 Purpose

The purpose of this Phase I Environmental Site Assessment (ESA) was to identify existing or potential Recognized Environmental Conditions (RECs) (as defined by ASTM Standard E1527-21) in connection with the Site.

2.2 Scope of Services

PES has performed a Phase I Environmental Site Assessment on the Site in general conformance with the scope and limitations of ASTM Practice E1527-21. Any exceptions to or deletions from this practice are described in the body of this report.

In general, the scope of this assessment consisted of reviewing readily available information and environmental data relating to the Site; interviewing readily available persons knowledgeable about the Site; reviewing readily available maps, aerial photographs and records maintained by federal, state, and local regulatory agencies.

2.3 Assumptions

There is a possibility that even with the proper application of these methodologies there may exist on the Site conditions that could not be identified within the scope of the assessment or that were not reasonably identifiable from the available information. PES believes that the information obtained from the record review and the interviews concerning the Site is reliable.

2.4 Limitations and Exceptions (Data Gaps)

The findings and conclusions contain all of the limitations inherent in these methodologies that are referred to in ASTM E1527-21. Specific limitations and exceptions to this ESA are more specifically set forth below:

- PES encountered data limitations by not interviewing past Site owners, tenants, or adjoining property owners, as none were available for comment, did not respond to requests to information, or did not exist. This is considered a data gap. However, based on our review of the available municipal, regulatory, and historical information, the absence of information obtained from interviews with these individuals is not considered significant to the findings, conclusions, or recommendations of this assessment.
- No other data gaps were noted.

2.5 Special Terms and Conditions

Authorization to perform this work was given by a directive from Samsung Solar Energy 2, LLC, the owner of Pelicans Jaw Solar, LLC.

The conclusions and findings set forth in this report are strictly limited in time and scope to the date of the evaluations. The conclusions presented in the report are based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of agreed-upon services or the time and budgeting restraints imposed by the client. No subsurface exploratory drilling or sampling was done under the scope of this work. Unless specifically stated otherwise in the report, no chemical analyses have been performed during the course of this ESA.

Some of the information provided in this report is based upon personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

The content and conclusions provided by PES in this report are based solely on the information collected during our investigation and activities at the Site, our present understanding of the Site conditions, and our professional judgment in light of such information at the time this report was prepared. Part of the findings in this investigation is based on data provided by others. This report presents PES's professional opinion, and no warranty, expressed or implied, is made.

2.6 User Reliance

Samsung Solar Energy 2, LLC, its affiliates and co-owners and/or shareholders of Pelicans Jaw Solar LLC and its affiliates (collectively, "Client") may use and rely upon this Report in connection with a planned loan securitization or planned financial transaction involving the Site.

3.0 SITE DESCRIPTION

3.1 User Provided Information

Pursuant to ASTM E1527-21, PES requested the following site information from Samsung Solar Energy 2 LLC and Pelicans Jaw Solar LLC (Users of this report) and from the site contact.

3.2 Location and Legal Description

The parcels are located along Twisselman Road in Lost Hill, Kern County, CA. The Site is located in a rural area of Lost Hills. According to the Kern County Tax Assessor's Office. The parcels total approximately 3446.31 acres. The legal description for the parcels is presented in Appendix A.

3.3 Site and Vicinity General Characteristics

The Site is situated within a rural & agricultural area of Lost Hills. The Site is bound to the north by undeveloped farm land; to the south by undeveloped farm land; to the east by undeveloped farm land; and to the west by undeveloped farm land, power lines, a Shell gas pipeline (further west from the Site) and then a solar farm. Based upon topographic map interpretation and site observations, groundwater flow beneath the Site is inferred to be in a northeasterly direction.

3.4 Current Use of the Site

The Site consists of 26 parcels totaling 3446.31 acres (Table 1). The parcels are owned by Wonderful Nut Orchards LLC. The Site area is currently developed as farm land. The Site is farm/cattle land with a irrigation ditches, and a few areas of debris piles. There are cattle water/feed stations on some of the parcels. There is a cattle corral, four grain silos, and a building located in the southwest section of Parcel #044-150-17. Additionally, there is a small electrical power station located to the northeast of Parcel #044-103-06, that is used for the irrigation control structures. Vehicle access to the Site is provided off of Twisselman Road. There is an existing solar field and two cell towers located to the southwest of Parcel 044-150-09 (not on the proposed Site) along the main access road for the project. There is a gas pipeline further to the west of the Site and power lines that border the northwest portion of the proposed project area (not on the proposed Site). The October 2022 site visit covered only the new Parcels #044-101-11, 16, & 044-102-23). No environmentally significant surface features were noted on the Site during the review.

3.5 Description of Site Improvements

The Site is farm/cattle land with a irrigation ditches, and a few areas of debris piles. There are cattle water/feed stations on some of the parcels. There is a cattle corral, four grain silos, and a building located in the southwest section of Parcel #044-150-17. Additionally, there is a small electrical power station located on Parcel northeastern side of Parcel #044-103-06, that is used for the irrigation control structures. Electricity is provided to the Site by Pacific Gas & Electric (PG&E).

3.6 Current Use of Adjoining Properties

During the vicinity review, PES noted the following land use on properties in the immediate vicinity of the Site.

North:	Areas immediately adjoining to the north of the Site include the following: farm land
South:	Areas immediately adjoining to the south of the Site include the following: farm land
East:	Areas immediately adjoining to the east of the Site include the following: farm land
West:	Areas immediately adjoining to the west of the Site include the following: farm land, power lines, oil pipeline, and then a solar farm and two cell towers
No recognized environmental conditions (RECs) were identified based on the current uses of the adjoining properties.	

4.0 RECORDS REVIEW

4.1 Standard Environmental Record Sources

4.1.1 State and Federal Regulatory Review

Information from standard Federal and state environmental record sources was provided through Environmental Data Resources (EDR). Data from governmental agency lists are updated and integrated into one database, which is updated as these data are released. This integrated database also contains postal service data in order to enhance address matching. Records from one government source are compared to records from another to clarify any address ambiguities. The demographic and geographic information available provides assistance in identifying and managing risk. The accuracy of the geocoded locations is approximately +/-300 feet.

In some cases, location information supplied by the regulatory agencies is insufficient to allow the database companies to geocode facility locations. These facilities are listed under the unmappables section within the EDR report. A review of the unmappable facilities indicated that none of these facilities are within the ASTM minimum search distance from the Site. These facilities are discussed under the appropriate database heading below. PES ran three separate databases with a 2-mile radius in order to cover the entire project area.

Regulatory information from the following database sources were reviewed for information within the ASTM minimum search distance from the Site. Specific facilities are discussed below if the potential for a recognized environmental condition (REC) has resulted at the Site from the listed facilities. The October 2022 EDR database covered on the three new parcels (#044-101-11, 16, & #044-102-23) for a one mile radius search. Please refer to Appendix A for a complete listing.

Federal NPL

The National Priorities List (NPL) is the U.S. Environmental Protection Agency (EPA) database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program. *The Site is not listed as a NPL facility. No NPL sites are located within two mile radius of the Site. The October 2022 database listed no NPL sites.*

Federal Delisted NPL

The Delisted NPL is the U.S. EPA database of sites that have been deleted from the NPL where no further response is appropriate. *The Site is not listed as a Delisted NPL facility. No Delisted NPL sites are located within two mile radius of the Site. The October 2022 database listed no Delisted NPL sites.*

Federal CERCLIS List

The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) list is a compilation of sites that the EPA has investigated or is currently investigating for a release or threatened release of hazardous substances. *The Site is not listed as a CERCLIS facility. No CERCLIS sites are listed within two mile radius of the Site. The October 2022 database listed no CERCLIS sites.*

Federal CERCLIS NFRAP Sites List

The CERCLIS No Further Remedial Action Planned (NFRAP) List is a compilation of sites that the EPA has investigated, and has determined do not pose a threat to human health or the environment, under the CERCLA framework. *The Site is not listed as a CERCLIS-NFRAP facility. No CERCLIS-NFRAP sites are listed within two mile radius of Site. The October 2022 database listed no CERCLIS-NFRAP sites.*

Federal RCRA CORRACTS Facilities List

The EPA Resource Conservation and Recovery Act (RCRA) Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The CORRACTS database is the EPA's list of hazardous waste handlers subject to corrective action under RCRA. *The Site is not listed as a RCRA CORRACTS facility. No RCRA CORRACTS sites are listed within two mile radius of the Site. The October 2022 database listed no RCRA CORRACTS sites.*

Federal RCRA Non-CORRACTS TSD Facilities List

The RCRA Non-CORRACTS Treatment, Storage and Disposal (TSD) database is a compilation by the EPA of reporting facilities that treat, store or dispose of hazardous waste. *The Site is not listed as a RCRA Non-CORRACTS TSD facility. No RCRA Non-CORRACTS TSD sites are listed within two mile radius of the Site. The October 2022 database listed no RCRA Non-CORRACTS TSD sites.*

Federal RCRA Generators List

The RCRA program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA Generators database is a compilation by the EPA of reporting facilities that generate hazardous waste. *The Site is not listed as a RCRA facility. No RCRA Generator sites are listed on the adjoining properties or within the database two mile radius. The October 2022 database listed no RCRA Generator sites.*

Federal Institutional Control / Engineering Control Registries

The U.S. institutional control (INST CONTROL) and engineering control (ENG CONTROL) registries include sites with engineering controls and institutional controls in place. Engineering controls including various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health. Institutional controls include administrative measures intended to prevent exposure to contaminants remaining on site. *No U.S. INST CONTROL or ENG CONTROL sites are listed on the Site. or within the database two mile radius. The October 2022 database listed no U.S. INST CONTROL or ENG CONTROL sites.*

Federal ERNS

The Emergency Response Notification System (ERNS) is a national database used to collect information on reported releases of oil or hazardous substances. *No ERNS sites are listed for the Site or within the database two mile radius. The October 2022 database listed no ERNS sites.*

State CERCLIS-Equivalent List

The State maintains a State CERCLIS-equivalent list (SCL) of facilities under investigation that could be actually or potentially contaminated and presenting a possible threat to human health and the environment. *The Site is not listed as a SCL facility. No SCL sites are listed within two mile radius of the Site. One non-geocoded SCL (Farm Flite Ag Service) was listed in the*

database. PES did not observe this site within the two mile radius during the site area canvass. The October 2022 database listed no SCL sites.

Solid Waste/Landfill Facilities

A database of Solid Waste and/or Landfill (SWLF) facilities is maintained by the state. *The Site is not listed as a SWLF facility. No SWLF sites are listed within two mile radius of the Site. Three non-geocoded SWLF sites (Bitterwater Creek Pumping Station, Mustang Hill Landfill, and Lost Hill Transfer Station) were listed in the database. PES did not observe these sites within the two mile radius during the site area canvass. The October 2022 database listed no SWL sites.*

State Leaking Underground Storage Tank List

The State compiles lists of all leaking underground storage tanks (LUST). *The Site is not listed as a LUST facility. One LUST site is listed within two mile radius of the Site (Shell Pipeline - 0.94 miles west). The Pipeline had a release of crude oil in 1992. Based on the CA records, the clean up is complete and the file is inactive. The last report on file with the state was from a soil sampling report from 1992 (Appendix C). The report indicated that the lab results for the excavated soils were all below the state criteria for reuse on the site. This LUST listing can be considered upgradient of the project Site. However, given the inactive nature of the listing, the LUST poses no risk to the project Site at this time. The October 2022 database listed no LUST sites.*

State Registered Storage Tank List

The State compiles a list of registered petroleum tank (i.e. underground and aboveground storage tank (UST/AST) locations. *The Site is not listed as a UST/AST facility. No registered UST/AST sites are listed within a two mile radius of the Site. The October 2022 database listed no UST/AST sites.*

State Institutional Control / Engineering Control Registries

The State compiles a list of INST CONTROL and ENG CONTROL sites. *No State INST CONTROL or ENG CONTROL sites are listed for the Site or within the database two mile radius. The October 2022 database listed no INST CONTROL or ENG CONTROL sites.*

State Voluntary Cleanup Sites

The State compiles a list of Voluntary Cleanup Program (VCP) sites. *No VCP facilities are listed for the Site. No VCP sites are listed within two mile radius of the Site. The October 2022 database listed no VCP sites.*

State Brownfields Sites

The State compiles a list of Brownfield sites. *No Brownfield facilities are listed for the Site. No Brownfield sites are listed within two mile radius of the Site. The October 2022 database listed no Brownfields sites.*

State SPILLS/OTHER sites

No SPILLS/OTHER sites are listed for the Site. No SPILLS and four OTHER sites are listed within two mile radius of the Site. All of the site are located either to the west or southwest of the Site parcels. The listed sites are for FINDS (Verizon), CIWQS (West Side Solar and Route 5 Construction site) and CERS (1992 Shell Pipeline cleanup) and not considered to be to pose a risk to the project area at this time. The October 2022 database listed no SPILLS/OTHER sites.

4.1.2 Regulatory Agency Review

4.1.2.1 State Agency

A file review was performed for the Site with the State. This file review consisted of an online search of the State records by EDR. There are no current records on file for the Site with the State, other than what is described above in the EDR database findings.

4.1.2.2 Assessor & Health Dept.

According the County Assessor's Office, no environmentally-related liens or deed restrictions have been recorded against the Site.

4.1.2.3 Fire Officials

Records from local Fire Department were reviewed for evidence indicating the presence of petroleum bulk storage tanks and for the use of hazardous materials. No current records were found for the Site address.

4.1.2.4 Planning/Building Department

Records from County Planning/Building Department were reviewed for evidence indicating the developmental history of the Site, and for the presence of documentation relative to petroleum bulk storage tanks. Land use was indicated as farm land.

4.2 Physical Setting Sources

4.2.1 Topography

The United States Geological Survey (USGS), Lone Tree Well, West Camp, Lost Hill NW, CA Quadrangle 7.5 minute series topographic map was reviewed for this ESA. This map was published by the USGS in 2019. According to the contour lines on the topographic map, the Site is located at approximately 214-221 feet above mean sea level (MSL). The contour lines in the area of the Site indicate the area is sloping to the northeast.

4.2.2 Soils/Geology

Based on the on-line soil survey maps published by the USDA Soil Conservation Service, the Site is unmapped but is likely as loamy clay soils of the Houser-Nahrub-Twisselman Association. The estimated depth to bedrock at the Site is approximately >20 feet bgs. The site bedrock consists of sandy shales, sandstones, and clays of the McKittrick Formation.

4.2.3 Hydrology

Based on the topography of the Site and vicinity, groundwater flow beneath the Site is inferred to be in a northeasterly direction. Surface water is located along the eastern boundary of the Site (Kern River). Wetland areas were not noted on the Site. The National Wetlands Map shows no wetland areas on the Site, but there are areas further to the east of the Site.

The EPA defines a sole or principal source aquifer as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas may have no alternative drinking water source(s) that could physically, legally and economically supply all those who depend on the aquifer for drinking water. For convenience, all

designated sole or principal source aquifers are referred to as "sole source aquifers" (SSA). This designation was made under Section 1424(e) of the Safe Drinking Water Act. The Site is not situated above a SSA.

4.2.4 Flood Zone Information

A review of the Flood Insurance Rate Maps, published by the Federal Emergency Management Agency (FEMA), was performed. According to Panel Number 06029C0650E and 06029C0125E, the Site is located in Flood Zone X and Zone AE. Flood Zone X regions consist of those areas that are outside the 100-year flood zone and Zone AE are areas within the 100-year flood zone.

4.2.5 Oil and Gas Exploration

According to web-based information available from the State, the Site is mapped in an area where there is current or historical exploration or production of oil, gas, or geothermal resources. There is one dry plugged hole, one plugged well, and one cancelled well (never drilled) within the project area. There are several other dry plugged holes to the west and east of the project boundary. There are no active wells on the wells parcels. PES did not observe these wells during the site visit. The wells may have been buried and fully abandoned. There is one listed dry well (plugged) on Parcel #044-101-11 (northeast corner). Mr. Widhalm was unaware of any oil wells on the property, since his ownership.

There is a Shell Oil pipeline that runs northwest to southeast further to the west of the northwest section of the project area (not on the project Site). PES also noted a gas pipeline marker that appears to run west to east thru parcels 044-101-02, 044-101-05, 044-101-03, and 044-102-01 within the project Site boundary.

4.3 Historical Use Information

The historical use of the Site was determined based on review of aerial photographs. The following briefly summarizes the developmental history of the Site.

4.3.1 Aerial Photographs

Available aerial photographs dated *1994, 2003, 2012, and 2022*, from Google Earth, were reviewed for this ESA. Copies of selected photographs are included in Appendix C of this report. The site appears as undeveloped cattle and farm land in all the photos.

4.3.2 Fire Insurance Maps

Fire insurance maps were created for insurance underwriters and often contain information regarding the uses of individual structures, and the locations of fuel and/or chemical storage tanks that may have historically been on a property. No fire insurance map collection was available for the Site area.

4.3.3 City Directories

Historical city directories were not available for the site. The lack of city directories does not represent a data gap for the report.

4.3.4 Chain of Title

A 50-year chain-of-title was not warranted for this study. Historical use of the Site was researched using other standard historical sources. The site is owned by the Wonderful Nut Orchards LLC & Paramount Orchards VI LLC. PES reviewed the following title report: #00844909-988-CIO-ML9, prepared by Ticor Title Company, dated June 3, 2022. PES noted no environmental liens or issues in the title reports. There are water rights, mineral rights and conservation (agricultural) easements on some of the parcels. PES reviewed the following Title Reports: #1796955, dated August 10, 2022; #1796967, dated August 16, 2022; and #1825827, dated September 8, 2022, prepared by Stewart Title Company. PES noted no environmental liens or issues in the title reports. There are water rights, a PG&E natural gas line easement, and mineral rights on the parcels.

4.3.5 Additional Environmental Record Sources

No additional environmental record sources were available for the project area. PES interviewed the property owner (Mike Widhalm). Mr. Widhalm indicated that he has owned for 20+ years. The parcels were used for cotton and grain historically. The last 10 years the parcels have been used for cattle grazing only. Mr. Widhalm indicated that there are no septic systems, fuel tanks or potable water wells on the parcels. Mr. Widhalm indicated that is one irrigation well on the parcel that is used for the cattle. Additionally, Mr. Widhalm was unaware of any environmental issues on the parcels. There has not been any pesticide or herbicide usage at the parcels for over 10 years.

4.3.6 Historical Use Information on Adjoining Properties

By review of the standard historical sources referenced above, the historical uses of the adjoining properties were similar to the current usage in all aerial photos. PES also reviewed a Soil Sampling Report, dated 12-11-92, prepared by Advanced Environmental Concepts Inc. The report covered the soil sampling from excavated soils from the pipeline to the west of the subject Site. The sampling took places at three locations along the pipeline. The results indicated that no levels of hydrocarbons in the soils were above the State of CA limits. The soils were re-used on site for earthen berms along the pipeline. Based upon the data, the pipeline soils do not constitute a Controlled REC or Historical REC in relation to the subject site at this time.

5.0 SITE REVIEW

5.1 General Site Characteristics

The Site is farm/cattle land with a irrigation ditches, and a few areas of debris piles. There are cattle water/feed stations on some of the parcels. There is a cattle corral, four grain silos, and a building located in the southwest section of Parcel #044-150-17. Additionally, there is a small electrical power station located on the parcel to the northeast of Parcel #044-103-06, that is used for the irrigation control structures (not on the project Site). Vehicle access to the Site is provided off of Twisselman Road. There is an existing solar field and two cell towers located in the southwest portion of Parcel 044-150-09 along the main access road for the project (not on the project Site). There is a gas pipeline further to the west of the project Site and power lines that border the northwest portion of the proposed project Site. The three new parcels (#044-101-11, 16, & #044-102-23) were undeveloped farm land, with a power line running through the southwest corner of Parcel #044-101-16. No significant surface features were noted on the Site during the review.

5.1.1 Solid Waste Disposal

No solid waste disposal was noted on the Site, other than some minor debris (metal & wood, and few tires) at the building on parcel 044-150-17. No indication of potentially hazardous material disposal was noted during PES's review. No debris was noted on the Parcels #044-101-11, 16, & #044-102-23 during the October 2022 visit.

5.1.2 Surface Water Drainage

The Kern River and a water irrigation pipeline is located along the eastern boundary of the parcels and several irrigation ditches located throughout the parcel. The canals were dry during the site visit.

5.1.3 Wells and Cisterns

No aboveground evidence of cisterns were noted during the Site review. Mr. Widhalm indicated that there is one irrigation well use for cattle water on Parcel #044-103-01.

5.1.4 Wastewater

No indications of industrial/sanitary wastewater disposal or treatment facilities were noted during the Site review.

5.1.5 Additional Site Observations

No additional relevant general Site characteristics were noted.

5.2 Potential Environmental Conditions

5.2.1 Hazardous Materials and Petroleum Products Used or Stored at the Site

No evidence of the use of hazardous materials or wastes was noted on the Site during the site review. Portions of the project area were used as farm land historically. There was likely use of pesticides and fertilizers on some areas of the site. According to Mr. Widhalm, no fertilizers or herbicides have been used in the last 10+ years.

5.2.1.1 Unlabeled Containers and Drums

No unlabeled containers or drums were noted during the Site review.

5.2.1.2 Disposal Locations of Regulated/ Hazardous Waste

No obvious indications of hazardous waste generation, storage or disposal were noted on the Site or were indicated during interviews.

5.2.2 Evidence of Releases

No obvious indications of hazardous material or petroleum product releases, such as stained areas or stressed vegetation, was noted during the Site review.

5.2.3 Polychlorinated Biphenyls (PCBs)

Older transformers and other electrical equipment could contain polychlorinated biphenyls (PCBs) at a level that subjects them to regulation by the U.S. EPA. PCBs in electrical equipment are controlled by United States Environmental Protection Agency regulations 40 CFR, Part 761. Under the regulations, there are three categories into which electrical equipment can be classified:

- Less than 50 parts per million (PPM) of PCBs – "*Non-PCB" transformer*
- 50 ppm-500 ppm – "PCB-Contaminated" electrical equipment
- Greater than 500 ppm – "*PCB" transformer*

PES noted several pole-mounted electrical transformers and one pad mounted transformer are located on the Site. All the units are labeled as non-PCB containing. No staining or leakage was noted around the units. No other electrical equipment expected to contain PCBs was noted on the Site during PES's review.

5.2.4 Landfills

No evidence of on-Site landfills were noted or reported during the Site review.

5.2.5 Pits, Ponds, Lagoons, Sumps, and Catch Basins

No evidence of on-Site pits, ponds, or lagoons was noted or reported during the Site review. No evidence of sumps or catch basins were noted or reported during the Site review.

5.2.6 On-Site ASTs and USTs

No evidence of aboveground storage tanks (ASTs) or underground storage tanks (USTs) was noted during the Site review. PES did note several water holding tanks that are used for the cattle.

5.2.7 Vapor Migration

During PES's Site observations, review of historical sources, and review of regulatory databases, no current or historical usage of chemicals of concern at the Site or reported release or other indication of subsurface contamination from an onsite source was evident. Additionally, no release or material threat of a release to the subsurface from an offsite source was identified. As such, a vapor migration concern was not identified for the Site during the course of this assessment.

5.2.8 Radiological Hazards

No radiological substances or equipment was noted or reported to be stored on the Site.

5.2.9 Drinking Water

The Site has no on-site drinking water wells (other than the one well for the cattle) or municipal services.

5.2.10 Additional Hazard Observations

No additional hazards were noted on the Site.

5.2.11 Asbestos-Containing Materials (ACM)

No suspected areas of ACMs were noted on the parcel.

5.2.12 Radon

The U.S. EPA has prepared a map to assist National, State, and local organizations to target their resources and to implement radon-resistant building codes. The map divides the country into three Radon Zones, based on the EPA Action limit of 4.0 picoCuries per Liter (pCi/L). Review of the EPA Map of Radon Zones places the Site in Zone 2, where average predicted radon levels are greater than 4.0 pCi/L. Additionally, based on the undeveloped nature of the site, radon is not considered to be a concern for the Site.

5.2.13 Lead-Based Paint

No suspected areas of lead-based paints were noted on the parcel.

5.2.14 Mold

No suspected areas of mold were noted on the parcel.

6.0 INTERVIEWS

Interviews were conducted with the following individuals. Findings from these interviews are discussed in the appropriate sections in this report.

Contact Name	Affiliation	Telephone No	Date Interviewed	Comments
Jon Lifquist	County Assessor	661-868-3485	7-5-22/10-5-22	No issues known
Aaron Duncan	Fire Department	661-797-2308	7-5-22/10-5-22	No issues known
Loreiei Oviatt	County Building-Planning	661-862-8600	7-5-22/10-5-22	No issues known
Brynn Carrigan	County Health Dept	661-321-3000	7-5-22/10-5-22	No issues known
Mike Widhalm	Property owner	661-301-3973	7-5-22/10-5-22	No issues known

7.0 FINDINGS AND CONCLUSIONS

7.1 Findings

7.1.1 On-Site Recognized Environmental Conditions (RECs)

No on-Site RECs were identified during the course of this assessment.

7.1.2 Off-Site Recognized Environmental Conditions (RECs)

No off-Site RECs were identified during the course of this assessment.

7.1.3 Historical/Controlled Recognized Environmental Conditions (HRECs/CRECs)

No HRECs or CRECs were identified on the Site during the course of this assessment.

7.1.4 De Minimis Environmental Conditions (DECs)

Portions of the project area were used as farm land historically. There was likely use of pesticides and fertilizers on those areas of the site. Any residual materials (pesticides or fertilizers) in the site soils would be considered a historical *de minimis* environmental condition.

7.2 Opinion

During the performance of this ESA, no environmental conditions were identified that likely would impact the Site.

7.3 Conclusions

PES has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E1527-21 of the parcels for the Pelicans Jaw Hybrid Solar Project located along Twisselman Road in Lost Hill, Kern County, CA (the Site). Any exceptions to or deletions from this practice are described in Section 2.4 of this report. This assessment has revealed no evidence of recognized environmental conditions (RECs) in connection with the Site.

7.4 Recommendations

No further actions or investigations are recommended at this time.

7.5 Deviations

This Phase I ESA substantially complies with the scope of services and E1527-21, as amended, except for exceptions and/or limiting conditions as discussed in Section 3.4.

8.0 REFERENCES

REPORTS, PLANS, AND OTHER DOCUMENTS REVIEWED:

Aerial Photographs – EDR - 1994, 2003, 2012, 2021

EDR Radius Map Reports

Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, Community Panel Number 06029C0650E & 06029C0125E

State or Federal radon info.

State Groundwater or Water Well Maps

State Oil and Gas Map reviewed

USEPA National Radon Survey, 1993.

USGS - 7.5 Minute Topographic Quadrangle

USGS Soil Survey (online)

Title Report: #00844909-988-CIO-ML9, prepared by Ticor Title Company, dated June 3, 2022

Title Reports: #1796955, dated August 10, 2022; #1796967, dated August 16, 2022; and #1825827, dated September 8, 2022, prepared by Stewart Title Company

PES Site Visit - 7-3-2022 (entire project area), 10-5-22 (three new Parcels #044-101-11 & 16, #044-102-23)

Owner Interview - Mike Widhalm - 7-5-22 & 10-5-22

AGENCIES CONTACTED:

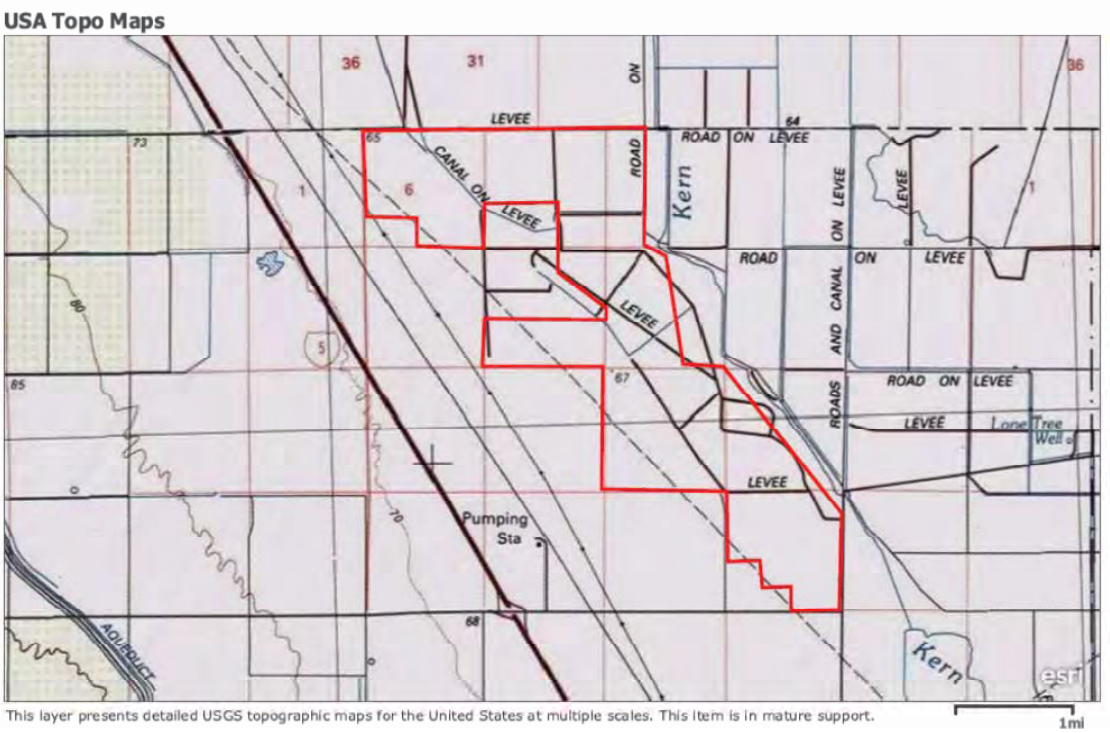
County - Fire Department

County - Tax Assessor

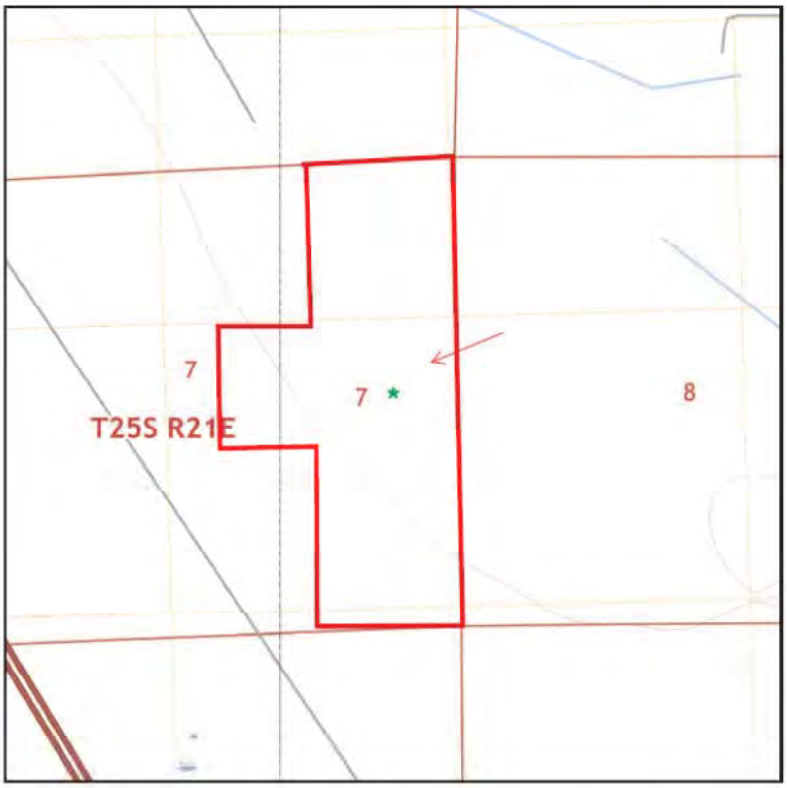
County - Building/Planning/Health Dept.

FIGURES

Figure 1 - Topo

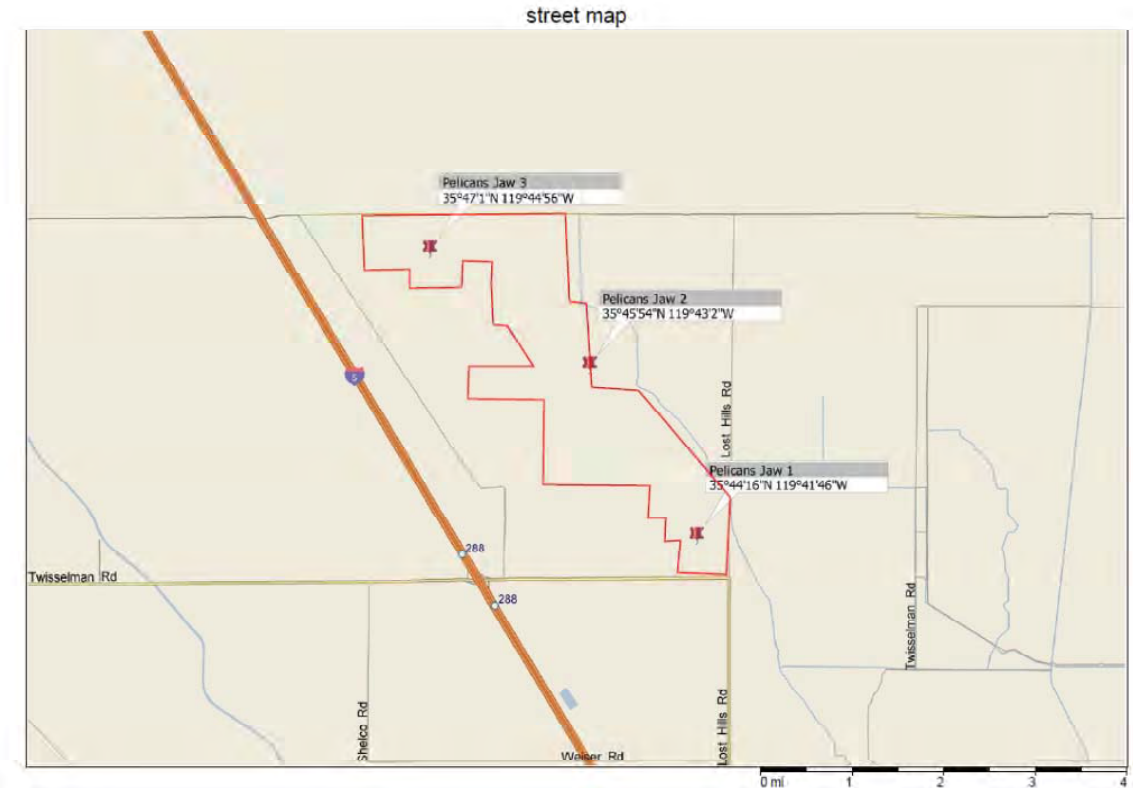


Topo for Parcels - 044-101-11, 16, & 044-102-23



USGS - Lone Tree Well, West Camp, Lost Hill NW

Figure 2 - Site Location



****EDR 2-Mile Databases run based on each of the three points on this map****

Parcels - 044-101-11, 16, & 044-102-23

Figure 3 - Site Map

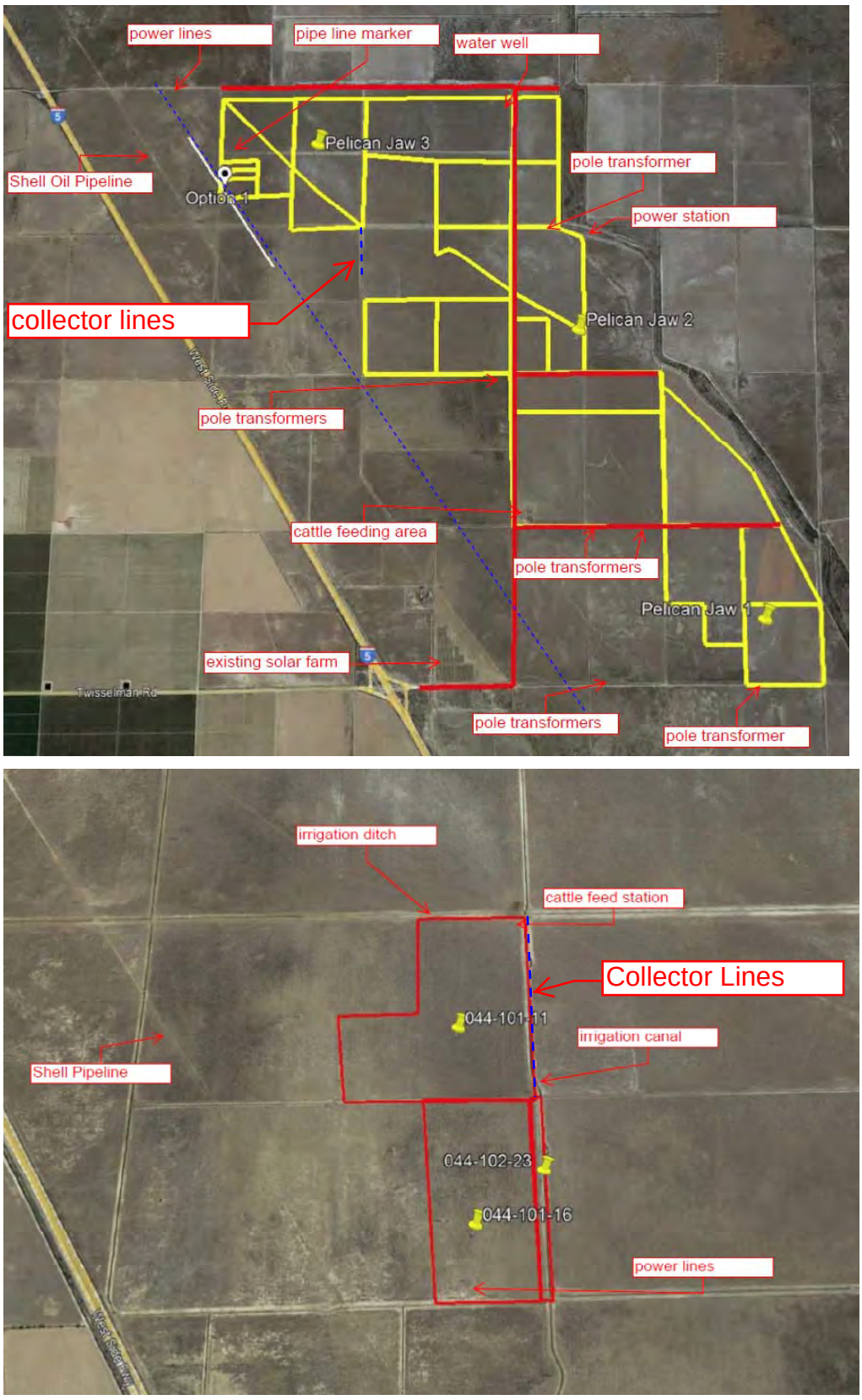


Figure 4 - Tax Parcel Map

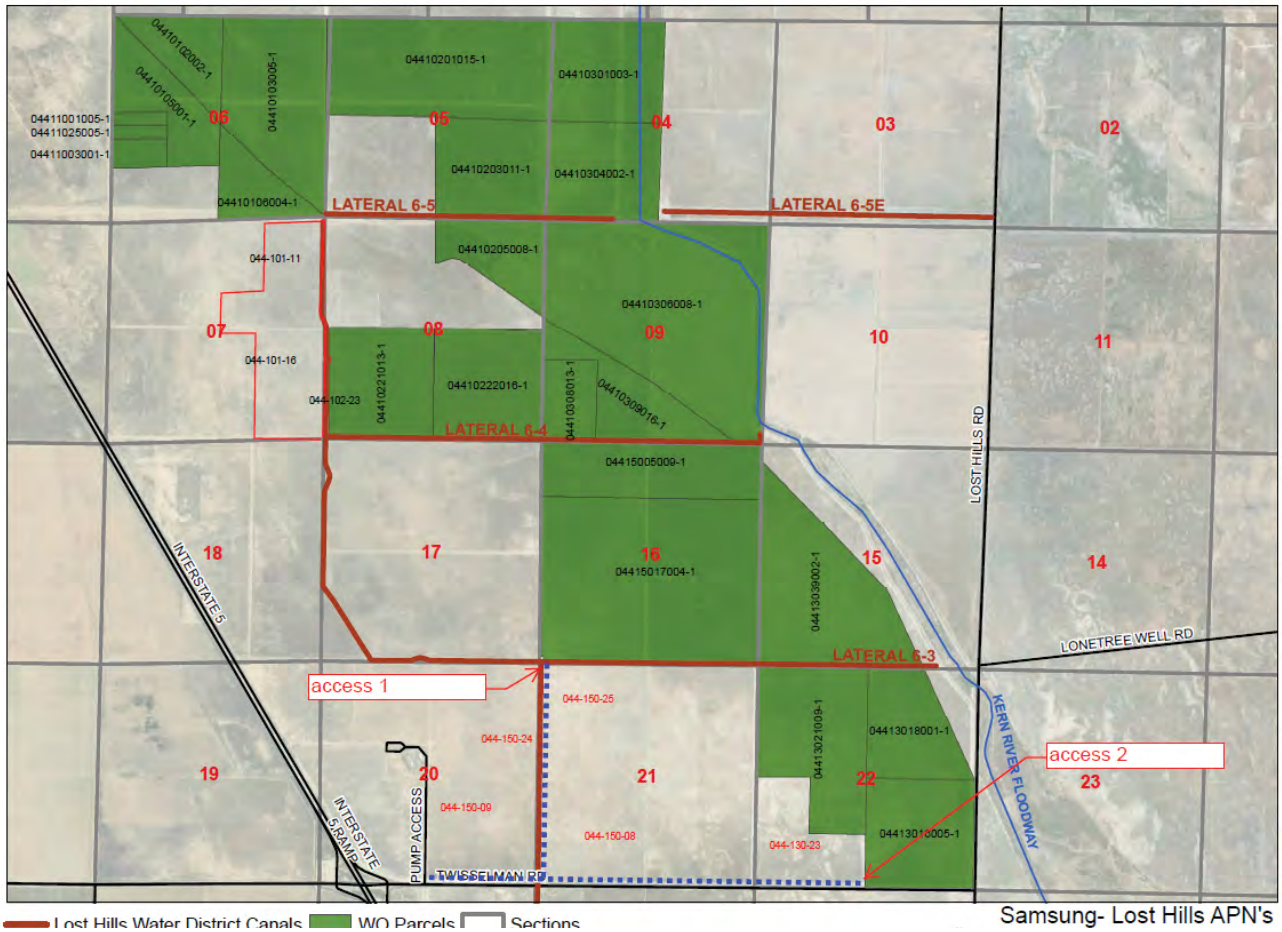


TABLE 1 - PARCEL LIST

Land Owner	APN	Acreage
WONDERFUL NUT ORCHARDS LLC	044-102-01	320.00
	044-102-03	160.00
	044-103-01	80 ac of a 160 ac total
	044-103-04	80 ac of a 160 ac total
	044-101-03	254.69
	044-101-02	87.29
	044-101-06	65.73
	044-101-05	111.99
	044-110-01	10.00
	044-110-25	10.00
	044-110-03	20.00
	044-102-05	91.64
	044-102-21	153.90
	044-102-22	160.00
	044-103-06	175 ac of 478.65 ac total
	044-103-08	60.00
	044-103-09	72 ac of 101.35 ac total
	044-150-05	160.00
	044-150-17	479.77
	044-130-39	230.02
	044-130-21	200.00
	044-130-18	120.00
	044-130-16	158.18
	044-150-09	access road
	044-150-24	access road
	044-150-25	access road
	044-150-08	access road
	044-130-23	access road
	044-101-11	100.00
	044-101-16	80.00
	044-102-23	6.10
Total		3,039.31

APPENDIX A

ENVIRONMENTAL DATABASE
&
LEGAL DESCRIPTIONS

LEGAL DESCRIPTIONS

APN: 044-102-03 THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM ALL MINERALS OF EVERY KIND AND DESCRIPTION, INCLUDING OIL, PETROLEUM, GAS AND ALL OTHER MINERALS IN, UPON OR UNDER THE SAID LAND, AS EXCEPTED AND RESERVED IN DEED DATED OCTOBER 24, 1955, FROM DEL MONTE PROPERTIES COMPANY TO JOAQUIN IZU, ET AL, RECORDED DECEMBER 19, 1955 IN BOOK 2531 PAGE 251, OFFICIAL RECORDS, WHICH DEED PROVIDES AS FOLLOWS: (A) WITH FILL POWER AND RIGHT TO THE PARTY OF THE FIRST PART, ITS HEIRS AND ASSIGNS, TO MINE, EXCAVATE, DRILL, EXPLORE AND DEVELOP SAID LAND IN SUCH LOCATIONS, WHERE IN THE OPINION OF THE PARTY OF THE FIRST PART, ITS HEIRS AND ASSIGNS, ANY SUCH MINERALS MAY BE LOCATED. (B) THE RIGHT TO USE SUCH PORTIONS OF HE SURFACE OF SAID LANDS AS MAY BE NECESSARY TO CARRY ON OR CONDUCT THEIR MINING, OIL, AND GAS OPERATIONS ON SAID LANDS, AND TO EXTRACT AND REMOVE FROM SAID LANDS ALL MINERALS OF EVERY CHARACTER AND DESCRIPTION, INCLUDING OIL, PETROLEUM, GAS AND ALL OTHER MINERALS WHICH THEY PRODUCE, DEVELOP OR EXTRACT FROM SAID LANDS, AND TO TAKE ALL USUAL, NECESSARY AND PROPER MEANS FOR WORKING AND OPERATING ANY MINES OR WELLS SAID LAND. (C) ALL NECESSARY EASEMENTS AND RIGHTS. OF WAY OVER AND THROUGH. ANY AND ALL PARTS OF SAID LAND FOR INGRESS TO AND EGRESS FROM ANY WELLS, OR MINES, WHICH ARE LOCATED OR DEVELOPED FROM TIME TO TIME UPON SAID LANDS, AND FOR CONVEYING MINING EQUIPMENT AND SUPPLIES AND MINING PRODUCTS TO AND FROM WHERE SAID WELLS OR MINES MAY FROM TIME TO TIME BE LOCATED OR DEVELOPED, TOGETHER WITH THE RIGHT TO LAY AND MAINTAIN PIPES FOR CONVEYING OIL, GAS, WATER OR OTHER SUBSTANCES. (D) THE RIGHT TO ERECT POLES AND WIRES ON SAID LANDS FOR CONVEYING ELECTRIC, OR OTHER POWER, TO AND FROM ANY WELL OR MINES, MANUFACTORY OR OTHER STRUCTURE WHICH MAY FROM TIME TO TIME BE LOCATED ON SAID LAND. (E) THE RIGHT TO ERECT, MAINTAIN AND OPERATE TELEPHONE AND TELEGRAPH LINES IN CONNECTION WITH THEIR OPERATIONS ON THE SAID LANDS,. AND ALSO THE RIGHT TO GUILD TANKS, TOWERS, AND OTHER STRUCTURES OF SAID LANDS TO PRODUCE, SAVE AND TAKE CARE OF ALL MINERALS WHICH THEY PRODUCE, DEVELOP OR EXTRACT FROM THE SAID LANDS, WITH THE RIGHT TO REMOVE ANY AND ALL BUILDINGS, MACHINERY, PIPE LINES OR OTHER PROPERTY ERECTED OR PLACED ON SAID LANDS IN CONNECTION WITH THEIR OPERATIONS THEREON.

PARCEL 7 APN: 044-110-01 THE NORTH HALF OF THE NORTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL FLAT THEREOF. EXCEPTING THEREFROM AN UNDIVIDED 1/2 OF ALL OIL, GAS, AND HYDROCARBON SUBSTANCES AND MINERALS, AS RESERVED IN DEED, EXECUTED BY WEST HAVE FARMING COMPANY, A COOPERATION AND WESTFARMERS, A CALIFORNIA GENERAL PARTNERSHIP, RECORDED FEBRUARY 28, 2003, AS INSTRUMENT NO. 0203038168, AND RE-RECORDED JUNE 12, 2003 AS INSTRUMENT NO. 0203114997, OF OFFICIAL RECORDS.

PARCEL 8 APN: 044-110-03 THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING 7/8THS OF ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES, IN DEED RECORDED MARCH 17, 1981 IN BOOK 5359 PAGE 1951, OF OFFICIAL RECORDS. ALSO EXCEPTING THEREFROM AN UNDIVIDED 1/16TH OF ALL OIL, GAS, AND HYDROCARBON SUBSTANCES AND MINERALS, AS RESERVED IN DEED, EXECUTED BY WEST HAVE FARMING COMPANY, A COOPERATION AND WESTFARMERS. A CALIFORNIA GENERAL PARTNERSHIP, RECORDED FEBRUARY 28, 2003, INSTRUMENT NO. 0203038168 AND RERECORDED JUNE 12, 2003, INSTRUMENT NO. 0203114997, BOTH OF OFFICIAL RECORDS. APN:

PARCEL 9 APN: 044-110-25 THE SOUTH HALF OF THE NORTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 6, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT THEREFROM 50% OF ALL OIL, GAS, AND OTHER HYDROCARBON SUBSTANCES LYING IN AND UNDER SAID LAND, AS RESERVED BY FREDERICK N. HADLWY, ET UK, IN DEED

RECORDED JANUARY 25, 1977 IN BOOK 5003, PAGE 1770, OF OFFICIAL RECORDS. ALSO EXCEPTING THEREFROM AN UNDIVIDED 25% OF ALL OIL, GAS, AND HYDROCARBON SUBSTANCES AND MINERALS, AS RESERVED IN DEED, EXECUTED BY WEST HAVE FARMING COMPANY, A COOPERATION AND WESTFARMERS. A CALIFORNIA GENERAL PARTNERSHIP, RECORDED FEBRUARY 28, 2003, INSTRUMENT NO. 0203038168 AND RE-RECORDED JUNE 12, 2003, INSTRUMENT NO. 0203114997, BOTH OF OFFICIAL RECORDS.

PARCEL 10 APN: 044-103-08 THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER AND THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 9, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM ALL OIL, GAS AND MINERAL RIGHTS, WITHIN AND UNDER SAME, TOGETHER WITH RIGHT OF INGRESS AND EGRESS TO RECOVER SAME AS RESERVED IN THE DEED FROM ETHEL B. COOPER, A MARRIED WOMAN AND FINIS G. COOPER, A MARRIED MAN, RECORDED APRIL 4, 1974 IN BOOK 4834, PAGE 1195 OF OFFICIAL RECORDS.

PARCEL 11: APN: 044-103-06 ALL THAT PORTION OF SECTION 9, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA, COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, WHICH LIES NORTHEASTERLY OF THE SWAMP AND OVERFLOW SEGREGATION LINE. EXCEPTING FROM THAT PORTION LYING WITHIN LOT 2 IN THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 9 ONE-SIXTEENTH OF ALL COAL, OIL, GAS AND OTHER MINERAL DEPOSITS CONTAINED IN SAID LAND AS PROVIDED BY AN ACT OF THE LEGISLATURE, APPROVED MAY 25, 1921 (CHAPTER 303 STATUTES OF CALIFORNIA, 1921) AS RESERVED BY THE STATE OF CALIFORNIA IN PATENT RECORDED DECEMBER 20, 1939 IN BOOK 903, PAGE 386 OF OFFICIAL RECORDS. ALSO EXCEPTING ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS RESERVED IN DEED FROM WARD THOMAS, ET AL, RECORDED APRIL 19, 1974 IN BOOK 4836, PAGE 2254 OF OFFICIAL RECORDS.

PARCEL 12: APN: 044-103-09 ALL OF THE GOVERNMENT OR HIGHLAND (CONTRA-DISTINGUISHED FROM SWAMP AND OVERFLOWED LAND GRANTED TO THE STATE OF CALIFORNIA) IN SECTION 9, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM THE SOUTHWEST QUARTER OF THE SOUTHWEST QUARTER, AND THE SOUTH HALF OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 9. ALSO EXCEPTING THEREFROM ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDER SAID LAND, AS EXCEPTED BY IRENE MEDOFF IN DEED RECORDED MAY 3, 1974 IN BOOK 4839, PAGE 280, OFFICIAL RECORDS.

PARCEL 13: APN: 044-102-22 THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA, COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES IN AND UNDER SAID LAND, AS RESERVED BY DOROTHY J. MC VICKER, IN DEED RECORDED MARCH 1, 1974, IN BOOK 4828, PAGE 2003 , OF OFFICIAL RECORDS.

PARCEL 14: APN: 044-102-21 AND 044-102-23 THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS EXCEPTED AND RESERVED TO CROCKER-NATIONAL BANK, TRUSTEE, UNDER THE WILL OF MIRIAM M. STUTSMAN, DECEASED, IN DEED RECORDED APRIL 24, 1974, IN BOOK 4837, PAGE 1485 , OF OFFICIAL RECORDS.

PARCEL 15: APN: 044-102-05-00 ALL THAT PORTION OF THE NORTHEAST QUARTER OF SECTION 8, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA, COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, WHICH LIES NORTHEASTERLY OF THE SWAMP AND OVERFLOW SEGREGATION LINE. EXCEPTING THEREFROM ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS

RESERVED IN DEED FROM WARD THOMAS, ET AL, RECORDED APRIL 19, 1974 IN BOOK 4836, PAGE 2254, OF OFFICIAL RECORDS.

PARCEL 16: APN: 044-103-04 THE SOUTHWEST QUARTER OF FRACTIONAL SECTION 4, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA, OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT AN UNDIVIDED 25% OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCE WITHIN OR UNDERLYING SAID LAND, AS RESERVED BY GEORGE M. BENNETT, ET UX, IN DEED RECORDED MARCH 20, 1975, IN BOOK 4887 PAGE 1097 OF OFFICIAL RECORDS. ALSO EXCEPTING AN UNDIVIDED 25% OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS RESERVED BY RICHARD W. BENNETT, ET UX, IN DEED RECORDED MARCH 20, 1975, IN BOOK 4887 PAGE 1098 OF OFFICIAL RECORDS. ALSO EXCEPTING AN UNDIVIDED 25% OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS RESERVED BY GEORGE F. ALLEN, ET UX, IN DEED RECORDED MARCH 20, 1975, IN BOOK 4887 PAGE 1099 OF OFFICIAL RECORDS. ALSO EXCEPT ALL REMAINING OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCE WITHIN OR UNDERLYING SAID LAND, AS RESERVED BY MARTIN LACHMAN, A MARRIED MAN WHO TOOK TITLE AS A SINGLE MAN, IN DEED RECORDED DECEMBER 31, 1976 IN BOOK 4999 PAGE 600 OF OFFICIAL RECORDS.

PARCEL 17: APN: 044-103-01 THE NORTHWEST QUARTER OF FRACTIONAL SECTION 4, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPTING THEREFROM ALL OIL, GAS, OTHER HYDROCARBON SUBSTANCES AND MINERALS WITHIN OR UNDERLYING AND WHICH MAY BE PRODUCED FRO SAID LAND, TOGETHER WITH THE RIGHT OF ENTRY THEREON FOR THE PURPOSE OF EXPLORING FOR, DRILLING FOR, PRODUCING, EXTRACTING, AND REMOVING THE SAME, AS RESERVED BY SUPERIOR OIL COMPANY, IN DEED RECORDED AUGUST 23, 1977 IN BOOK 5050 PAGE 775 OF OFFICIAL RECORDS.

PARCEL 18: APN: 044-130-18-00, 044-130-21-00, 044-130-23-00 THE WEST HALF AND THE NORTHEAST QUARTER, EXCEPT LOT 1 IN SECTION 22, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA, COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT FROM THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER AND THE NORTHWEST QUARTER OF SAID SECTION 22, ALL OF THE COAL, PHOSPHATE, SODIUM, GOLD, SILVER, AND ALL OTHER MINERALS DEPOSITS, INCLUDING OIL AND GAS DEPOSITS, AS RESERVED OR OTHERWISE PROVIDED PATENT DATED APRIL 25, 1944, RECORDED JUNE 19, 1944 IN BOOK 1200, PAGE 368, OF OFFICIAL RECORDS, FROM THE STATE OF CALIFORNIA, TO JAMES B. CUTTEN. ALSO EXCEPT FROM THE REMAINDER OF SAID LAND AN UNDIVIDED 1/4TH OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES UNDERLYING SAID LAND, AS RESERVED IN DEED FROM JAMES B. CUTTEN, A MARRIED MAN DEALING WITH HIS SEPARATE PROPERTY, DATED APRIL 10, 1963 RECORDED MAY 13, 1963 IN BOOK 3605, PAGE 732, OF OFFICIAL RECORDS. ALSO EXCEPT ALL REMAINING, OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND AS EXCEPTED IN DEED TO HAROLD M. HILL, ET AL, ET UX., RECORDED JUNE 27, 1974 IN BOOK 4847, PAGE 2055 OF OFFICIAL RECORDS.

PARCEL 19: APN: 044-130-16 THE SOUTHEAST QUARTER OF SECTION 22, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING THE OFFICIAL PLAT THEREOF. EXCEPT AN UNDIVIDED 1/8TH INTEREST IN AND TO ALL OIL, GAS, PETROLEUM, AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS EXCEPTED AND RESERVED IN THE DEED RECORDED FEBRUARY 5, 1970 IN BOOK 4364, PAGE 383, OF OFFICIAL RECORDS. ALSO EXCEPT AN UNDIVIDED 1/2 INTEREST IN AND TO ALL OIL, GAS, PETROLEUM AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS EXCEPTED AND RESERVED IN THE DEED RECORDED FEBRUARY 5, 1970 IN BOOK 4364, PAGE 385 OF OFFICIAL RECORDS. ALSO EXCEPT ALL REMAINING OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND AS EXCEPTED IN DEEDS RECORDED JUNE 27, 1974 IN BOOK 4847 PAGE 2052 AND IN BOOK 4847 PAGE 2055, BOTH OF OFFICIAL RECORDS

PARCEL 20: APN: 044-150-05-00 THE NORTH HALF OF THE NORTH HALF OF SECTION 16, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT ALL OIL, GAS AND MINERAL RIGHTS, WITHIN AND UNDER SAME, TOGETHER WITH RIGHT OF INGRESS AND EGRESS TO RECOVER SAME AS RESERVED IN THE DEED FROM ETHEL B. COOPER, A MARRIED WOMAN AND FINIS G. COOPER, A MARRIED MAN, RECORDED APRIL 4, 1974 IN BOOK 4834, PAGE 1195, OF OFFICIAL RECORDS.

PARCEL 21: APN: 044-130-39 ALL THAT PORTION OF SECTION 15, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF, LYING WESTERLY OF THE SEGREGATION LINE. EXCEPT THEREFROM AN UNDIVIDED 45% INTEREST IN AND TO AN UNDIVIDED 1/3RD INTEREST OF ALL OIL, GAS AND OTHER HYDROCARBON SUBSTANCES AND MINERALS IN OR UNDER SAID PREMISES, OR THAT MAY BE AT ANY TIME BE PRODUCED OR EXTRACTED THEREFROM, TOGETHER WITH THE RIGHT TO PROSPECT FOR, DEVELOP, EXTRACT OR REMOVE THE SAME, AS RESERVED BY DEED FROM NORMA FRANCES COHN, AS TRUSTEE UNDER DECLARATION OF TRUST DATED OCTOBER 22, 1969 RECORDED JULY 19, 1974 IN BOOK 4851, PACE 703, OFFICIAL RECORDS. ALSO EXCEPT AN UNDIVIDED 112 OF AN UNDIVIDED 55% INTEREST IN AND TO AN UNDIVIDED 1/3RD INTEREST IN ALL OIL, GAS, OTHER HYDROCARBON SUBSTANCES AND MINERALS IN AND UNDER SAID LAND, AS RESERVED BY DEED FROM CRACKER NATIONAL BANK, A NATIONAL BANKING ASSOCIATION, TRUSTEE, RECORDED JUNE 17, 1915 IN BOOK 4900 PAGE 6544 OF OFFICIAL RECORDS. ALSO EXCEPT AN UNDIVIDED 4/9THS INTEREST OF AN UNDIVIDED 2/3RDS INTEREST OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND, AS EXCEPTED IN DEED BY MAXINE T. SMITH, THALIA K. CONSIDINE, HERBERT C. KELLY, JR. AND GRAHAM M. KELLY, RECORDED JUNE 3, 1977 IN BOOK 5031 PAGE 1724 OF OFFICIAL RECORDS.

PARCEL 22: APN: 044-150-17 AND 044-150-24 ALL OF SECTION 16, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO MERIDIAN, IN THE UNINCORPORATED AREA OF THE COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT THE NORTH HALF OF THE NORTH HALF OF SAID SECTION 16. ALSO EXCEPT ALL OIL, GAS AND MINERAL RIGHTS, WITHIN AND UNDER SAME, TOGETHER WITH RIGHT OF INGRESS AND EGRESS TO RECOVER SAME AS RESERVED IN THE DEED FROM ETHEL B. COOPER, A MARRIED WOMAN AND FINIS G. COOPER, A MARRIED MAN, RECORDED APRIL 4, 1974, IN BOOK 4834, PAGE 1195 OF OFFICIAL RECORDS.

PARCEL 23: APN: 044-150-08 AND APN: 044-150-25 ALL OF SECTION 21, TOWNSHIP 25 SOUTH, RANGE 21 EAST, MOUNT DIABLO BASE AND MERIDIAN, IN THE UNINCORPORATED AREA, COUNTY OF KERN, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF. EXCEPT THE SOUTH 40 FEET OF SAID SECTION 21 AS CONVEYED TO THE COUNTY OF KERN, IN DEED RECORDED MARCH 19, 1962 IN BOOK 3473 PAGE 532, OFFICIAL RECORDS. ALSO EXCEPT 1/2 OF ALL OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN AND UNDERLYING SAID LAND, AS EXCEPTED BY ROBERT P. SHIELDS, MORTON K. SHIELDS, EDGAR W. HOGAN, ELIZABETH S. MC KINLEY, MARY B. FINDEL AND FORREST S. MC KINLEY, AS TRUSTEES, WITH FULL POWER OF SALE UNDER DECLARATION OF TRUST DATED JANUARY 11, 1937 RECORDED MARCH 12, 1937 IN BOOK 696 PAGE 393, OFFICIAL RECORDS, IN DEED RECORDED MARCH 26, 1962 IN BOOK 3475 PAGE 811, OFFICIAL RECORDS. ALSO EXCEPT ALL REMAINING OIL, GAS, MINERALS AND OTHER HYDROCARBON SUBSTANCES WITHIN OR UNDERLYING SAID LAND AS EXCEPTED IN DEEDS RECORDED JUNE 27, 1974 IN BOOK 4847, PAGE 2052 AND BOOK 4847, PAGE 2055, OFFICIAL RECORDS OF SAID COUNTY.

All of the East half of the Northeast quarter and the East half of the Southwest quarter of the Northeast quarter of Fractional Section 7 in Township 25 South, Range 21 East, Mount Diablo Base and Meridian, in the Unincorporated Area, County of Kern, State of California, according to the official plat thereof. Excepting therefrom all minerals, oil, gas and other hydrocarbon substances within or underlying said land, together with the right of ingress and egress to the above described property, as reserved by Yvonne Costigan, et al, in deed recorded June 18, 1976 in Book 4961, Page 1643 of official, records. ***APN: 044-101-11-00-8***

The Southwest quarter of Section 8, Township 25 South, Range 21 East, Mount Diablo Base and Meridian, in the unincorporated area of the County of Kern, State of California, according to the Official Plat thereof. Excepting therefrom all oil, gas, minerals and other hydrocarbon substances within or underlying said land, as excepted and reserved to Crocker-National Bank, Trustee, under the will of Miriam M. Stutsman, deceased, in Deed recorded April 24, 1974, in Book 4837, Page 1485 , of Official Records. ***APN: 044-102-23***

The East half of the Southeast quarter of Fractional Section 7, Township 25 South, Range 21 East, Mount Diablo Base and Meridian, in the unincorporated area of the County of Kern, State of California, according to the Official Plat thereof. Except only the rights to all oil, gas, hydrocarbons and other minerals on or underlying said land, as conveyed in the deed to Hannah Ranch, a partnership, recorded February 6, 1987 in Book 5967, Page 2117, of Official Records. Also excepting therefrom unto grantor 50% of all remaining oil, gas, and hydrocarbon substances and minerals in and under all of the land as reserved in the deed executed by West Haven Farming Company, a corporation and Westfarmers, a California general partnership, recorded May 12, 2003 as Instrument No. 0203114997, of Official Records. ***APN: 044-101-16-00***

Pelican Jaw 040-101-11, 16, 044-102-23
Twisselman Road,
Lost Hills, CA 93249

Inquiry Number: 7137312.2s
October 04, 2022

FirstSearch Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

TARGET SITE **TWISSELMAN ROAD,**
LOST HILLS, CA 93249

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	Y	0	0	0	0	0	0	0
NPL Delisted	Y	0	0	0	0	0	0	0
CERCLIS	Y	0	0	0	0	-	0	0
NFRAP	Y	0	0	0	0	-	0	0
RCRA COR ACT	Y	0	0	0	0	0	0	0
RCRA TSD	Y	0	0	0	0	-	0	0
RCRA GEN	Y	0	0	0	-	-	0	0
Federal IC / EC	Y	0	0	0	0	-	0	0
ERNS	Y	0	-	-	-	-	0	0
State/Tribal NPL	Y	0	0	0	0	0	0	0
State/Tribal CERCLIS	Y	0	0	0	0	0	0	0
State/Tribal SWL	Y	0	0	0	0	-	0	0
State/Tribal LTANKS	Y	0	0	0	0	-	0	0
State/Tribal Tanks	Y	0	0	0	-	-	0	0
State/Tribal VCP	Y	0	0	0	0	-	0	0
US Brownfields	Y	0	0	0	0	-	0	0
Other SWF	Y	0	0	0	0	-	0	0
Other Haz Sites	Y	0	0	0	-	-	0	0
Other Tanks	Y	0	0	0	-	-	0	0
Local Land Records	Y	0	0	0	0	-	0	0
Spills	Y	0	-	-	-	-	0	0
Other	Y	0	0	0	-	-	0	0
	- Totals --	0	0	0	0	0	0	0

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Search Summary Report

TARGET SITE: **TWISSELMAN ROAD,**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	07/26/2022	1.000	0	0	0	0	0	0	0
	Proposed NPL	07/26/2022	1.000	0	0	0	0	0	0	0
NPL Delisted	Delisted NPL	07/26/2022	1.000	0	0	0	0	0	0	0
CERCLIS	SEMS	07/26/2022	0.500	0	0	0	0	-	0	0
NFRAP	SEMS-ARCHIVE	07/26/2022	0.500	0	0	0	0	-	0	0
RCRA COR ACT	CORRACTS	06/20/2022	1.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	06/20/2022	0.500	0	0	0	0	-	0	0
RCRA GEN	RCRA-LQG	06/20/2022	0.250	0	0	0	-	-	0	0
	RCRA-SQG	06/20/2022	0.250	0	0	0	-	-	0	0
	RCRA-VSQG	06/20/2022	0.250	0	0	0	-	-	0	0
Federal IC / EC	US ENG CONTROLS	05/16/2022	0.500	0	0	0	0	-	0	0
	US INST CONTROLS	05/16/2022	0.500	0	0	0	0	-	0	0
ERNS	ERNS	06/14/2022	TP	0	-	-	-	-	0	0
State/Tribal NPL	RESPONSE	04/25/2022	1.000	0	0	0	0	0	0	0
State/Tribal CERCLIS	ENVIROSTOR	04/25/2022	1.000	0	0	0	0	0	0	0
State/Tribal SWL	SWF/LF	05/09/2022	0.500	0	0	0	0	-	0	0
State/Tribal LTANKS	LUST	05/23/2022	0.500	0	0	0	0	-	0	0
	INDIAN LUST	04/28/2021	0.500	0	0	0	0	-	0	0
	CPS-SLIC	05/23/2022	0.500	0	0	0	0	-	0	0
State/Tribal Tanks	UST	06/06/2022	0.250	0	0	0	-	-	0	0
	AST	07/06/2016	0.250	0	0	0	-	-	0	0
	INDIAN UST	04/07/2022	0.250	0	0	0	-	-	0	0
State/Tribal VCP	VCP	04/25/2022	0.500	0	0	0	0	-	0	0
US Brownfields	US BROWNFIELDS	02/23/2022	0.500	0	0	0	0	-	0	0

Search Summary Report

TARGET SITE: **TWISSELMAN ROAD,**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
Other SWF	WMUDS/SWAT	04/01/2000	0.500	0	0	0	0	-	0	0
Other Haz Sites	SCH	04/25/2022	0.250	0	0	0	-	-	0	0
	US CDL	04/30/2022	TP	0	-	-	-	-	0	0
Other Tanks	SWEEPS UST	06/01/1994	0.250	0	0	0	-	-	0	0
	CA FID UST	10/31/1994	0.250	0	0	0	-	-	0	0
Local Land Records	DEED	05/31/2022	0.500	0	0	0	0	-	0	0
Spills	HMIRS	09/19/2022	TP	0	-	-	-	-	0	0
	CHMIRS	06/30/2022	TP	0	-	-	-	-	0	0
	SPILLS 90	06/06/2012	TP	0	-	-	-	-	0	0
Other	RCRA NonGen / NLR	06/20/2022	0.250	0	0	0	-	-	0	0
	TSCA	12/31/2016	TP	0	-	-	-	-	0	0
	TRIS	12/31/2018	TP	0	-	-	-	-	0	0
	SSTS	07/18/2022	TP	0	-	-	-	-	0	0
	RAATS	04/17/1995	TP	0	-	-	-	-	0	0
	PRP	07/26/2022	TP	0	-	-	-	-	0	0
	PADS	01/20/2022	TP	0	-	-	-	-	0	0
	ICIS	11/18/2016	TP	0	-	-	-	-	0	0
	FTTS	04/09/2009	TP	0	-	-	-	-	0	0
	MLTS	06/10/2022	TP	0	-	-	-	-	0	0
	RADINFO	07/01/2019	TP	0	-	-	-	-	0	0
	INDIAN RESERV	12/31/2014	1.000	0	0	0	0	0	0	0
	US AIRS	10/12/2016	TP	0	-	-	-	-	0	0
	FINDS	05/13/2022	TP	0	-	-	-	-	0	0
	Cortese	06/21/2022	0.500	0	0	0	0	-	0	0
	CUPA Listings		0.250	0	0	0	-	-	0	0
	HAZNET	12/31/2021	0.250	0	0	0	-	-	0	0
	WDS	06/19/2007	TP	0	-	-	-	-	0	0
	- Totals --			0	0	0	0	0	0	0

Site Information Report

Request Date: OCTOBER 4, 2022
Request Name: MARK LAROCQUE
Search Type: COORD
Job Number: NA

Target Site: TWISSELMAN ROAD,
LOST HILLS, CA 93249

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)	UTMs	
Longitude:	119.745647	119.7456470 - 119ˆ 44’ 44.32’’	Easting:	251783.6
Latitude:	35.768378	35.7683780 - 35ˆ 46’ 6.16’’	Northing:	3961536.8
Elevation:	219 ft. above sea level		Zone:	Zone 11

Demographics

Sites: 0 **Non-Geocoded:** 0 **Population:** N/A

RADON

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.422 pCi/L	98%	2%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Target Site Summary Report

Target Property: TWISSELMAN ROAD,
LOST HILLS, CA 93249

JOB: NA

TOTAL: 0 GEOCODED: 0 NON GEOCODED: 0

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

NO SITES FOUND

Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: Delisted NPL The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Delisted NPL - National Priority List Deletions

CERCLIS: SEMS SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL. SEMS - Superfund Enterprise Management System

NFRAP: SEMS-ARCHIVE SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site. SEMS-ARCHIVE - Superfund Enterprise Management System Archive

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-VSQG - RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators).

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROLS - Institutional Controls Sites List.

Database Descriptions

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

State/Tribal NPL: RESPONSE Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. RESPONSE - State Response Sites

State/Tribal CERCLIS: ENVIROSTOR The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites. ENVIROSTOR - EnviroStor Database

State/Tribal SWL: SWF/LF (SWIS) Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF (SWIS) - Solid Waste Information System

State/Tribal LTANKS: NAPA CO. LUST SAN MATEO CO. LUST - Fuel Leak List. ORANGE CO. LUST - List of Underground Storage Tank Cleanups. LUST - Leaking Underground Fuel Tank Report (GEOTRACKER). LUST REG 6L - Leaking Underground Storage Tank Case Listing. LUST REG 6V - Leaking Underground Storage Tank Case Listing. LUST REG 1 - Active Toxic Site Investigation. LUST REG 2 - Fuel Leak List. LUST REG 3 - Leaking Underground Storage Tank Database. LUST REG 4 - Underground Storage Tank Leak List. LUST REG 5 - Leaking Underground Storage Tank Database. LUST REG 7 - Leaking Underground Storage Tank Case Listing. LUST REG 8 - Leaking Underground Storage Tanks. LUST REG 9 - Leaking Underground Storage Tank Report. LUST SANTA CLARA - LOP Listing. SAN FRANCISCO CO. LUST - Local Oversite Facilities. VENTURA CO. LUST - Listing of Underground Tank Cleanup Sites. SOLANO CO. LUST - Leaking Underground Storage Tanks. SAN DIEGO CO. SAM - Environmental Case Listing. RIVERSIDE CO. LUST - Listing of Underground Tank Cleanup Sites. SONOMA CO. LUST - Leaking Underground Storage Tank Sites. A listing of leaking underground storage tank sites located in Napa county. SONOMA CO. LUST - Sites With Reported Contamination INDIAN LUST R5 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. CPS-SLIC - Statewide SLIC Cases (GEOTRACKER). SLIC REG 1 - Active Toxic Site Investigations. SLIC REG 2 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 3 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 4 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 5 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6V - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6L - SLIC Sites. SLIC REG 7 - SLIC List. SLIC REG 8 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. Sacramento Co. CS - Toxic Site Clean-Up List. SLIC REG 9 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing.

State/Tribal Tanks: UST UST CLOSURE - Proposed Closure of Underground Storage Tank (UST) Cases. MILITARY UST SITES - Military UST Sites (GEOTRACKER). UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders. MILITARY UST SITES - Proposed Closure of Underground Storage Tank (UST) Cases AST - Aboveground Petroleum Storage Tank Facilities. INDIAN UST R1 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land.

Database Descriptions

State/Tribal VCP: VCP Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. VCP - Voluntary Cleanup Program Properties SAN FRANCISCO MAHER - Maher Ordinance Property Listing.

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: VENTURA CO. LF LOS ANGELES CO. LF - List of Solid Waste Facilities. CA LA LF - City of Los Angeles Landfills. SAN DIEGO CO. LF - Solid Waste Facilities. WMUDS/SWAT - Waste Management Unit Database. Solid Waste Facilities in Los Angeles County. WMUDS/SWAT - List of Solid Waste Facilities

Other Haz Sites: SCH This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose. SCH - School Property Evaluation Program SAN DIEGO CO. HMMD - Hazardous Materials Management Division Database. CERS HAZ WASTE - CERS HAZ WASTE. US CDL - Clandestine Drug Labs. PFAS - PFAS Contamination Site Location Listing. AQUEOUS FOAM - Former Fire Training Facility Assessments Listing.

Other Tanks: SWEEPS UST Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list. SWEEPS UST - SWEEPS UST Listing ALAMEDA CO. UST - Underground Tanks. KERN CO. UST - Underground Storage Tank Sites & Tank Listing. MARIN CO. UST - Underground Storage Tank Sites. NAPA CO. UST - Closed and Operating Underground Storage Tank Sites. ORANGE CO. UST - List of Underground Storage Tank Facilities. RIVERSIDE CO. UST - Underground Storage Tank Tank List. SAN FRANCISCO CO. UST - Underground Storage Tank Information. SOLANO CO. UST - Underground Storage Tanks. SUTTER CO. UST - Underground Storage Tanks. VENTURA CO. UST - Underground Tank Closed Sites List. LOS ANGELES UST - Active & Inactive UST Inventory. YOLO CO. UST - Underground Storage Tank Comprehensive Facility Report. EL SEGUNDO UST - City of El Segundo Underground Storage Tank. LONG BEACH UST - City of Long Beach Underground Storage Tank. UST MENDOCINO - Mendocino County UST Database. UST SAN JOAQUIN - San Joaquin Co. UST. TORRANCE UST - City of Torrance Underground Storage Tank. LOS ANGELES AST - Active & Inactive AST Inventory. SAN FRANCISCO AST - Aboveground Storage Tank Site Listing. CERS TANKS - California Environmental Reporting System (CERS) Tanks. CA FID UST - Facility Inventory Database.

Local Land Records: DEED Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners. DEED - Deed Restriction Listing

Database Descriptions

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System CHMIRS - California Hazardous Material Incident Report System. Orange Co. Industrial Site - List of Industrial Site Cleanups. SPILLS 90 - SPILLS90 data from FirstSearch.

Other: RCRA NonGen / NLR RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste. RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated FEDLAND - Federal and Indian Lands. TSCA - Toxic Substances Control Act. TRIS - Toxic Chemical Release Inventory System. SSTS - Section 7 Tracking Systems. RAATS - RCRA Administrative Action Tracking System. PRP - Potentially Responsible Parties. PADS - PCB Activity Database System. ICIS - Integrated Compliance Information System. FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. BRS - Biennial Reporting System. INDIAN RESERV - Indian Reservations. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. FINDS - Facility Index System/Facility Registry System. CORTESE - "Cortese" Hazardous Waste & Substances Sites List. CUPA - CUPA Resources List. CUPA AMADOR - CUPA Facility List. CUPA BUTTE - CUPA Facility Listing. CUPA CALVERAS - CUPA Facility Listing. CUPA COLUSA - CUPA Facility List. CUPA DEL NORTE - CUPA Facility List. CUPA EL DORADO - CUPA Facility List. CUPA FRESNO - CUPA Resources List. CUPA HUMBOLDT - CUPA Facility List. CUPA TEHAMA - CUPA Facility List. CUPA PLUMAS - CUPA Facility List. CUPA STANISLAUS - CUPA Facility List. CUPA TRINITY - CUPA Facility List. CUPA LIVERMORE-PLEASANTON - CUPA Facility Listing. CUPA GLENN - CUPA Facility List. CUPA IMPERIAL - CUPA Facility List. CUPA LASSEN - CUPA Facility List. CUPA SAN FRANCISCO CO - CUPA Facility Listing. CUPA SAN BENITO - CUPA Facility List. CUPA TULARE - CUPA Facility List. CUPA INYO - CUPA Facility List. CUPA KINGS - CUPA Facility List. CUPA LAKE - CUPA Facility List. CUPA MADERA - CUPA Facility List. CUPA MERCED - CUPA Facility List. CUPA MONO - CUPA Facility List. CUPA MONTEREY - CUPA Facility Listing. CUPA NEVADA - CUPA Facility List. CUPA SAN LUIS OBISPO - CUPA Facility List. CUPA SANTA BARBARA - CUPA Facility Listing. CUPA SANTA CLARA - Cupa Facility List. CUPA SANTA CRUZ - CUPA Facility List. CUPA SHASTA - CUPA Facility List. CUPA SONOMA - Cupa Facility List. CUPA TUOLUMNE - CUPA Facility List. CUPA YUBA - CUPA Facility List. KERN CO CUPA - CUPA Facility List. HAZNET - Facility and Manifest Data. Sacramento Co. ML - Master Hazardous Materials Facility List. San Bern. Co. Permit - Hazardous Material Permits. LA Co. Site Mitigation - Site Mitigation List. UIC GEO - Underground Injection Control Sites (GEOTRACKER). WDS - Waste Discharge System. MILITARY PRIV SITES - Military Privatized Sites (GEOTRACKER). PROJECT - Project Sites (GEOTRACKER). WDR - Waste Discharge Requirements Listing. SAN DIEGO CO LOP - Local Oversight Program Listing. CIWQS - California Integrated Water Quality System. CERS - CalEPA Regulated Site Portal Data. NON-CASE INFO - Non-Case Information Sites (GEOTRACKER). OTHER OIL GAS - Other Oil & Gas Projects Sites (GEOTRACKER). PROD WATER PONDS - Produced Water Ponds Sites (GEOTRACKER). SAMPLING POINT - Sampling Point ? Public Sites (GEOTRACKER). WELL STIM PROJ - Well Stimulation Project (GEOTRACKER). MINES MRDS - Mineral Resources Data System. PCS ENF - Enforcement data. PCS INACTIVE - Listing of Inactive PCS Permits. PCS - Permit Compliance System. HWTS - Hazardous Waste Tracking System. LOS ANGELES CO LF METHANE - Methane Producing Landfills.

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Quarterly

State/Tribal NPL: Department of Toxic Substances Control

Updated Quarterly

State/Tribal CERCLIS: Department of Toxic Substances Control

Updated Quarterly

State/Tribal SWL: Department of Resources Recycling and Recovery

Updated Quarterly

State/Tribal LTANKS: Napa County Department of Environmental Management

No Update Planned

Database Sources

State/Tribal Tanks: SWRCB

Updated Semi-Annually

State/Tribal VCP: Department of Toxic Substances Control

Updated Quarterly

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: Environmental Health Division

No Update Planned

Other Haz Sites: Department of Toxic Substances Control

Updated Quarterly

Other Tanks: State Water Resources Control Board

No Update Planned

Local Land Records: DTSC and SWRCB

Updated Semi-Annually

Spills: U.S. Department of Transportation

Updated Quarterly

Other: Environmental Protection Agency

Updated Quarterly

Street Name Report for Streets near the Target Property

Target Property: TWISSELMAN ROAD,
LOST HILLS, CA 93249

JOB: NA

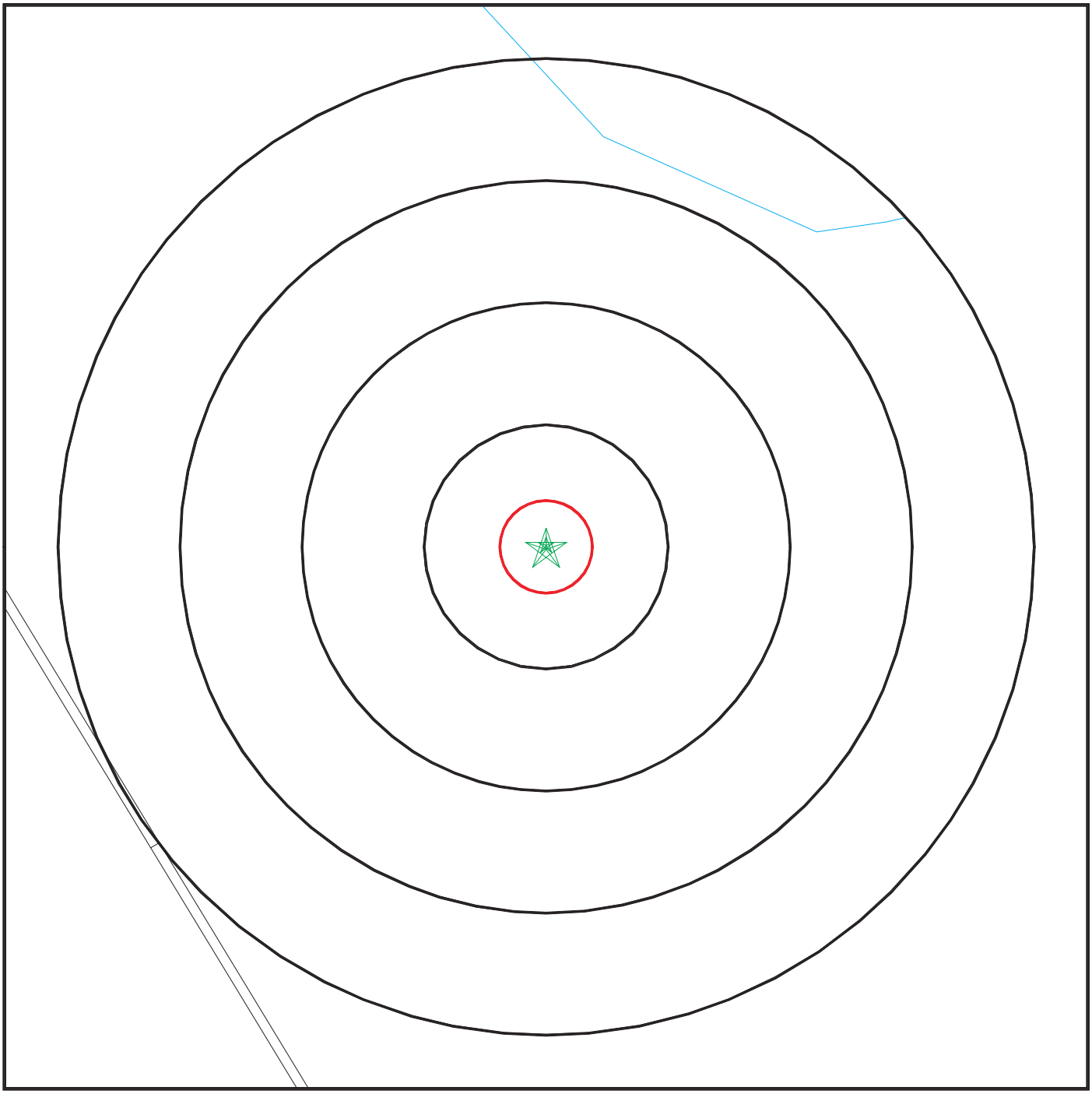
Street Name	Dist/Dir	Street Name	Dist/Dir

Environmental FirstSearch

1.000 Mile Radius

ASTM MAP: NPL, RCRACOR, STATES Sites

TWISSELMAN ROAD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

Target Property (Latitude: 35.768378 Longitude: 119.745647)

Identified Sites

National Priority List Sites

Indian Reservations BIA

EDR Reference Code (EDR internal use only): 7137312.2s
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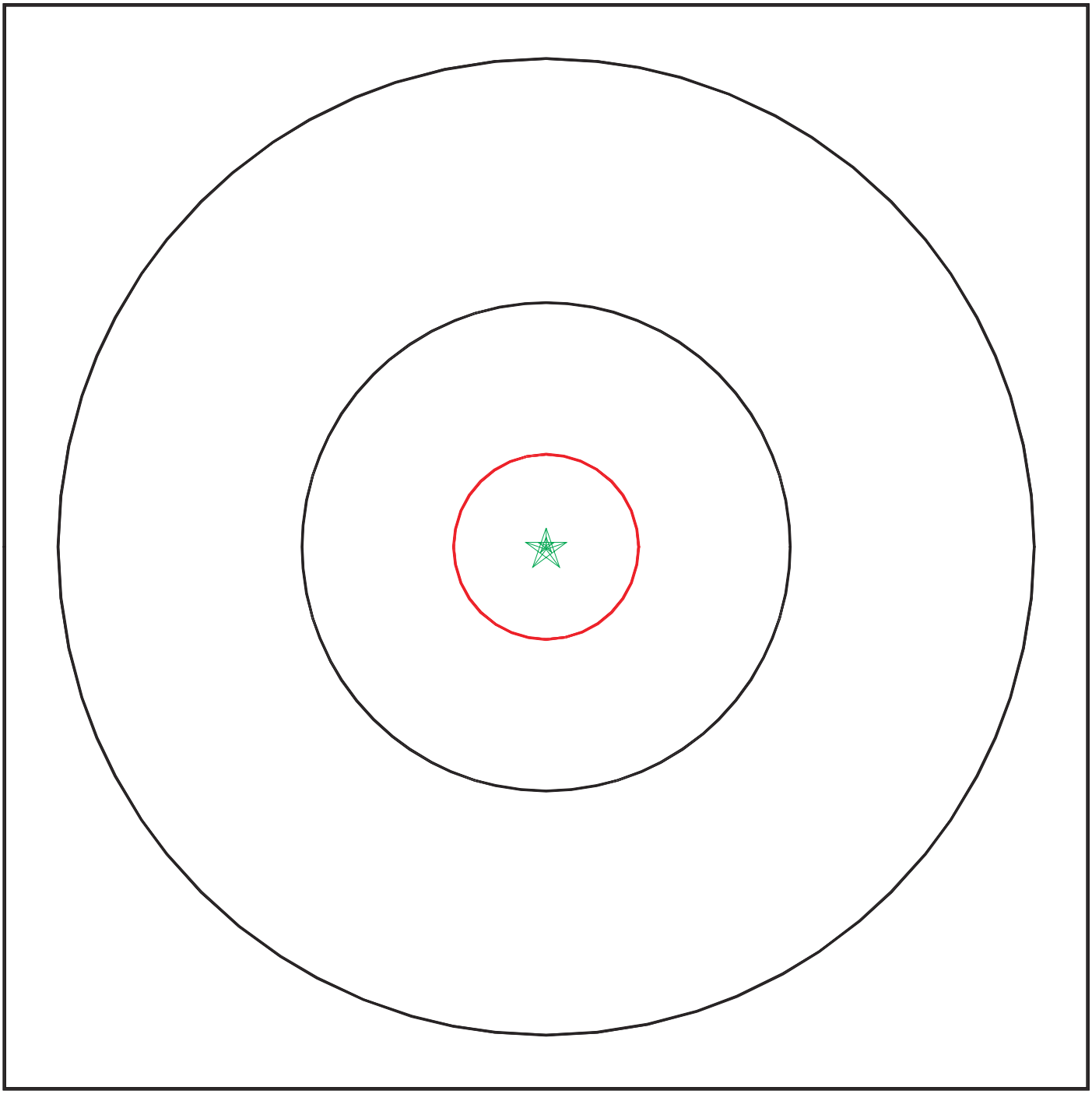
22-10-04.11:19:42.Tue

Environmental FirstSearch

0.500 Mile Radius

ASTM MAP: CERCLIS, RCRATSD, LUST, SWL

TWISSELMAN ROAD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; **Red Ring Represents 500 ft. Radius**

★ **Target Property (Latitude: 35.768378 Longitude: 119.745647)**

▲ **Identified Sites**

National Priority List Sites

Indian Reservations BIA

EDR Reference Code (EDR Internal use only): 7137312.2s
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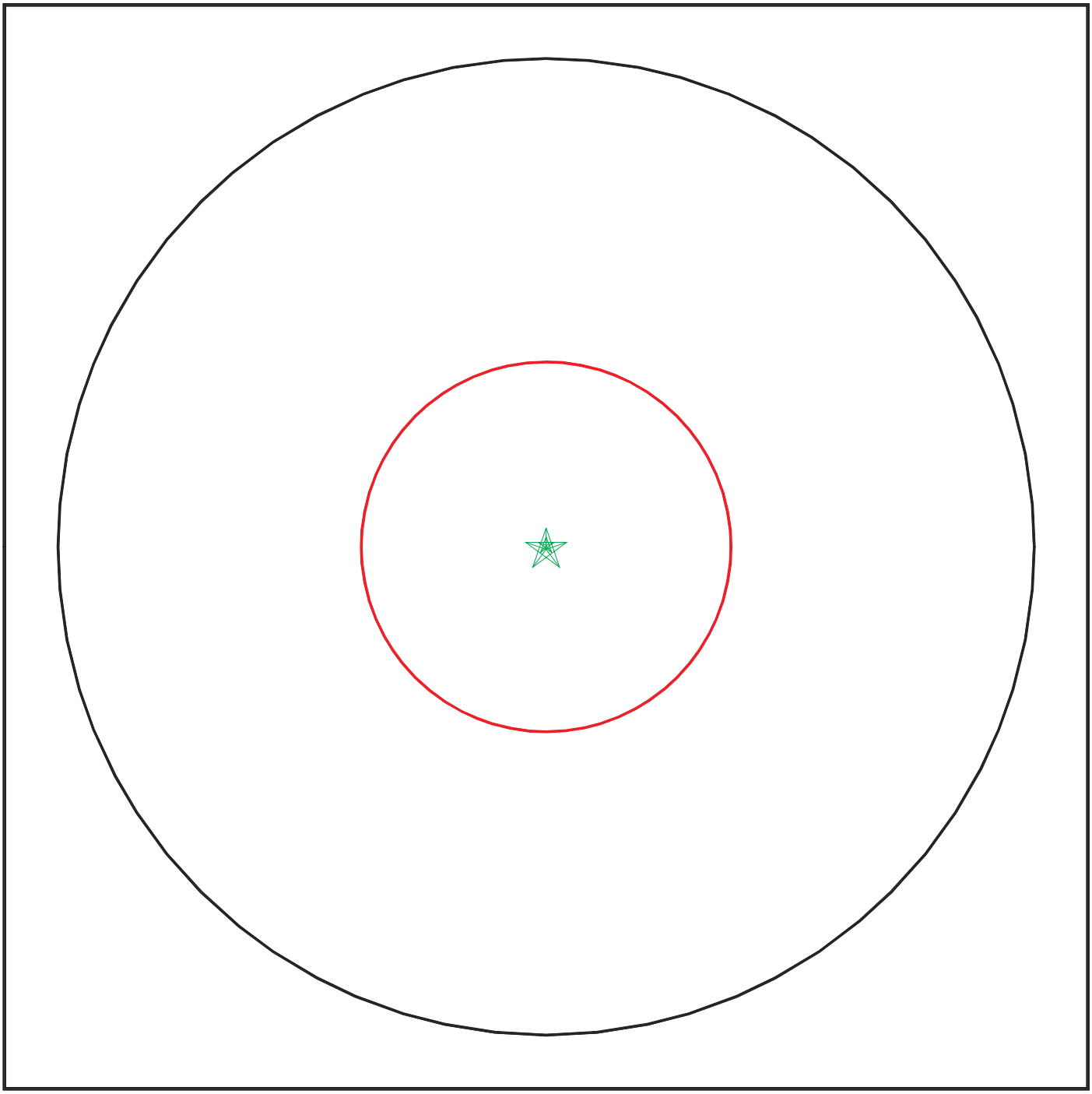
22-10-04.11:19:50.Tue

Environmental FirstSearch

0.25 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS

TWISSELMAN ROAD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.768378 Longitude: 119.745647)

▲ Identified Sites

National Priority List Sites

Indian Reservations BIA

EDR Reference Code (EDR Internal use only): 7137312.2s

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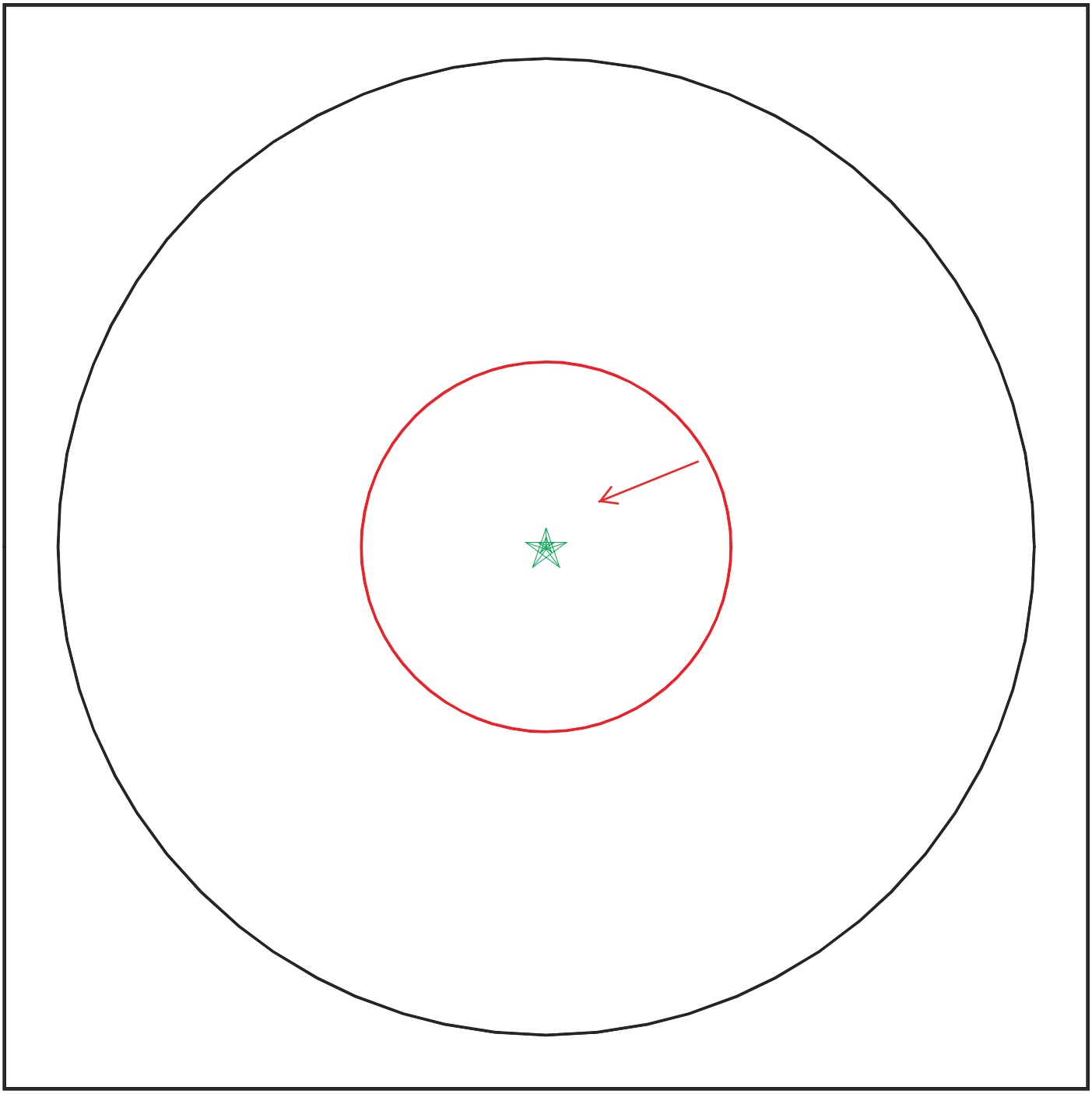
22-10-04.11:19:57.Tue

Environmental FirstSearch

0.25 Mile Radius
Non ASTM Map, Spills, FINDS

TWISSELMAN ROAD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

- Target Property (Latitude: 35.768378 Longitude: 119.745647)
- Identified Sites
- Sensitive Receptors
- National Priority List Sites
- Indian Reservations BIA

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Pelicans Jaw 1
Twisselman Rd,
Lost Hills, CA 93249

Inquiry Number: 7009509.4d
July 5, 2022

FirstSearch Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

TARGET SITE **TWISSELMAN RD,**
LOST HILLS, CA 93249

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	Y	0	0	0	0	0	0	0
NPL Delisted	Y	0	0	0	0	0	0	0
CERCLIS	Y	0	0	0	0	0	0	0
NFRAP	Y	0	0	0	0	0	0	0
RCRA COR ACT	Y	0	0	0	0	0	0	0
RCRA TSD	Y	0	0	0	0	0	0	0
RCRA GEN	Y	0	0	0	0	0	0	0
Federal IC / EC	Y	0	0	0	0	0	0	0
ERNS	Y	0	0	0	0	0	0	0
State/Tribal NPL	Y	0	0	0	0	0	0	0
State/Tribal CERCLIS	Y	0	0	0	0	0	1	1
State/Tribal SWL	Y	0	0	0	0	0	0	0
State/Tribal LTANKS	Y	0	0	0	0	0	0	0
State/Tribal Tanks	Y	0	0	0	0	0	0	0
State/Tribal VCP	Y	0	0	0	0	0	0	0
ST/Tribal Brownfields	Y	0	0	0	0	0	0	0
US Brownfields	Y	0	0	0	0	0	0	0
Other SWF	Y	0	0	0	0	0	0	0
Other Haz Sites	Y	0	0	0	0	0	0	0
Other Tanks	Y	0	0	0	0	0	0	0
Local Land Records	Y	0	0	0	0	0	0	0
Spills	Y	0	0	0	0	0	0	0
Other	Y	0	0	0	0	0	0	2
	- Totals --	0	0	0	0	2	1	3

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Search Summary Report

TARGET SITE: **TWISSELMAN RD,**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	10/20/2021	2.000	0	0	0	0	0	0	0
	Proposed NPL	10/20/2021	2.000	0	0	0	0	0	0	0
NPL Delisted	Delisted NPL	10/20/2021	2.000	0	0	0	0	0	0	0
CERCLIS	SEMS	10/20/2021	2.000	0	0	0	0	0	0	0
NFRAP	SEMS-ARCHIVE	10/20/2021	2.000	0	0	0	0	0	0	0
RCRA COR ACT	CORRACTS	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA GEN	RCRA-LQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-SQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-VSQG	09/13/2021	2.000	0	0	0	0	0	0	0
Federal IC / EC	US ENG CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
	US INST CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
ERNS	ERNS	09/13/2021	2.000	0	0	0	0	0	0	0
State/Tribal NPL	RESPONSE	07/22/2021	2.000	0	0	0	0	0	0	0
State/Tribal CERCLIS	ENVIROSTOR	07/22/2021	2.000	0	0	0	0	0	1	1
State/Tribal SWL	SWF/LF	08/09/2021	2.000	0	0	0	0	0	0	0
State/Tribal LTANKS	LUST	09/07/2021	2.000	0	0	0	0	0	0	0
	INDIAN LUST	04/28/2021	2.000	0	0	0	0	0	0	0
	CPS-SLIC	09/07/2021	2.000	0	0	0	0	0	0	0
State/Tribal Tanks	UST	09/07/2021	2.000	0	0	0	0	0	0	0
	AST	07/06/2016	2.000	0	0	0	0	0	0	0
	INDIAN UST	04/28/2021	2.000	0	0	0	0	0	0	0
State/Tribal VCP	VCP	07/22/2021	2.000	0	0	0	0	0	0	0
ST/Tribal Brownfields	BROWNFIELDS	09/20/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **TWISSELMAN RD,**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
US Brownfields	US BROWNFIELDS	06/10/2021	2.000	0	0	0	0	0	0	0
Other SWF	WMUDS/SWAT	04/01/2000	2.000	0	0	0	0	0	0	0
	IHS OPEN DUMPS	04/01/2014	2.000	0	0	0	0	0	0	0
Other Haz Sites	SCH	07/22/2021	2.000	0	0	0	0	0	0	0
	CERS HAZ WASTE	07/15/2021	2.000	0	0	0	0	0	0	0
	US CDL	05/18/2021	2.000	0	0	0	0	0	0	0
	PFAS	09/07/2021	2.000	0	0	0	0	0	0	0
	AQUEOUS FOAM	12/01/2019	2.000	0	0	0	0	0	0	0
Other Tanks	SWEEPS UST	06/01/1994	2.000	0	0	0	0	0	0	0
	CA FID UST	10/31/1994	2.000	0	0	0	0	0	0	0
	CERS TANKS	07/15/2021	2.000	0	0	0	0	0	0	0
Local Land Records	DEED	08/30/2021	2.000	0	0	0	0	0	0	0
Spills	HMIRS	09/12/2021	2.000	0	0	0	0	0	0	0
	CHMIRS	06/30/2021	2.000	0	0	0	0	0	0	0
	SPILLS 90	06/06/2012	2.000	0	0	0	0	0	0	0
Other	RCRA NonGen / NLR	09/13/2021	2.000	0	0	0	0	0	0	0
	TSCA	12/31/2016	2.000	0	0	0	0	0	0	0
	TRIS	12/31/2018	2.000	0	0	0	0	0	0	0
	SSTS	07/19/2021	2.000	0	0	0	0	0	0	0
	RMP	10/20/2021	2.000	0	0	0	0	0	0	0
	RAATS	04/17/1995	2.000	0	0	0	0	0	0	0
	PRP	10/20/2021	2.000	0	0	0	0	0	0	0
	PADS	11/19/2020	2.000	0	0	0	0	0	0	0
	ICIS	11/18/2016	2.000	0	0	0	0	0	0	0
	FTTS	04/09/2009	2.000	0	0	0	0	0	0	0
	MLTS	07/29/2021	2.000	0	0	0	0	0	0	0
	RADINFO	07/01/2019	2.000	0	0	0	0	0	0	0
	INDIAN RESERV	12/31/2014	2.000	0	0	0	0	0	0	0
	FUSRAP	07/26/2021	2.000	0	0	0	0	0	0	0
	US AIRS	10/12/2016	2.000	0	0	0	0	0	0	0
	ABANDONED MINES	09/14/2021	2.000	0	0	0	0	0	0	0
	FINDS	05/05/2021	2.000	0	0	0	0	0	0	1
	DOCKET HWC	05/06/2021	2.000	0	0	0	0	0	0	0
	ECHO	06/26/2021	2.000	0	0	0	0	0	0	0
	UXO	12/31/2018	2.000	0	0	0	0	0	0	0
	FUELS PROGRAM	08/13/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **TWISSELMAN RD,**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
	Cortese	09/20/2021	2.000	0	0	0	0	0	0	0
	CUPA Listings		2.000	0	0	0	0	0	0	0
	HAZNET	12/31/2019	2.000	0	0	0	0	0	0	0
	ICE	08/13/2021	2.000	0	0	0	0	0	0	0
	MINES	09/07/2021	2.000	0	0	0	0	0	0	0
	PEST LIC	08/30/2021	2.000	0	0	0	0	0	0	0
	UIC GEO	09/07/2021	2.000	0	0	0	0	0	0	0
	WASTEWATER PITS	02/11/2021	2.000	0	0	0	0	0	0	0
	WDS	06/19/2007	2.000	0	0	0	0	0	0	0
	MILITARY PRIV SITES	09/07/2021	2.000	0	0	0	0	0	0	0
	PROJECT	09/07/2021	2.000	0	0	0	0	0	0	0
	WDR	09/07/2021	2.000	0	0	0	0	0	0	0
	CIWQS	08/30/2021	2.000	0	0	0	0	0	0	1
	CERS	07/15/2021	2.000	0	0	0	0	0	0	0
	NON-CASE INFO	09/07/2021	2.000	0	0	0	0	0	0	0
	OTHER OIL GAS	09/07/2021	2.000	0	0	0	0	0	0	0
	PROD WATER PONDS	09/07/2021	2.000	0	0	0	0	0	0	0
	SAMPLING POINT	09/07/2021	2.000	0	0	0	0	0	0	0
	WELL STIM PROJ	09/07/2021	2.000	0	0	0	0	0	0	0
	HWTS	07/13/2021	2.000	0	0	0	0	0	0	0
	MINES MRDS	04/06/2018	2.000	0	0	0	0	0	0	0
	- Totals --			0	0	0	0	2	1	3

Site Information Report

Request Date: JULY 5, 2022
Search Type: COORD
Request Name: MARK LAROCQUE
Job Number: 2022-082

Target Site: TWISSELMAN RD,
LOST HILLS, CA 93249

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)	UTMs	
Longitude:	119.696333	119.6963330 - 119ˆ 41' 46.79''	Easting:	256149.5
Latitude:	35.737833	35.7378330 - 35ˆ 44' 16.19''	Northing:	3958024.0
Elevation:	221 ft. above sea level		Zone:	Zone 11

Demographics

Sites: 2 **Non-Geocoded:** 1 **Population:** N/A

RADON

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.422 pCi/L	98%	2%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Target Site Summary Report

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 3 GEOCODED: 2 NON GEOCODED: 1

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Sites Summary Report

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 3 GEOCODED: 2 NON GEOCODED: 1

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
1	FINDS --110038075935	VERIZON WIRELESS - LOST HILLS	INTERSTATE 5 & TWISSLMAN LOST HILLS, CA 93249	1.85 WSW	+ 1	1
2	CIWQS	WESTSIDE SOLAR SITE 1	TWISSELMAN ROAD 1/4 MILE LOST HILLS, CA 93249	1.98 West	+ 1	2

Sites Summary Report

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 3 GEOCODED: 2 NON GEOCODED: 1

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
	ENVIROSTOR --15070027 --Refer: Other Agency	FARM FLITE AG SERVICE	LOST HILLS MUNICIPAL AIRP LOST HILLS, CA 93249	NON GC	N/A	N/A

Site Detail Report

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

FINDS

EDR ID: 1011978085 **DIST/DIR:** 1.853 WSW **ELEVATION:** 222 **MAP ID:** 1

NAME: VERIZON WIRELESS - LOST HILLS
ADDRESS: INTERSTATE 5 & TWISSLMAN RD
LOST HILLS, CA 93249
KERN
SOURCE: US EPA

Rev: 05/05/2021
ID/Status: 110038075935

FINDS:
Registry ID: 110038075935

Click Here:

Environmental Interest/Information System:
AIR EMISSIONS CLASSIFICATION UNKNOWN
STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

Site Detail Report

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

CIWQS

EDR ID: S126356128 **DIST/DIR:** 1.981 West **ELEVATION:** 222 **MAP ID:** 2

NAME: WESTSIDE SOLAR SITE 1 **Rev:** 08/30/2021

ADDRESS: TWISSELMAN ROAD 1/4 MILE EAST OF HWY 5
LOST HILLS, CA 93249
KERN

SOURCE: CA State Water Resources Control Board

CIWQS:
Name: WESTSIDE SOLAR SITE 1
Address: TWISSELMAN ROAD 1/4 MILE EAST OF HWY 5
City,State,Zip: LOST HILLS, CA 93249
Agency: DG West 1 LLC
Agency Address: 700 Universe Boulevard, Juno Beach, FL 33408
Place/Project Type: Construction - Other: Solar
SIC/NAICS: Not reported
Region: 5F
Program: CONSTW
Regulatory Measure Status: Terminated
Regulatory Measure Type: Storm water construction
Order Number: 2009-0009-DWQ
WDID: 5F15C391401
NPDES Number: CAS000002
Adoption Date: Not reported
Effective Date: 09/09/2020
Termination Date: 03/18/2021
Expiration/Review Date: Not reported
Design Flow: Not reported
Major/Minor: Not reported
Complexity: Not reported
TTWQ: Not reported
Enforcement Actions within 5 years: 0
Violations within 5 years: 0
Latitude: 35.73474
Longitude: -119.73136

Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: Delisted NPL The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Delisted NPL - National Priority List Deletions

CERCLIS: SEMS SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL. SEMS - Superfund Enterprise Management System

NFRAP: SEMS-ARCHIVE SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site. SEMS-ARCHIVE - Superfund Enterprise Management System Archive

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-VSQG - RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators).

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROLS - Institutional Controls Sites List.

Database Descriptions

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

State/Tribal NPL: RESPONSE Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. RESPONSE - State Response Sites

State/Tribal CERCLIS: ENVIROSTOR The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites. ENVIROSTOR - EnviroStor Database

State/Tribal SWL: SWF/LF (SWIS) Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF (SWIS) - Solid Waste Information System

State/Tribal LTANKS: RIVERSIDE CO. LUST LUST REG 9 - Leaking Underground Storage Tank Report. LUST REG 2 - Fuel Leak List. LUST REG 1 - Active Toxic Site Investigation. SAN DIEGO CO. SAM - Environmental Case Listing. LUST REG 5 - Leaking Underground Storage Tank Database. LUST REG 6V - Leaking Underground Storage Tank Case Listing. SAN MATEO CO. LUST - Fuel Leak List. VENTURA CO. LUST - Listing of Underground Tank Cleanup Sites. LUST REG 8 - Leaking Underground Storage Tanks. NAPA CO. LUST - Sites With Reported Contamination. SAN FRANCISCO CO. LUST - Local Oversite Facilities. LUST REG 6L - Leaking Underground Storage Tank Case Listing. ORANGE CO. LUST - List of Underground Storage Tank Cleanups. LUST REG 7 - Leaking Underground Storage Tank Case Listing. SOLANO CO. LUST - Leaking Underground Storage Tanks. LUST REG 3 - Leaking Underground Storage Tank Database. LUST - Leaking Underground Fuel Tank Report (GEOTRACKER). LUST SANTA CLARA - LOP Listing. SONOMA CO. LUST - Leaking Underground Storage Tank Sites. LUST REG 4 - Underground Storage Tank Leak List. Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties. LUST REG 4 - Leaking Underground Storage Tank Database INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R5 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. CPS-SLIC - Statewide SLIC Cases (GEOTRACKER). SLIC REG 1 - Active Toxic Site Investigations. SLIC REG 2 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 3 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 4 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 5 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6V - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6L - SLIC Sites. SLIC REG 7 - SLIC List. SLIC REG 8 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 9 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. Sacramento Co. CS - Toxic Site Clean-Up List.

State/Tribal Tanks: MILITARY UST SITES UST - Active UST Facilities. UST CLOSURE - Proposed Closure of Underground Storage Tank (UST) Cases. Military ust sites UST CLOSURE - Military UST Sites (GEOTRACKER) AST - Aboveground Petroleum Storage Tank Facilities. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land.

Database Descriptions

State/Tribal VCP: VCP Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. VCP - Voluntary Cleanup Program Properties

ST/Tribal Brownfields: BROWNFIELDS A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process. BROWNFIELDS - Considered Brownfieds Sites Listing

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: WMUDS/SWAT SAN DIEGO CO. LF - Solid Waste Facilities. CA LA LF - City of Los Angeles Landfills. LOS ANGELES CO. LF - List of Solid Waste Facilities. VENTURA CO. LF - Inventory of Illegal Abandoned and Inactive Sites. Solid Waste Facilities in Los Angeles County. VENTURA CO. LF - List of Solid Waste Facilities IHS OPEN DUMPS - Open Dumps on Indian Land.

Other Haz Sites: SCH This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose. SCH - School Property Evaluation Program SAN DIEGO CO. HMMD - Hazardous Materials Management Division Database. CERS HAZ WASTE - CERS HAZ WASTE. US CDL - Clandestine Drug Labs. AQUEOUS FOAM - Former Fire Training Facility Assessments Listing. PFAS - PFAS Contamination Site Location Listing.

Other Tanks: SWEEPS UST Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list. SWEEPS UST - SWEEPS UST Listing ALAMEDA CO. UST - Underground Tanks. KERN CO. UST - Underground Storage Tank Sites & Tank Listing. MARIN CO. UST - Underground Storage Tank Sites. NAPA CO. UST - Closed and Operating Underground Storage Tank Sites. ORANGE CO. UST - List of Underground Storage Tank Facilities. RIVERSIDE CO. UST - Underground Storage Tank Tank List. SAN FRANCISCO CO. UST - Underground Storage Tank Information. SOLANO CO. UST - Underground Storage Tanks. SUTTER CO. UST - Underground Storage Tanks. VENTURA CO. UST - Underground Tank Closed Sites List. YOLO CO. UST - Underground Storage Tank Comprehensive Facility Report. LOS ANGELES UST - Active & Inactive UST Inventory. EL SEGUNDO UST - City of El Segundo Underground Storage Tank. LONG BEACH UST - City of Long Beach Underground Storage Tank. UST MENDOCINO - Mendocino County UST Database. UST SAN JOAQUIN - San Joaquin Co. UST. TORRANCE UST - City of Torrance Underground Storage Tank. LOS ANGELES AST - Active & Inactive AST Inventory. SAN FRANCISCO AST - Aboveground Storage Tank Site Listing. CA FID UST - Facility Inventory Database. CERS TANKS - California Environmental Reporting System (CERS) Tanks.

Local Land Records: DEED Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners. DEED - Deed Restriction Listing

Database Descriptions

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System CHMIRS - California Hazardous Material Incident Report System. Orange Co. Industrial Site - List of Industrial Site Cleanups. SPILLS 90 - SPILLS90 data from FirstSearch.

Other: RCRA NonGen / NLR RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste. RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated FEDLAND - Federal and Indian Lands. TSCA - Toxic Substances Control Act. TRIS - Toxic Chemical Release Inventory System. SSTS - Section 7 Tracking Systems. RMP - Risk Management Plans. RAATS - RCRA Administrative Action Tracking System. PRP - Potentially Responsible Parties. PADS - PCB Activity Database System. ICIS - Integrated Compliance Information System. FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. BRS - Biennial Reporting System. INDIAN RESERV - Indian Reservations. FUSRAP - Formerly Utilized Sites Remedial Action Program. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. ABANDONED MINES - Abandoned Mines. FINDS - Facility Index System/Facility Registry System. UXO - Unexploded Ordnance Sites. ECHO - Enforcement & Compliance History Information. DOCKET HWC - Hazardous Waste Compliance Docket Listing. FUELS PROGRAM - EPA Fuels Program Registered Listing. CORTESE - "Cortese" Hazardous Waste & Substances Sites List. CUPA - CUPA Resources List. CUPA AMADOR - CUPA Facility List. CUPA BUTTE - CUPA Facility Listing. CUPA CALVERAS - CUPA Facility Listing. CUPA COLUSA - CUPA Facility List. CUPA DEL NORTE - CUPA Facility List. CUPA EL DORADO - CUPA Facility List. CUPA FRESNO - CUPA Resources List. CUPA HUMBOLDT - CUPA Facility List. CUPA LIVERMORE-PLEASANTON - CUPA Facility Listing. CUPA IMPERIAL - CUPA Facility List. CUPA TRINITY - CUPA Facility List. CUPA PLUMAS - CUPA Facility List. CUPA STANISLAUS - CUPA Facility List. CUPA SAN FRANCISCO CO - CUPA Facility Listing. CUPA LASSEN - CUPA Facility List. CUPA TEHAMA - CUPA Facility List. CUPA TULARE - CUPA Facility List. CUPA GLENN - CUPA Facility List. CUPA SAN BENITO - CUPA Facility List. CUPA INYO - CUPA Facility List. CUPA KINGS - CUPA Facility List.
CUPA LAKE - CUPA Facility List. CUPA MADERA - CUPA Facility List. CUPA MERCED - CUPA Facility List. CUPA MONO - CUPA Facility List. CUPA MONTEREY - CUPA Facility Listing. CUPA NEVADA - CUPA Facility List. CUPA SAN LUIS OBISPO - CUPA Facility List. CUPA SANTA BARBARA - CUPA Facility Listing. CUPA SANTA CLARA - Cupa Facility List. CUPA SANTA CRUZ - CUPA Facility List. CUPA SHASTA - CUPA Facility List. CUPA SONOMA - Cupa Facility List. CUPA TUOLUMNE - CUPA Facility List. KERN CO CUPA - CUPA Facility List. CUPA YUBA - CUPA Facility List. HAZNET - Facility and Manifest Data. ICE - ICE. MINES - Mines Site Location Listing. Sacramento Co. ML - Master Hazardous Materials Facility List. San Bern. Co. Permit - Hazardous Material Permits. PEST LIC - Pesticide Regulation Licenses Listing. LA Co. Site Mitigation - Site Mitigation List. UIC GEO - Underground Injection Control Sites (GEOTRACKER). WASTEWATER PITS - Oil Wastewater Pits Listing. WDS - Waste Discharge System. MILITARY PRIV SITES - Military Privatized Sites (GEOTRACKER). PROJECT - Project Sites (GEOTRACKER). WDR - Waste Discharge Requirements Listing. SAN DIEGO CO LOP - Local Oversight Program Listing. CIWQS - California Integrated Water Quality System. CERS - CalEPA Regulated Site Portal Data. NON-CASE INFO - Non-Case Information Sites (GEOTRACKER). OTHER OIL GAS - Other Oil & Gas Projects Sites (GEOTRACKER). PROD WATER PONDS - Produced Water Ponds Sites (GEOTRACKER). SAMPLING POINT - Sampling Point ? Public Sites (GEOTRACKER). WELL STIM PROJ - Well Stimulation Project (GEOTRACKER). HWTS - Hazardous Waste Tracking System. PCS INACTIVE - Listing of Inactive PCS Permits. MINES MRDS - Mineral Resources Data System. PCS ENF - Enforcement data. PCS - Permit Compliance System. LOS ANGELES CO LF METHANE - Methane Producing Landfills.

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Quarterly

State/Tribal NPL: Department of Toxic Substances Control

Updated Quarterly

State/Tribal CERCLIS: Department of Toxic Substances Control

Updated Quarterly

State/Tribal SWL: Department of Resources Recycling and Recovery

Updated Quarterly

State/Tribal LTANKS: California Regional Water Quality Control Board Central Valley Region (5)

No Update Planned

Database Sources

State/Tribal Tanks: SWRCB

Updated Semi-Annually

State/Tribal VCP: Department of Toxic Substances Control

Updated Quarterly

ST/Tribal Brownfields: State Water Resources Control Board

Updated Quarterly

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: Engineering & Construction Division

Varies

Other Haz Sites: Department of Toxic Substances Control

Updated Quarterly

Other Tanks: State Water Resources Control Board

No Update Planned

Local Land Records: DTSC and SWRCB

Updated Semi-Annually

Spills: U.S. Department of Transportation

Updated Quarterly

Other: Environmental Protection Agency

Updated Quarterly

Street Name Report for Streets near the Target Property

Target Property: TWISSELMAN RD,
LOST HILLS, CA 93249

JOB: 2022-082

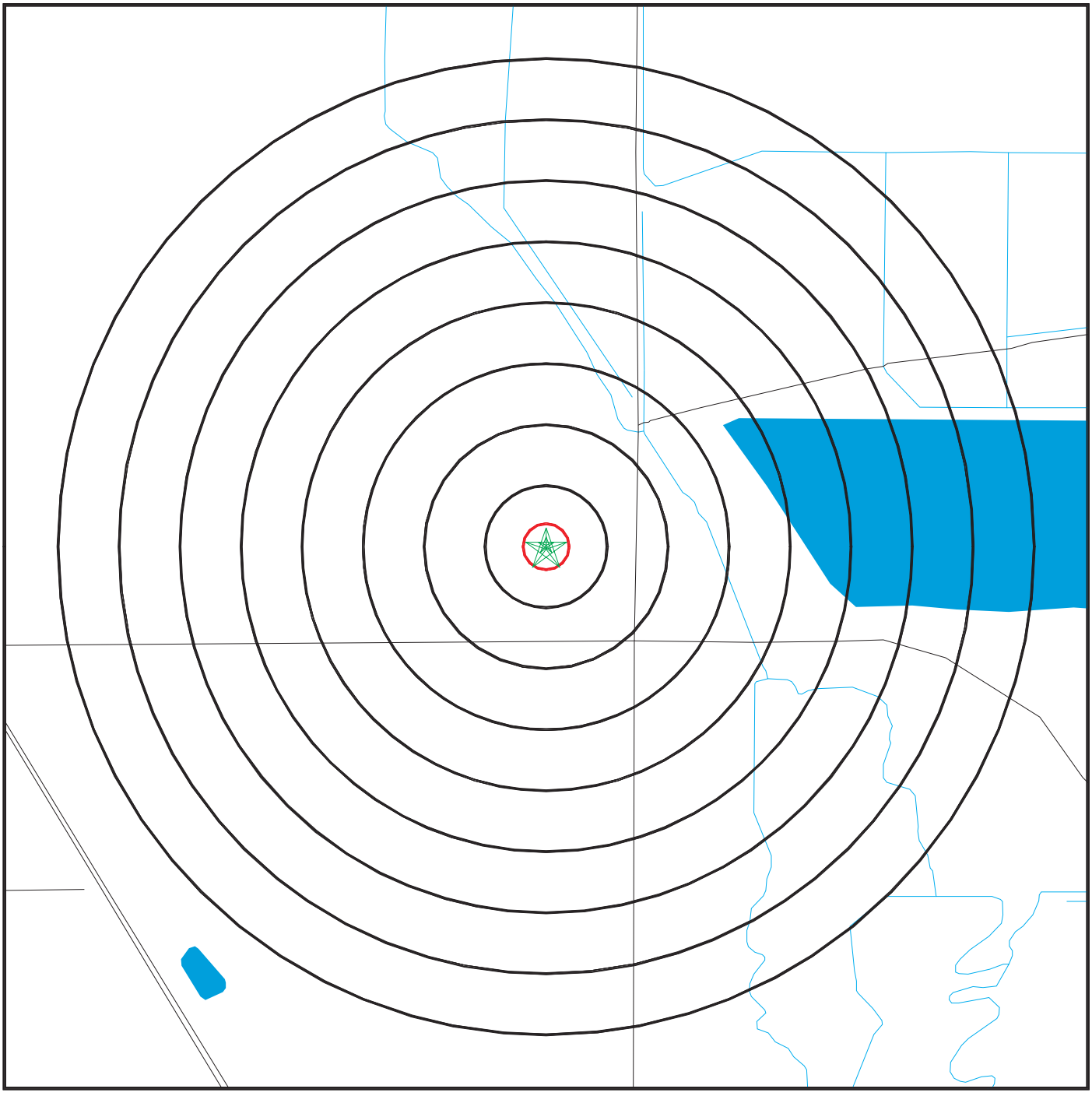
Street Name	Dist/Dir	Street Name	Dist/Dir

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: NPL, RCRACOR, STATES Sites

TWISSELMAN RD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

Target Property (Latitude: 35.737833 Longitude: 119.696333)

Identified Sites

National Priority List Sites

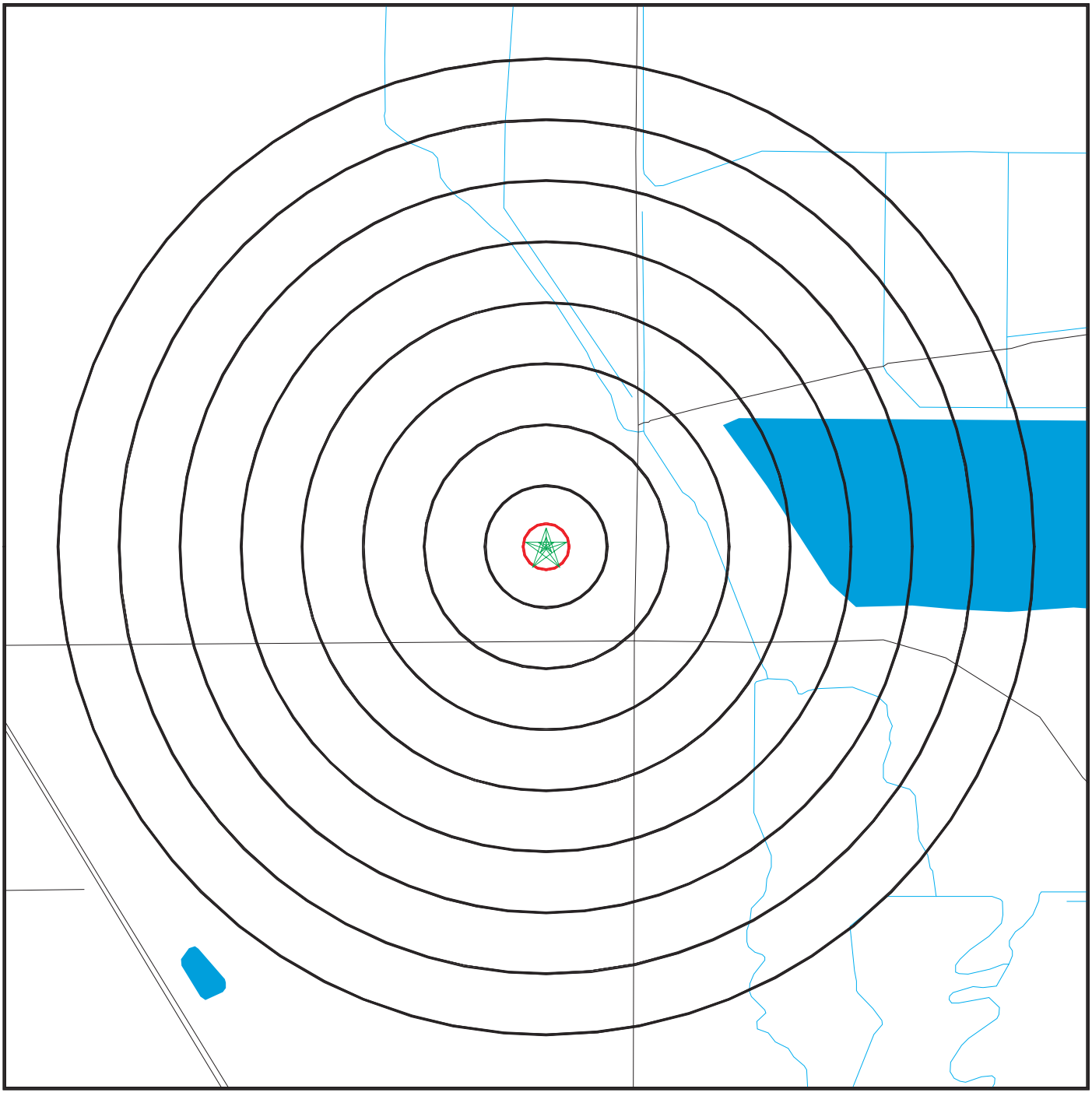
Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: CERCLIS, RCRATSD, LUST, SWL

TWISSELMAN RD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.737833 Longitude: 119.696333)

▲ Identified Sites

National Priority List Sites

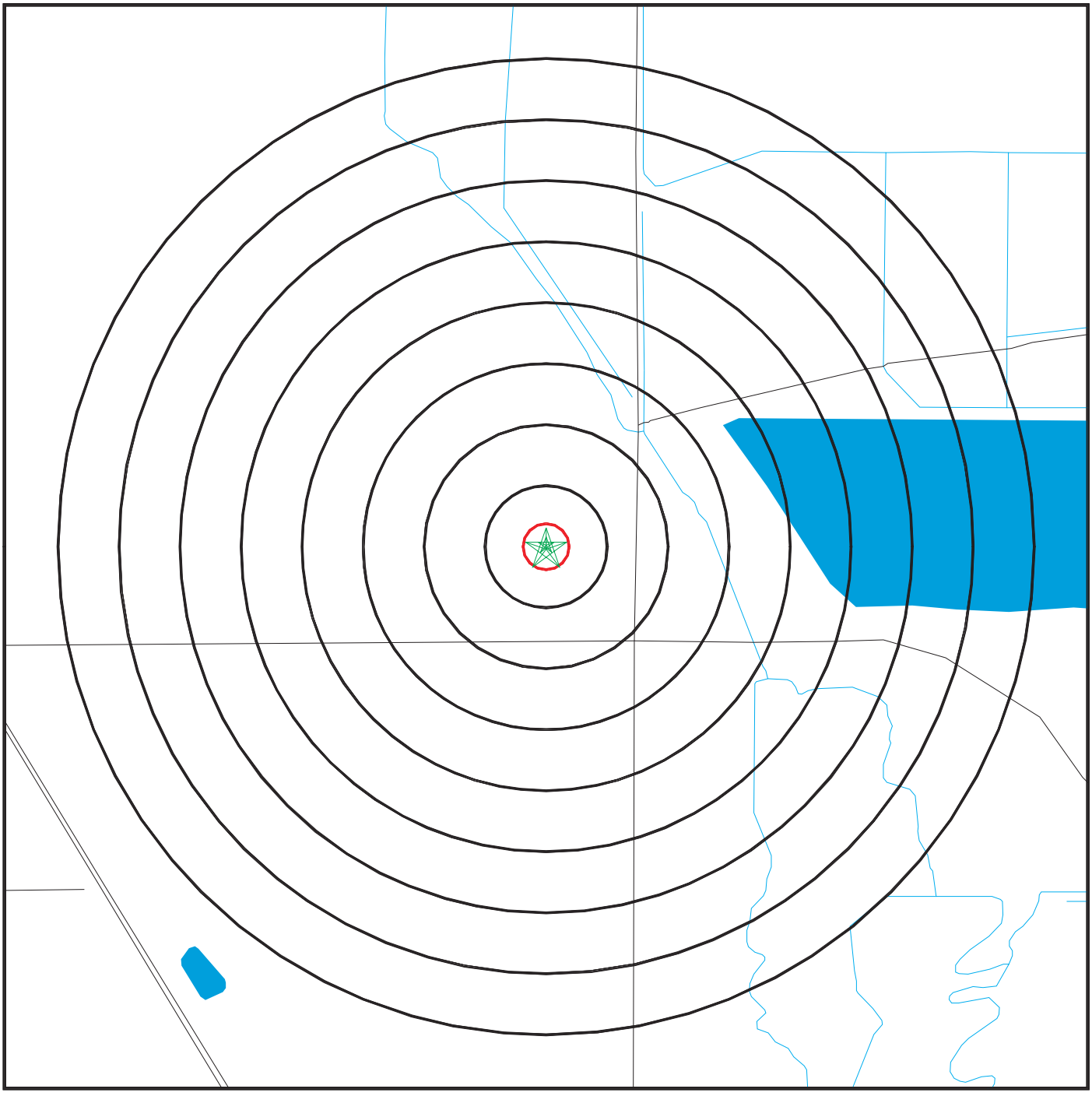
Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS

TWISSELMAN RD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.737833 Longitude: 119.696333)

▲ Identified Sites

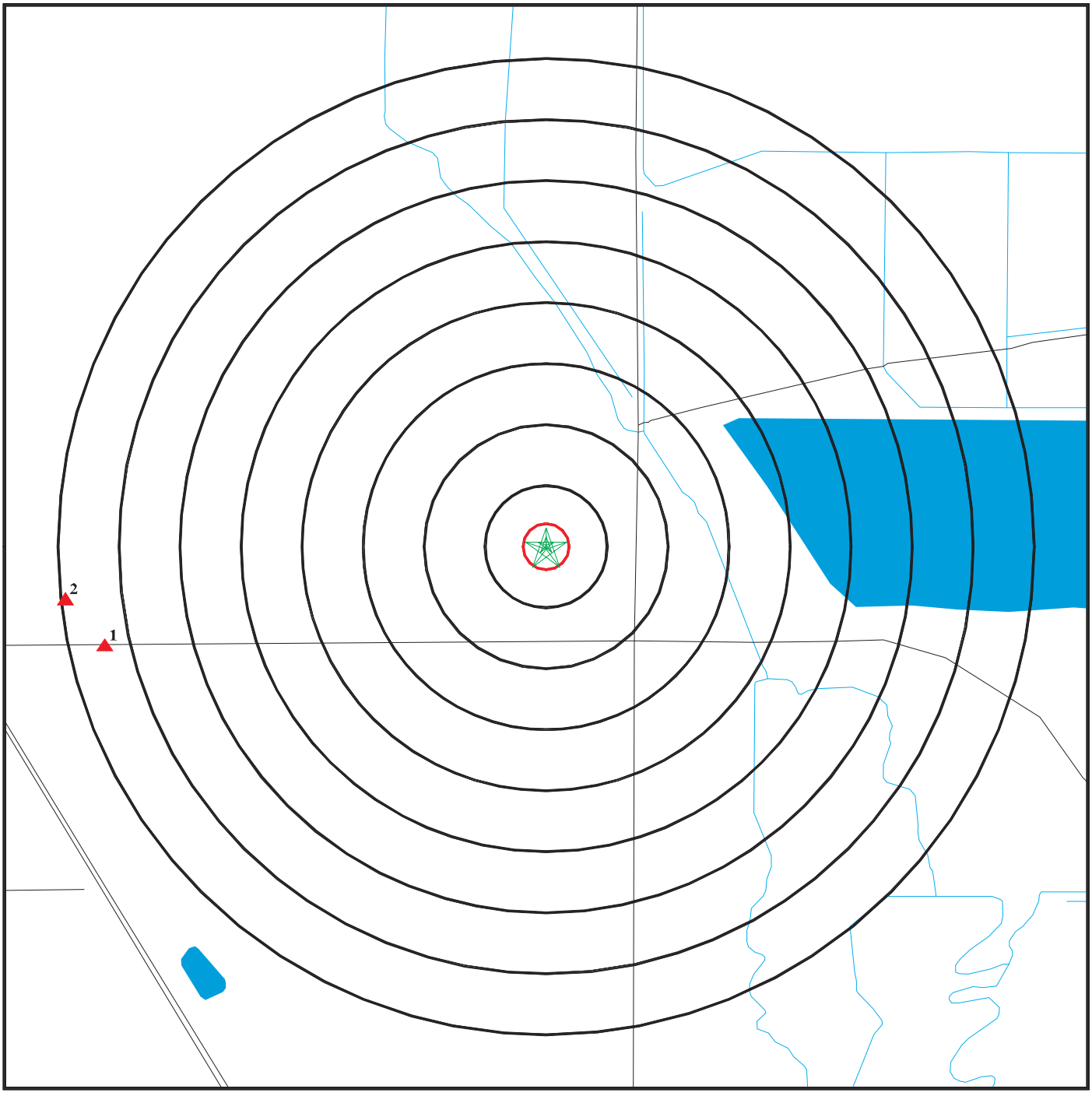
National Priority List Sites

Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius
Non ASTM Map, Spills, FINDS

TWISSELMAN RD, LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.737833 Longitude: 119.696333)

▲ Identified Sites

Sensitive Receptors

National Priority List Sites

Indian Reservations BIA

Pelicans Jaw 2
Twisselman Road
Lost Hills, CA 93249

Inquiry Number: 7009509.4f
July 5, 2022

FirstSearch Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

TARGET SITE **Twisselman Road**
LOST HILLS, CA 93249

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	Y	0	0	0	0	0	0	0
NPL Delisted	Y	0	0	0	0	0	0	0
CERCLIS	Y	0	0	0	0	0	0	0
NFRAP	Y	0	0	0	0	0	0	0
RCRA COR ACT	Y	0	0	0	0	0	0	0
RCRA TSD	Y	0	0	0	0	0	0	0
RCRA GEN	Y	0	0	0	0	0	0	0
Federal IC / EC	Y	0	0	0	0	0	0	0
ERNS	Y	0	0	0	0	0	0	0
State/Tribal NPL	Y	0	0	0	0	0	0	0
State/Tribal CERCLIS	Y	0	0	0	0	0	1	1
State/Tribal SWL	Y	0	0	0	0	0	0	0
State/Tribal LTANKS	Y	0	0	0	0	0	0	0
State/Tribal Tanks	Y	0	0	0	0	0	0	0
State/Tribal VCP	Y	0	0	0	0	0	0	0
ST/Tribal Brownfields	Y	0	0	0	0	0	0	0
US Brownfields	Y	0	0	0	0	0	0	0
Other SWF	Y	0	0	0	0	0	0	0
Other Haz Sites	Y	0	0	0	0	0	0	0
Other Tanks	Y	0	0	0	0	0	0	0
Local Land Records	Y	0	0	0	0	0	0	0
Spills	Y	0	0	0	0	0	0	0
Other	Y	0	0	0	0	0	0	0
	- Totals --	0	0	0	0	0	1	1

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Search Summary Report

TARGET SITE: **Twisselman Road**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	10/20/2021	2.000	0	0	0	0	0	0	0
	Proposed NPL	10/20/2021	2.000	0	0	0	0	0	0	0
NPL Delisted	Delisted NPL	10/20/2021	2.000	0	0	0	0	0	0	0
CERCLIS	SEMS	10/20/2021	2.000	0	0	0	0	0	0	0
NFRAP	SEMS-ARCHIVE	10/20/2021	2.000	0	0	0	0	0	0	0
RCRA COR ACT	CORRACTS	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA GEN	RCRA-LQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-SQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-VSQG	09/13/2021	2.000	0	0	0	0	0	0	0
Federal IC / EC	US ENG CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
	US INST CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
ERNS	ERNS	09/13/2021	2.000	0	0	0	0	0	0	0
State/Tribal NPL	RESPONSE	07/22/2021	2.000	0	0	0	0	0	0	0
State/Tribal CERCLIS	ENVIROSTOR	07/22/2021	2.000	0	0	0	0	0	1	1
State/Tribal SWL	SWF/LF	08/09/2021	2.000	0	0	0	0	0	0	0
State/Tribal LTANKS	LUST	09/07/2021	2.000	0	0	0	0	0	0	0
	INDIAN LUST	04/28/2021	2.000	0	0	0	0	0	0	0
	CPS-SLIC	09/07/2021	2.000	0	0	0	0	0	0	0
State/Tribal Tanks	UST	09/07/2021	2.000	0	0	0	0	0	0	0
	AST	07/06/2016	2.000	0	0	0	0	0	0	0
	INDIAN UST	04/28/2021	2.000	0	0	0	0	0	0	0
State/Tribal VCP	VCP	07/22/2021	2.000	0	0	0	0	0	0	0
ST/Tribal Brownfields	BROWNFIELDS	09/20/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **Twisselman Road**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
US Brownfields	US BROWNFIELDS	06/10/2021	2.000	0	0	0	0	0	0	0
Other SWF	WMUDS/SWAT	04/01/2000	2.000	0	0	0	0	0	0	0
	IHS OPEN DUMPS	04/01/2014	2.000	0	0	0	0	0	0	0
Other Haz Sites	SCH	07/22/2021	2.000	0	0	0	0	0	0	0
	CERS HAZ WASTE	07/15/2021	2.000	0	0	0	0	0	0	0
	US CDL	05/18/2021	2.000	0	0	0	0	0	0	0
	PFAS	09/07/2021	2.000	0	0	0	0	0	0	0
	AQUEOUS FOAM	12/01/2019	2.000	0	0	0	0	0	0	0
Other Tanks	SWEEPS UST	06/01/1994	2.000	0	0	0	0	0	0	0
	CA FID UST	10/31/1994	2.000	0	0	0	0	0	0	0
	CERS TANKS	07/15/2021	2.000	0	0	0	0	0	0	0
Local Land Records	DEED	08/30/2021	2.000	0	0	0	0	0	0	0
Spills	HMIRS	09/12/2021	2.000	0	0	0	0	0	0	0
	CHMIRS	06/30/2021	2.000	0	0	0	0	0	0	0
	SPILLS 90	06/06/2012	2.000	0	0	0	0	0	0	0
Other	RCRA NonGen / NLR	09/13/2021	2.000	0	0	0	0	0	0	0
	TSCA	12/31/2016	2.000	0	0	0	0	0	0	0
	TRIS	12/31/2018	2.000	0	0	0	0	0	0	0
	SSTS	07/19/2021	2.000	0	0	0	0	0	0	0
	RMP	10/20/2021	2.000	0	0	0	0	0	0	0
	RAATS	04/17/1995	2.000	0	0	0	0	0	0	0
	PRP	10/20/2021	2.000	0	0	0	0	0	0	0
	PADS	11/19/2020	2.000	0	0	0	0	0	0	0
	ICIS	11/18/2016	2.000	0	0	0	0	0	0	0
	FTTS	04/09/2009	2.000	0	0	0	0	0	0	0
	MLTS	07/29/2021	2.000	0	0	0	0	0	0	0
	RADINFO	07/01/2019	2.000	0	0	0	0	0	0	0
	INDIAN RESERV	12/31/2014	2.000	0	0	0	0	0	0	0
	FUSRAP	07/26/2021	2.000	0	0	0	0	0	0	0
	US AIRS	10/12/2016	2.000	0	0	0	0	0	0	0
	ABANDONED MINES	09/14/2021	2.000	0	0	0	0	0	0	0
	FINDS	05/05/2021	2.000	0	0	0	0	0	0	0
	DOCKET HWC	05/06/2021	2.000	0	0	0	0	0	0	0
	ECHO	06/26/2021	2.000	0	0	0	0	0	0	0
	UXO	12/31/2018	2.000	0	0	0	0	0	0	0
	FUELS PROGRAM	08/13/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **Twisselman Road**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
	Cortese	09/20/2021	2.000	0	0	0	0	0	0	0
	CUPA Listings		2.000	0	0	0	0	0	0	0
	HAZNET	12/31/2019	2.000	0	0	0	0	0	0	0
	ICE	08/13/2021	2.000	0	0	0	0	0	0	0
	MINES	09/07/2021	2.000	0	0	0	0	0	0	0
	PEST LIC	08/30/2021	2.000	0	0	0	0	0	0	0
	UIC GEO	09/07/2021	2.000	0	0	0	0	0	0	0
	WASTEWATER PITS	02/11/2021	2.000	0	0	0	0	0	0	0
	WDS	06/19/2007	2.000	0	0	0	0	0	0	0
	MILITARY PRIV SITES	09/07/2021	2.000	0	0	0	0	0	0	0
	PROJECT	09/07/2021	2.000	0	0	0	0	0	0	0
	WDR	09/07/2021	2.000	0	0	0	0	0	0	0
	CIWQS	08/30/2021	2.000	0	0	0	0	0	0	0
	CERS	07/15/2021	2.000	0	0	0	0	0	0	0
	NON-CASE INFO	09/07/2021	2.000	0	0	0	0	0	0	0
	OTHER OIL GAS	09/07/2021	2.000	0	0	0	0	0	0	0
	PROD WATER PONDS	09/07/2021	2.000	0	0	0	0	0	0	0
	SAMPLING POINT	09/07/2021	2.000	0	0	0	0	0	0	0
	WELL STIM PROJ	09/07/2021	2.000	0	0	0	0	0	0	0
	HWTS	07/13/2021	2.000	0	0	0	0	0	0	0
	MINES MRDS	04/06/2018	2.000	0	0	0	0	0	0	0
	- Totals --			0	0	0	0	0	1	1

Site Information Report

Request Date: JULY 5, 2022
Search Type: COORD
Request Name: MARK LAROCQUE
Job Number: 2022-082

Target Site: Twisselman Road
LOST HILLS, CA 93249

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)	UTMs	
Longitude:	119.717472	119.7174720 - 119ˆ 43' 2.89''	Easting:	254321.5
Latitude:	35.765194	35.7651940 - 35ˆ 45' 54.69''	Northing:	3961112.5
Elevation:	217 ft. above sea level		Zone:	Zone 11

Demographics

Sites: 0 **Non-Geocoded:** 1 **Population:** N/A

RADON

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.422 pCi/L	98%	2%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Target Site Summary Report

Target Property: Twisselman Road
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 1 GEOCODED: 0 NON GEOCODED: 1

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Sites Summary Report

Target Property: Twisselman Road
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 1 GEOCODED: 0 NON GEOCODED: 1

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
	ENVIROSTOR --15070027 --Refer: Other Agency	FARM FLITE AG SERVICE	LOST HILLS MUNICIPAL AIRP LOST HILLS, CA 93249	NON GC	N/A	N/A

NO SITES FOUND

Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: Delisted NPL The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Delisted NPL - National Priority List Deletions

CERCLIS: SEMS SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL. SEMS - Superfund Enterprise Management System

NFRAP: SEMS-ARCHIVE SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site. SEMS-ARCHIVE - Superfund Enterprise Management System Archive

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-VSQG - RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators).

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROLS - Institutional Controls Sites List.

Database Descriptions

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

State/Tribal NPL: RESPONSE Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. RESPONSE - State Response Sites

State/Tribal CERCLIS: ENVIROSTOR The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites. ENVIROSTOR - EnviroStor Database

State/Tribal SWL: SWF/LF (SWIS) Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF (SWIS) - Solid Waste Information System

State/Tribal LTANKS: RIVERSIDE CO. LUST LUST REG 9 - Leaking Underground Storage Tank Report. LUST REG 2 - Fuel Leak List. LUST REG 1 - Active Toxic Site Investigation. SAN DIEGO CO. SAM - Environmental Case Listing. LUST REG 5 - Leaking Underground Storage Tank Database. LUST REG 6V - Leaking Underground Storage Tank Case Listing. SAN MATEO CO. LUST - Fuel Leak List. VENTURA CO. LUST - Listing of Underground Tank Cleanup Sites. LUST REG 8 - Leaking Underground Storage Tanks. NAPA CO. LUST - Sites With Reported Contamination. SAN FRANCISCO CO. LUST - Local Oversite Facilities. LUST REG 6L - Leaking Underground Storage Tank Case Listing. ORANGE CO. LUST - List of Underground Storage Tank Cleanups. LUST REG 7 - Leaking Underground Storage Tank Case Listing. SOLANO CO. LUST - Leaking Underground Storage Tanks. LUST REG 3 - Leaking Underground Storage Tank Database. LUST - Leaking Underground Fuel Tank Report (GEOTRACKER). LUST SANTA CLARA - LOP Listing. SONOMA CO. LUST - Leaking Underground Storage Tank Sites. LUST REG 4 - Underground Storage Tank Leak List. Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties. LUST REG 4 - Leaking Underground Storage Tank Database INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R5 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. CPS-SLIC - Statewide SLIC Cases (GEOTRACKER). SLIC REG 1 - Active Toxic Site Investigations. SLIC REG 2 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 3 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 4 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 5 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6V - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6L - SLIC Sites. SLIC REG 7 - SLIC List. SLIC REG 8 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 9 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. Sacramento Co. CS - Toxic Site Clean-Up List.

State/Tribal Tanks: MILITARY UST SITES UST - Active UST Facilities. UST CLOSURE - Proposed Closure of Underground Storage Tank (UST) Cases. Military ust sites UST CLOSURE - Military UST Sites (GEOTRACKER) AST - Aboveground Petroleum Storage Tank Facilities. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land.

Database Descriptions

State/Tribal VCP: VCP Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. VCP - Voluntary Cleanup Program Properties

ST/Tribal Brownfields: BROWNFIELDS A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process. BROWNFIELDS - Considered Brownfieds Sites Listing

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: WMUDS/SWAT SAN DIEGO CO. LF - Solid Waste Facilities. CA LA LF - City of Los Angeles Landfills. LOS ANGELES CO. LF - List of Solid Waste Facilities. VENTURA CO. LF - Inventory of Illegal Abandoned and Inactive Sites. Solid Waste Facilities in Los Angeles County. VENTURA CO. LF - List of Solid Waste Facilities IHS OPEN DUMPS - Open Dumps on Indian Land.

Other Haz Sites: SCH This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose. SCH - School Property Evaluation Program SAN DIEGO CO. HMMD - Hazardous Materials Management Division Database. CERS HAZ WASTE - CERS HAZ WASTE. US CDL - Clandestine Drug Labs. AQUEOUS FOAM - Former Fire Training Facility Assessments Listing. PFAS - PFAS Contamination Site Location Listing.

Other Tanks: SWEEPS UST Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list. SWEEPS UST - SWEEPS UST Listing ALAMEDA CO. UST - Underground Tanks. KERN CO. UST - Underground Storage Tank Sites & Tank Listing. MARIN CO. UST - Underground Storage Tank Sites. NAPA CO. UST - Closed and Operating Underground Storage Tank Sites. ORANGE CO. UST - List of Underground Storage Tank Facilities. RIVERSIDE CO. UST - Underground Storage Tank Tank List. SAN FRANCISCO CO. UST - Underground Storage Tank Information. SOLANO CO. UST - Underground Storage Tanks. SUTTER CO. UST - Underground Storage Tanks. VENTURA CO. UST - Underground Tank Closed Sites List. YOLO CO. UST - Underground Storage Tank Comprehensive Facility Report. LOS ANGELES UST - Active & Inactive UST Inventory. EL SEGUNDO UST - City of El Segundo Underground Storage Tank. LONG BEACH UST - City of Long Beach Underground Storage Tank. UST MENDOCINO - Mendocino County UST Database. UST SAN JOAQUIN - San Joaquin Co. UST. TORRANCE UST - City of Torrance Underground Storage Tank. LOS ANGELES AST - Active & Inactive AST Inventory. SAN FRANCISCO AST - Aboveground Storage Tank Site Listing. CA FID UST - Facility Inventory Database. CERS TANKS - California Environmental Reporting System (CERS) Tanks.

Local Land Records: DEED Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners. DEED - Deed Restriction Listing

Database Descriptions

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System CHMIRS - California Hazardous Material Incident Report System. Orange Co. Industrial Site - List of Industrial Site Cleanups. SPILLS 90 - SPILLS90 data from FirstSearch.

Other: RCRA NonGen / NLR RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste. RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated FEDLAND - Federal and Indian Lands. TSCA - Toxic Substances Control Act. TRIS - Toxic Chemical Release Inventory System. SSTS - Section 7 Tracking Systems. RMP - Risk Management Plans. RAATS - RCRA Administrative Action Tracking System. PRP - Potentially Responsible Parties. PADS - PCB Activity Database System. ICIS - Integrated Compliance Information System. FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. BRS - Biennial Reporting System. INDIAN RESERV - Indian Reservations. FUSRAP - Formerly Utilized Sites Remedial Action Program. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. ABANDONED MINES - Abandoned Mines. FINDS - Facility Index System/Facility Registry System. UXO - Unexploded Ordnance Sites. ECHO - Enforcement & Compliance History Information. DOCKET HWC - Hazardous Waste Compliance Docket Listing. FUELS PROGRAM - EPA Fuels Program Registered Listing. CORTESE - "Cortese" Hazardous Waste & Substances Sites List. CUPA - CUPA Resources List. CUPA AMADOR - CUPA Facility List. CUPA BUTTE - CUPA Facility Listing. CUPA CALVERAS - CUPA Facility Listing. CUPA COLUSA - CUPA Facility List. CUPA DEL NORTE - CUPA Facility List. CUPA EL DORADO - CUPA Facility List. CUPA FRESNO - CUPA Resources List. CUPA HUMBOLDT - CUPA Facility List. CUPA LIVERMORE-PLEASANTON - CUPA Facility Listing. CUPA IMPERIAL - CUPA Facility List. CUPA TRINITY - CUPA Facility List. CUPA PLUMAS - CUPA Facility List. CUPA STANISLAUS - CUPA Facility List. CUPA SAN FRANCISCO CO - CUPA Facility Listing. CUPA LASSEN - CUPA Facility List. CUPA TEHAMA - CUPA Facility List. CUPA TULARE - CUPA Facility List. CUPA GLENN - CUPA Facility List. CUPA SAN BENITO - CUPA Facility List. CUPA INYO - CUPA Facility List. CUPA KINGS - CUPA Facility List.
CUPA LAKE - CUPA Facility List. CUPA MADERA - CUPA Facility List. CUPA MERCED - CUPA Facility List. CUPA MONO - CUPA Facility List. CUPA MONTEREY - CUPA Facility Listing. CUPA NEVADA - CUPA Facility List. CUPA SAN LUIS OBISPO - CUPA Facility List. CUPA SANTA BARBARA - CUPA Facility Listing. CUPA SANTA CLARA - Cupa Facility List. CUPA SANTA CRUZ - CUPA Facility List. CUPA SHASTA - CUPA Facility List. CUPA SONOMA - Cupa Facility List. CUPA TUOLUMNE - CUPA Facility List. KERN CO CUPA - CUPA Facility List. CUPA YUBA - CUPA Facility List. HAZNET - Facility and Manifest Data. ICE - ICE. MINES - Mines Site Location Listing. Sacramento Co. ML - Master Hazardous Materials Facility List. San Bern. Co. Permit - Hazardous Material Permits. PEST LIC - Pesticide Regulation Licenses Listing. LA Co. Site Mitigation - Site Mitigation List. UIC GEO - Underground Injection Control Sites (GEOTRACKER). WASTEWATER PITS - Oil Wastewater Pits Listing. WDS - Waste Discharge System. MILITARY PRIV SITES - Military Privatized Sites (GEOTRACKER). PROJECT - Project Sites (GEOTRACKER). WDR - Waste Discharge Requirements Listing. SAN DIEGO CO LOP - Local Oversight Program Listing. CIWQS - California Integrated Water Quality System. CERS - CalEPA Regulated Site Portal Data. NON-CASE INFO - Non-Case Information Sites (GEOTRACKER). OTHER OIL GAS - Other Oil & Gas Projects Sites (GEOTRACKER). PROD WATER PONDS - Produced Water Ponds Sites (GEOTRACKER). SAMPLING POINT - Sampling Point ? Public Sites (GEOTRACKER). WELL STIM PROJ - Well Stimulation Project (GEOTRACKER). HWTS - Hazardous Waste Tracking System. PCS INACTIVE - Listing of Inactive PCS Permits. MINES MRDS - Mineral Resources Data System. PCS ENF - Enforcement data. PCS - Permit Compliance System. LOS ANGELES CO LF METHANE - Methane Producing Landfills.

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Quarterly

State/Tribal NPL: Department of Toxic Substances Control

Updated Quarterly

State/Tribal CERCLIS: Department of Toxic Substances Control

Updated Quarterly

State/Tribal SWL: Department of Resources Recycling and Recovery

Updated Quarterly

State/Tribal LTANKS: California Regional Water Quality Control Board Central Valley Region (5)

No Update Planned

Database Sources

State/Tribal Tanks: SWRCB

Updated Semi-Annually

State/Tribal VCP: Department of Toxic Substances Control

Updated Quarterly

ST/Tribal Brownfields: State Water Resources Control Board

Updated Quarterly

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: Engineering & Construction Division

Varies

Other Haz Sites: Department of Toxic Substances Control

Updated Quarterly

Other Tanks: State Water Resources Control Board

No Update Planned

Local Land Records: DTSC and SWRCB

Updated Semi-Annually

Spills: U.S. Department of Transportation

Updated Quarterly

Other: Environmental Protection Agency

Updated Quarterly

Street Name Report for Streets near the Target Property

Target Property: Twisselman Road
LOST HILLS, CA 93249

JOB: 2022-082

Street Name	Dist/Dir	Street Name	Dist/Dir

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: NPL, RCRACOR, STATES Sites

LOST HILLS RD LOST HILLS, CA 93249

Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.765194 Longitude: 119.717472)

▲ Identified Sites

National Priority List Sites

Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: CERCLIS, RCRATSD, LUST, SWL

LOST HILLS RD LOST HILLS, CA 93249

Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.765194 Longitude: 119.717472)

▲ Identified Sites

National Priority List Sites

Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS

LOST HILLS RD LOST HILLS, CA 93249

Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.765194 Longitude: 119.717472)

▲ Identified Sites

National Priority List Sites

Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius
Non ASTM Map, Spills, FINDS

LOST HILLS RD LOST HILLS, CA 93249

Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.765194 Longitude: 119.717472)

▲ Identified Sites

Sensitive Receptors

National Priority List Sites

Indian Reservations BIA

Pelicans Jaw 3
TWISSELMAN ROAD
Lost Hills, CA 93249

Inquiry Number: 7009509.4h
July 5, 2022

FirstSearch Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Search Summary Report

TARGET SITE **TWISSELMAN ROAD**
LOST HILLS, CA 93249

Category	Sel	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	Y	0	0	0	0	0	0	0
NPL Delisted	Y	0	0	0	0	0	0	0
CERCLIS	Y	0	0	0	0	0	0	0
NFRAP	Y	0	0	0	0	0	0	0
RCRA COR ACT	Y	0	0	0	0	0	0	0
RCRA TSD	Y	0	0	0	0	0	0	0
RCRA GEN	Y	0	0	0	0	0	0	0
Federal IC / EC	Y	0	0	0	0	0	0	0
ERNS	Y	0	0	0	0	0	0	0
State/Tribal NPL	Y	0	0	0	0	0	0	0
State/Tribal CERCLIS	Y	0	0	0	0	0	0	0
State/Tribal SWL	Y	0	0	0	0	0	3	3
State/Tribal LTANKS	Y	0	0	0	0	1	0	1
State/Tribal Tanks	Y	0	0	0	0	0	0	0
State/Tribal VCP	Y	0	0	0	0	0	0	0
ST/Tribal Brownfields	Y	0	0	0	0	0	0	0
US Brownfields	Y	0	0	0	0	0	0	0
Other SWF	Y	0	0	0	0	0	0	0
Other Haz Sites	Y	0	0	0	0	0	0	0
Other Tanks	Y	0	0	0	0	0	0	0
Local Land Records	Y	0	0	0	0	0	0	0
Spills	Y	0	0	0	0	0	0	0
Other	Y	0	0	0	0	1	0	2
	- Totals --	0	0	0	0	3	3	6

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Search Summary Report

TARGET SITE: **TWISSELMAN ROAD**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
NPL	NPL	10/20/2021	2.000	0	0	0	0	0	0	0
	Proposed NPL	10/20/2021	2.000	0	0	0	0	0	0	0
NPL Delisted	Delisted NPL	10/20/2021	2.000	0	0	0	0	0	0	0
CERCLIS	SEMS	10/20/2021	2.000	0	0	0	0	0	0	0
NFRAP	SEMS-ARCHIVE	10/20/2021	2.000	0	0	0	0	0	0	0
RCRA COR ACT	CORRACTS	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA TSD	RCRA-TSDF	09/13/2021	2.000	0	0	0	0	0	0	0
RCRA GEN	RCRA-LQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-SQG	09/13/2021	2.000	0	0	0	0	0	0	0
	RCRA-VSQG	09/13/2021	2.000	0	0	0	0	0	0	0
Federal IC / EC	US ENG CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
	US INST CONTROLS	08/23/2021	2.000	0	0	0	0	0	0	0
ERNS	ERNS	09/13/2021	2.000	0	0	0	0	0	0	0
State/Tribal NPL	RESPONSE	07/22/2021	2.000	0	0	0	0	0	0	0
State/Tribal CERCLIS	ENVIROSTOR	07/22/2021	2.000	0	0	0	0	0	0	0
State/Tribal SWL	SWF/LF	08/09/2021	2.000	0	0	0	0	0	3	3
State/Tribal LTANKS	LUST	09/07/2021	2.000	0	0	0	0	0	0	0
	INDIAN LUST	04/28/2021	2.000	0	0	0	0	0	0	0
	CPS-SLIC	09/07/2021	2.000	0	0	0	0	1	0	1
State/Tribal Tanks	UST	09/07/2021	2.000	0	0	0	0	0	0	0
	AST	07/06/2016	2.000	0	0	0	0	0	0	0
	INDIAN UST	04/28/2021	2.000	0	0	0	0	0	0	0
State/Tribal VCP	VCP	07/22/2021	2.000	0	0	0	0	0	0	0
ST/Tribal Brownfields	BROWNFIELDS	09/20/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **TWISSELMAN ROAD**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
US Brownfields	US BROWNFIELDS	06/10/2021	2.000	0	0	0	0	0	0	0
Other SWF	WMUDS/SWAT	04/01/2000	2.000	0	0	0	0	0	0	0
	IHS OPEN DUMPS	04/01/2014	2.000	0	0	0	0	0	0	0
Other Haz Sites	SCH	07/22/2021	2.000	0	0	0	0	0	0	0
	CERS HAZ WASTE	07/15/2021	2.000	0	0	0	0	0	0	0
	US CDL	05/18/2021	2.000	0	0	0	0	0	0	0
	PFAS	09/07/2021	2.000	0	0	0	0	0	0	0
	AQUEOUS FOAM	12/01/2019	2.000	0	0	0	0	0	0	0
Other Tanks	SWEEPS UST	06/01/1994	2.000	0	0	0	0	0	0	0
	CA FID UST	10/31/1994	2.000	0	0	0	0	0	0	0
	CERS TANKS	07/15/2021	2.000	0	0	0	0	0	0	0
Local Land Records	DEED	08/30/2021	2.000	0	0	0	0	0	0	0
Spills	HMIRS	09/12/2021	2.000	0	0	0	0	0	0	0
	CHMIRS	06/30/2021	2.000	0	0	0	0	0	0	0
	SPILLS 90	06/06/2012	2.000	0	0	0	0	0	0	0
Other	RCRA NonGen / NLR	09/13/2021	2.000	0	0	0	0	0	0	0
	TSCA	12/31/2016	2.000	0	0	0	0	0	0	0
	TRIS	12/31/2018	2.000	0	0	0	0	0	0	0
	SSTS	07/19/2021	2.000	0	0	0	0	0	0	0
	RMP	10/20/2021	2.000	0	0	0	0	0	0	0
	RAATS	04/17/1995	2.000	0	0	0	0	0	0	0
	PRP	10/20/2021	2.000	0	0	0	0	0	0	0
	PADS	11/19/2020	2.000	0	0	0	0	0	0	0
	ICIS	11/18/2016	2.000	0	0	0	0	0	0	0
	FTTS	04/09/2009	2.000	0	0	0	0	0	0	0
	MLTS	07/29/2021	2.000	0	0	0	0	0	0	0
	RADINFO	07/01/2019	2.000	0	0	0	0	0	0	0
	INDIAN RESERV	12/31/2014	2.000	0	0	0	0	0	0	0
	FUSRAP	07/26/2021	2.000	0	0	0	0	0	0	0
	US AIRS	10/12/2016	2.000	0	0	0	0	0	0	0
	ABANDONED MINES	09/14/2021	2.000	0	0	0	0	0	0	0
	FINDS	05/05/2021	2.000	0	0	0	0	0	0	0
	DOCKET HWC	05/06/2021	2.000	0	0	0	0	0	0	0
	ECHO	06/26/2021	2.000	0	0	0	0	0	0	0
	UXO	12/31/2018	2.000	0	0	0	0	0	0	0
	FUELS PROGRAM	08/13/2021	2.000	0	0	0	0	0	0	0

Search Summary Report

TARGET SITE: **TWISSELMAN ROAD**
LOST HILLS, CA 93249

Category	Database	Update	Radius	Site	1/8	1/4	1/2	> 1/2	ZIP	TOTALS
	Cortese	09/20/2021	2.000	0	0	0	0	0	0	0
	CUPA Listings		2.000	0	0	0	0	0	0	0
	HAZNET	12/31/2019	2.000	0	0	0	0	0	0	0
	ICE	08/13/2021	2.000	0	0	0	0	0	0	0
	MINES	09/07/2021	2.000	0	0	0	0	0	0	0
	PEST LIC	08/30/2021	2.000	0	0	0	0	0	0	0
	UIC GEO	09/07/2021	2.000	0	0	0	0	0	0	0
	WASTEWATER PITS	02/11/2021	2.000	0	0	0	0	0	0	0
	WDS	06/19/2007	2.000	0	0	0	0	0	0	0
	MILITARY PRIV SITES	09/07/2021	2.000	0	0	0	0	0	0	0
	PROJECT	09/07/2021	2.000	0	0	0	0	0	0	0
	WDR	09/07/2021	2.000	0	0	0	0	0	0	0
	CIWQS	08/30/2021	2.000	0	0	0	0	0	0	1
	CERS	07/15/2021	2.000	0	0	0	0	1	0	1
	NON-CASE INFO	09/07/2021	2.000	0	0	0	0	0	0	0
	OTHER OIL GAS	09/07/2021	2.000	0	0	0	0	0	0	0
	PROD WATER PONDS	09/07/2021	2.000	0	0	0	0	0	0	0
	SAMPLING POINT	09/07/2021	2.000	0	0	0	0	0	0	0
	WELL STIM PROJ	09/07/2021	2.000	0	0	0	0	0	0	0
	HWTS	07/13/2021	2.000	0	0	0	0	0	0	0
	MINES MRDS	04/06/2018	2.000	0	0	0	0	0	0	0
	- Totals --			0	0	0	0	3	3	6

Site Information Report

Request Date: JULY 5, 2022
Request Name: MARK LAROCQUE
Search Type: COORD
Job Number: 2022-082

Target Site: TWISSELMAN ROAD
LOST HILLS, CA 93249

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)	UTMs	
Longitude:	119.749056	119.7490560 - 119ˆ 44' 56.60''	Easting:	251523.3
Latitude:	35.783778	35.7837780 - 35ˆ 47' 1.60''	Northing:	3963254.0
Elevation:	214 ft. above sea level		Zone:	Zone 11

Demographics

Sites: 3 **Non-Geocoded:** 3 **Population:** N/A

RADON

Federal EPA Radon Zone for KERN County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for KERN COUNTY, CA

Number of sites tested: 94

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.422 pCi/L	98%	2%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Target Site Summary Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 6 GEOCODED: 3 NON GEOCODED: 3

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.

No sites found for target address

Sites Summary Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 6 GEOCODED: 3 NON GEOCODED: 3

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
1	CERS	SHELL PIPELINE - KERN	SECT. 1,7,12; T25S/R20E BAKERSFIELD, CA	0.94 West	+ 10	1
1	CPS-SLIC --Open - Inactive --SLT5FR444398	SHELL PIPELINE - KERN	SECT. 1,7,12; T25S/R20E BAKERSFIELD, CA	0.94 West	+ 10	2
2	CIWQS	0U4704 CONSTRCUTION ON ROUTE 5	PM 84 LOST HILLS, CA 93249	1.83 SSW	+ 17	3

Sites Summary Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

TOTAL: 6 GEOCODED: 3 NON GEOCODED: 3

Map ID	DB Type --ID/Status	Site Name	Address	Dist/Dir	ElevDiff	Page No.
	SWF/LF --Closed --Unpermitted --15-CR-0097	BITTERWATER CREEK PUMPING ST.B	10990 BITTERWATER VALLEY BITTERWATER CREEK PUMPING STATIOIN, CA 93249	NON GC	N/A	N/A
	SWF/LF --Planned --Surrendered --16-AA-0013	MUSTANG HILL LANDFILL	29703 MILHAM ROAD KETTLEMAN CITY, CA 93239	NON GC	N/A	N/A
	SWF/LF --Closed --Notification --15-AA-0371	LOST HILLS TRANSFER/RECYCLING	1425 HOLLOWAY ROAD LOST HILLS, CA 93249	NON GC	N/A	N/A

Site Detail Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

CERS

EDR ID: S106486082 **DIST/DIR:** 0.936 West **ELEVATION:** 224 **MAP ID:** 1

NAME: SHELL PIPELINE - KERN **Rev:** 07/15/2021

ADDRESS: SECT. 1,7,12; T25S/R20E
BAKERSFIELD, CA

SOURCE: CA California Environmental Protection Agency

CERS:
Name: SHELL PIPELINE - KERN
Address: SECT. 1,7,12; T25S/R20E
City,State,Zip: BAKERSFIELD, CA
Site ID: 250784
CERS ID: SLT5FR444398
CERS Description: Cleanup Program Site

Affiliation:
Affiliation Type Desc: Regional Board Caseworker
Entity Name: JULIAN GRIJALVA - CENTRAL VALLEY RWQCB (REGION 5F)
Entity Title: Not reported
Affiliation Address: 1685 E Street
Affiliation City: FRESNO
Affiliation State: CA
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: 5594455579

Site Detail Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

CPS-SLIC

EDR ID: S106486082 **DIST/DIR:** 0.936 West **ELEVATION:** 224 **MAP ID:** 1

NAME: SHELL PIPELINE - KERN
ADDRESS: SECT. 1,7,12; T25S/R20E
BAKERSFIELD, CA

Rev: 09/07/2021
ID/Status: Open - Inactive
ID/Status: SLT5FR444398

SOURCE: CA State Water Resources Control Board

CPS-SLIC:
Name: SHELL PIPELINE - KERN
Address: SECT. 1,7,12; T25S/R20E
City,State,Zip: BAKERSFIELD, CA
Region: STATE
Facility Status: Open - Inactive
Status Date: 04/28/2016
Global Id: SLT5FR444398
Lead Agency: CENTRAL VALLEY RWQCB (REGION 5F)
Lead Agency Case Number: Not reported
Latitude: 35.7822
Longitude: -119.7656
Case Type: Cleanup Program Site
Case Worker: JEG
Local Agency: Not reported
RB Case Number: SLT5FR044
File Location: Not reported
Potential Media Affected: Soil
Potential Contaminants of Concern: Crude Oil
Site History: Not reported

Click here to access the California GeoTracker records for this facility:

Site Detail Report

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

CIWQS

EDR ID: S127010578 **DIST/DIR:** 1.835 SSW **ELEVATION:** 231 **MAP ID:** 2

NAME: 0U4704 CONSTRCUTION ON ROUTE 5 **Rev:** 08/30/2021

ADDRESS: PM 84
LOST HILLS, CA 93249
KERN

SOURCE: CA State Water Resources Control Board

CIWQS:
Name: 0U4704 CONSTRCUTION ON ROUTE 5
Address: PM 84
City,State,Zip: LOST HILLS, CA 93249
Agency: Caltrans District 06
Agency Address: 3240 N Millbrook ave, Fresno, CA 93726
Place/Project Type: Construction - Transportation
SIC/NAICS: Not reported
Region: 5F
Program: CONSTW
Regulatory Measure Status: Active
Regulatory Measure Type: Caltrans Construction
Order Number: 2009-009-DWQ
WDID: 5F15C391923
NPDES Number: CAS000002
Adoption Date: Not reported
Effective Date: 11/02/2020
Termination Date: Not reported
Expiration/Review Date: Not reported
Design Flow: Not reported
Major/Minor: Not reported
Complexity: Not reported
TTWQ: Not reported
Enforcement Actions within 5 years: 0
Violations within 5 years: 0
Latitude: 35.7586
Longitude: -119.7596

Database Descriptions

NPL: NPL National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices. NPL - National Priority List Proposed NPL - Proposed National Priority List Sites.

NPL Delisted: Delisted NPL The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Delisted NPL - National Priority List Deletions

CERCLIS: SEMS SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL. SEMS - Superfund Enterprise Management System

NFRAP: SEMS-ARCHIVE SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site. SEMS-ARCHIVE - Superfund Enterprise Management System Archive

RCRA COR ACT: CORRACTS CORRACTS identifies hazardous waste handlers with RCRA corrective action activity. CORRACTS - Corrective Action Report

RCRA TSD: RCRA-TSDF RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste. RCRA-TSDF - RCRA - Treatment, Storage and Disposal

RCRA GEN: RCRA-LQG RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. RCRA-LQG - RCRA - Large Quantity Generators RCRA-SQG - RCRA - Small Quantity Generators. RCRA-VSQG - RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators).

Federal IC / EC: US ENG CONTROLS A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health. US ENG CONTROLS - Engineering Controls Sites List US INST CONTROLS - Institutional Controls Sites List.

Database Descriptions

ERNS: ERNS Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances. ERNS - Emergency Response Notification System

State/Tribal NPL: RESPONSE Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. RESPONSE - State Response Sites

State/Tribal CERCLIS: ENVIROSTOR The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites. ENVIROSTOR - EnviroStor Database

State/Tribal SWL: SWF/LF (SWIS) Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites. SWF/LF (SWIS) - Solid Waste Information System

State/Tribal LTANKS: RIVERSIDE CO. LUST LUST REG 9 - Leaking Underground Storage Tank Report. LUST REG 2 - Fuel Leak List. LUST REG 1 - Active Toxic Site Investigation. SAN DIEGO CO. SAM - Environmental Case Listing. LUST REG 5 - Leaking Underground Storage Tank Database. LUST REG 6V - Leaking Underground Storage Tank Case Listing. SAN MATEO CO. LUST - Fuel Leak List. VENTURA CO. LUST - Listing of Underground Tank Cleanup Sites. LUST REG 8 - Leaking Underground Storage Tanks. NAPA CO. LUST - Sites With Reported Contamination. SAN FRANCISCO CO. LUST - Local Oversite Facilities. LUST REG 6L - Leaking Underground Storage Tank Case Listing. ORANGE CO. LUST - List of Underground Storage Tank Cleanups. LUST REG 7 - Leaking Underground Storage Tank Case Listing. SOLANO CO. LUST - Leaking Underground Storage Tanks. LUST REG 3 - Leaking Underground Storage Tank Database. LUST - Leaking Underground Fuel Tank Report (GEOTRACKER). LUST SANTA CLARA - LOP Listing. SONOMA CO. LUST - Leaking Underground Storage Tank Sites. LUST REG 4 - Underground Storage Tank Leak List. Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties. LUST REG 4 - Leaking Underground Storage Tank Database INDIAN LUST R4 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R7 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R8 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R5 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R9 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R6 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R10 - Leaking Underground Storage Tanks on Indian Land. INDIAN LUST R1 - Leaking Underground Storage Tanks on Indian Land. CPS-SLIC - Statewide SLIC Cases (GEOTRACKER). SLIC REG 1 - Active Toxic Site Investigations. SLIC REG 2 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 3 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 4 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 5 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6V - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 6L - SLIC Sites. SLIC REG 7 - SLIC List. SLIC REG 8 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. SLIC REG 9 - Spills, Leaks, Investigation & Cleanup Cost Recovery Listing. Sacramento Co. CS - Toxic Site Clean-Up List.

State/Tribal Tanks: MILITARY UST SITES UST - Active UST Facilities. UST CLOSURE - Proposed Closure of Underground Storage Tank (UST) Cases. Military ust sites UST CLOSURE - Military UST Sites (GEOTRACKER) AST - Aboveground Petroleum Storage Tank Facilities. INDIAN UST R8 - Underground Storage Tanks on Indian Land. INDIAN UST R6 - Underground Storage Tanks on Indian Land. INDIAN UST R7 - Underground Storage Tanks on Indian Land. INDIAN UST R9 - Underground Storage Tanks on Indian Land. INDIAN UST R10 - Underground Storage Tanks on Indian Land. INDIAN UST R1 - Underground Storage Tanks on Indian Land. INDIAN UST R5 - Underground Storage Tanks on Indian Land. INDIAN UST R4 - Underground Storage Tanks on Indian Land.

Database Descriptions

State/Tribal VCP: VCP Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs. VCP - Voluntary Cleanup Program Properties

ST/Tribal Brownfields: BROWNFIELDS A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process. BROWNFIELDS - Considered Brownfieds Sites Listing

US Brownfields: US BROWNFIELDS Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs. US BROWNFIELDS - A Listing of Brownfields Sites

Other SWF: WMUDS/SWAT SAN DIEGO CO. LF - Solid Waste Facilities. CA LA LF - City of Los Angeles Landfills. LOS ANGELES CO. LF - List of Solid Waste Facilities. VENTURA CO. LF - Inventory of Illegal Abandoned and Inactive Sites. Solid Waste Facilities in Los Angeles County. VENTURA CO. LF - List of Solid Waste Facilities IHS OPEN DUMPS - Open Dumps on Indian Land.

Other Haz Sites: SCH This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose. SCH - School Property Evaluation Program SAN DIEGO CO. HMMD - Hazardous Materials Management Division Database. CERS HAZ WASTE - CERS HAZ WASTE. US CDL - Clandestine Drug Labs. AQUEOUS FOAM - Former Fire Training Facility Assessments Listing. PFAS - PFAS Contamination Site Location Listing.

Other Tanks: SWEEPS UST Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list. SWEEPS UST - SWEEPS UST Listing ALAMEDA CO. UST - Underground Tanks. KERN CO. UST - Underground Storage Tank Sites & Tank Listing. MARIN CO. UST - Underground Storage Tank Sites. NAPA CO. UST - Closed and Operating Underground Storage Tank Sites. ORANGE CO. UST - List of Underground Storage Tank Facilities. RIVERSIDE CO. UST - Underground Storage Tank Tank List. SAN FRANCISCO CO. UST - Underground Storage Tank Information. SOLANO CO. UST - Underground Storage Tanks. SUTTER CO. UST - Underground Storage Tanks. VENTURA CO. UST - Underground Tank Closed Sites List. YOLO CO. UST - Underground Storage Tank Comprehensive Facility Report. LOS ANGELES UST - Active & Inactive UST Inventory. EL SEGUNDO UST - City of El Segundo Underground Storage Tank. LONG BEACH UST - City of Long Beach Underground Storage Tank. UST MENDOCINO - Mendocino County UST Database. UST SAN JOAQUIN - San Joaquin Co. UST. TORRANCE UST - City of Torrance Underground Storage Tank. LOS ANGELES AST - Active & Inactive AST Inventory. SAN FRANCISCO AST - Aboveground Storage Tank Site Listing. CA FID UST - Facility Inventory Database. CERS TANKS - California Environmental Reporting System (CERS) Tanks.

Local Land Records: DEED Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners. DEED - Deed Restriction Listing

Database Descriptions

Spills: HMIRS Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT. HMIRS - Hazardous Materials Information Reporting System CHMIRS - California Hazardous Material Incident Report System. Orange Co. Industrial Site - List of Industrial Site Cleanups. SPILLS 90 - SPILLS90 data from FirstSearch.

Other: RCRA NonGen / NLR RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste. RCRA NonGen / NLR - RCRA - Non Generators / No Longer Regulated FEDLAND - Federal and Indian Lands. TSCA - Toxic Substances Control Act. TRIS - Toxic Chemical Release Inventory System. SSTS - Section 7 Tracking Systems. RMP - Risk Management Plans. RAATS - RCRA Administrative Action Tracking System. PRP - Potentially Responsible Parties. PADS - PCB Activity Database System. ICIS - Integrated Compliance Information System. FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). FTTS INSP - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act). MLTS - Material Licensing Tracking System. RADINFO - Radiation Information Database. BRS - Biennial Reporting System. INDIAN RESERV - Indian Reservations. FUSRAP - Formerly Utilized Sites Remedial Action Program. US AIRS (AFS) - Aerometric Information Retrieval System Facility Subsystem (AFS). US AIRS MINOR - Air Facility System Data. ABANDONED MINES - Abandoned Mines. FINDS - Facility Index System/Facility Registry System. UXO - Unexploded Ordnance Sites. ECHO - Enforcement & Compliance History Information. DOCKET HWC - Hazardous Waste Compliance Docket Listing. FUELS PROGRAM - EPA Fuels Program Registered Listing. CORTESE - "Cortese" Hazardous Waste & Substances Sites List. CUPA - CUPA Resources List. CUPA AMADOR - CUPA Facility List. CUPA BUTTE - CUPA Facility Listing. CUPA CALVERAS - CUPA Facility Listing. CUPA COLUSA - CUPA Facility List. CUPA DEL NORTE - CUPA Facility List. CUPA EL DORADO - CUPA Facility List. CUPA FRESNO - CUPA Resources List. CUPA HUMBOLDT - CUPA Facility List. CUPA LIVERMORE-PLEASANTON - CUPA Facility Listing. CUPA IMPERIAL - CUPA Facility List. CUPA TRINITY - CUPA Facility List. CUPA PLUMAS - CUPA Facility List. CUPA STANISLAUS - CUPA Facility List. CUPA SAN FRANCISCO CO - CUPA Facility Listing. CUPA LASSEN - CUPA Facility List. CUPA TEHAMA - CUPA Facility List. CUPA TULARE - CUPA Facility List. CUPA GLENN - CUPA Facility List. CUPA SAN BENITO - CUPA Facility List. CUPA INYO - CUPA Facility List. CUPA KINGS - CUPA Facility List.
CUPA LAKE - CUPA Facility List. CUPA MADERA - CUPA Facility List. CUPA MERCED - CUPA Facility List. CUPA MONO - CUPA Facility List. CUPA MONTEREY - CUPA Facility Listing. CUPA NEVADA - CUPA Facility List. CUPA SAN LUIS OBISPO - CUPA Facility List. CUPA SANTA BARBARA - CUPA Facility Listing. CUPA SANTA CLARA - Cupa Facility List. CUPA SANTA CRUZ - CUPA Facility List. CUPA SHASTA - CUPA Facility List. CUPA SONOMA - Cupa Facility List. CUPA TUOLUMNE - CUPA Facility List. KERN CO CUPA - CUPA Facility List. CUPA YUBA - CUPA Facility List. HAZNET - Facility and Manifest Data. ICE - ICE. MINES - Mines Site Location Listing. Sacramento Co. ML - Master Hazardous Materials Facility List. San Bern. Co. Permit - Hazardous Material Permits. PEST LIC - Pesticide Regulation Licenses Listing. LA Co. Site Mitigation - Site Mitigation List. UIC GEO - Underground Injection Control Sites (GEOTRACKER). WASTEWATER PITS - Oil Wastewater Pits Listing. WDS - Waste Discharge System. MILITARY PRIV SITES - Military Privatized Sites (GEOTRACKER). PROJECT - Project Sites (GEOTRACKER). WDR - Waste Discharge Requirements Listing. SAN DIEGO CO LOP - Local Oversight Program Listing. CIWQS - California Integrated Water Quality System. CERS - CalEPA Regulated Site Portal Data. NON-CASE INFO - Non-Case Information Sites (GEOTRACKER). OTHER OIL GAS - Other Oil & Gas Projects Sites (GEOTRACKER). PROD WATER PONDS - Produced Water Ponds Sites (GEOTRACKER). SAMPLING POINT - Sampling Point ? Public Sites (GEOTRACKER). WELL STIM PROJ - Well Stimulation Project (GEOTRACKER). HWTS - Hazardous Waste Tracking System. PCS INACTIVE - Listing of Inactive PCS Permits. MINES MRDS - Mineral Resources Data System. PCS ENF - Enforcement data. PCS - Permit Compliance System. LOS ANGELES CO LF METHANE - Methane Producing Landfills.

Database Sources

NPL: EPA

Updated Quarterly

NPL Delisted: EPA

Updated Quarterly

CERCLIS: EPA

Updated Quarterly

NFRAP: EPA

Updated Quarterly

RCRA COR ACT: EPA

Updated Quarterly

RCRA TSD: Environmental Protection Agency

Updated Quarterly

RCRA GEN: Environmental Protection Agency

Updated Quarterly

Federal IC / EC: Environmental Protection Agency

Varies

ERNS: National Response Center, United States Coast Guard

Updated Quarterly

State/Tribal NPL: Department of Toxic Substances Control

Updated Quarterly

State/Tribal CERCLIS: Department of Toxic Substances Control

Updated Quarterly

State/Tribal SWL: Department of Resources Recycling and Recovery

Updated Quarterly

State/Tribal LTANKS: California Regional Water Quality Control Board Central Valley Region (5)

No Update Planned

Database Sources

State/Tribal Tanks: SWRCB

Updated Semi-Annually

State/Tribal VCP: Department of Toxic Substances Control

Updated Quarterly

ST/Tribal Brownfields: State Water Resources Control Board

Updated Quarterly

US Brownfields: Environmental Protection Agency

Updated Semi-Annually

Other SWF: Engineering & Construction Division

Varies

Other Haz Sites: Department of Toxic Substances Control

Updated Quarterly

Other Tanks: State Water Resources Control Board

No Update Planned

Local Land Records: DTSC and SWRCB

Updated Semi-Annually

Spills: U.S. Department of Transportation

Updated Quarterly

Other: Environmental Protection Agency

Updated Quarterly

Street Name Report for Streets near the Target Property

Target Property: TWISSELMAN ROAD
LOST HILLS, CA 93249

JOB: 2022-082

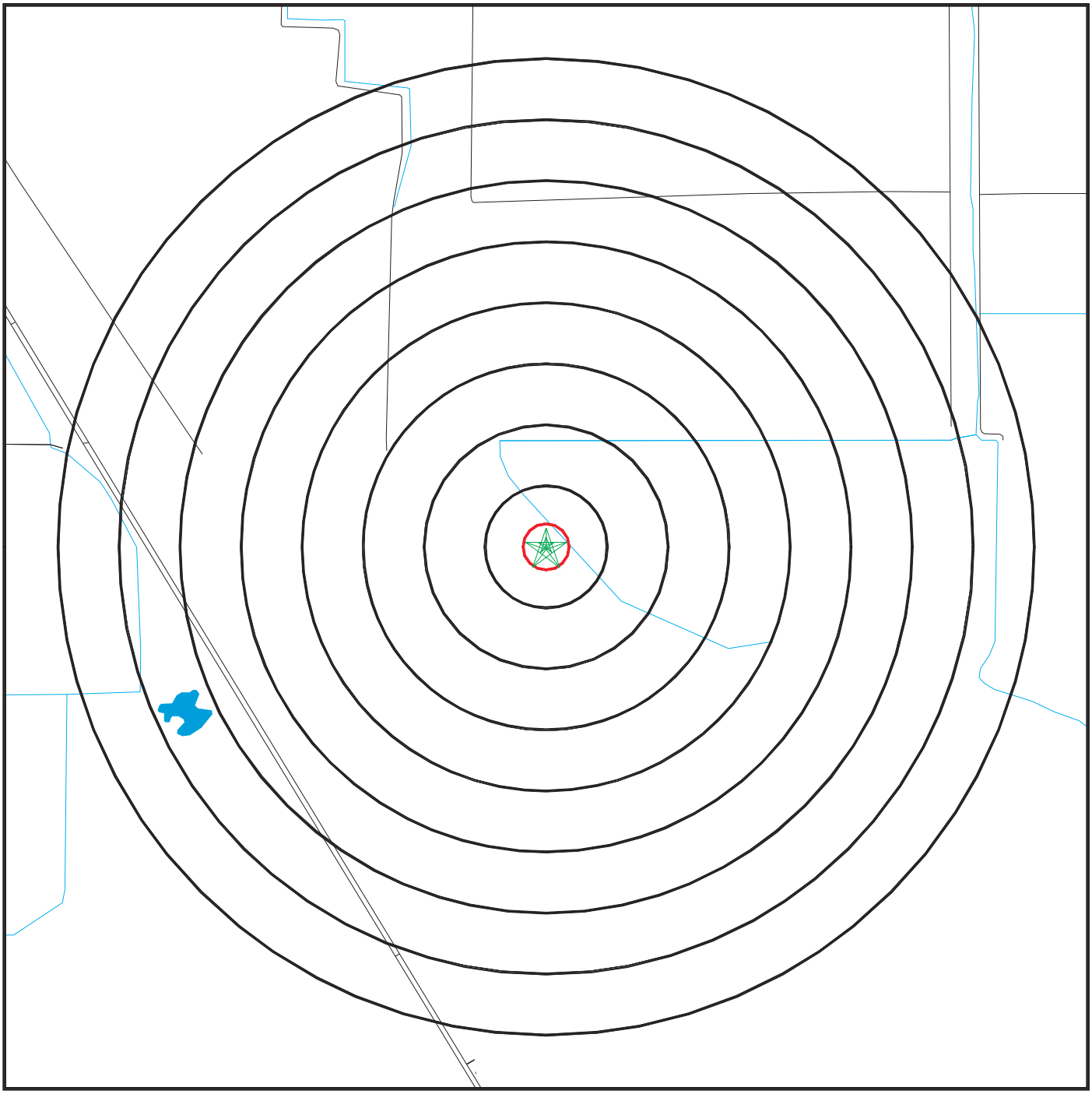
Street Name	Dist/Dir	Street Name	Dist/Dir

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: NPL, RCRACOR, STATES Sites

ROAD 06031 LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

Target Property (Latitude: 35.783778 Longitude: 119.749056)

Identified Sites

National Priority List Sites

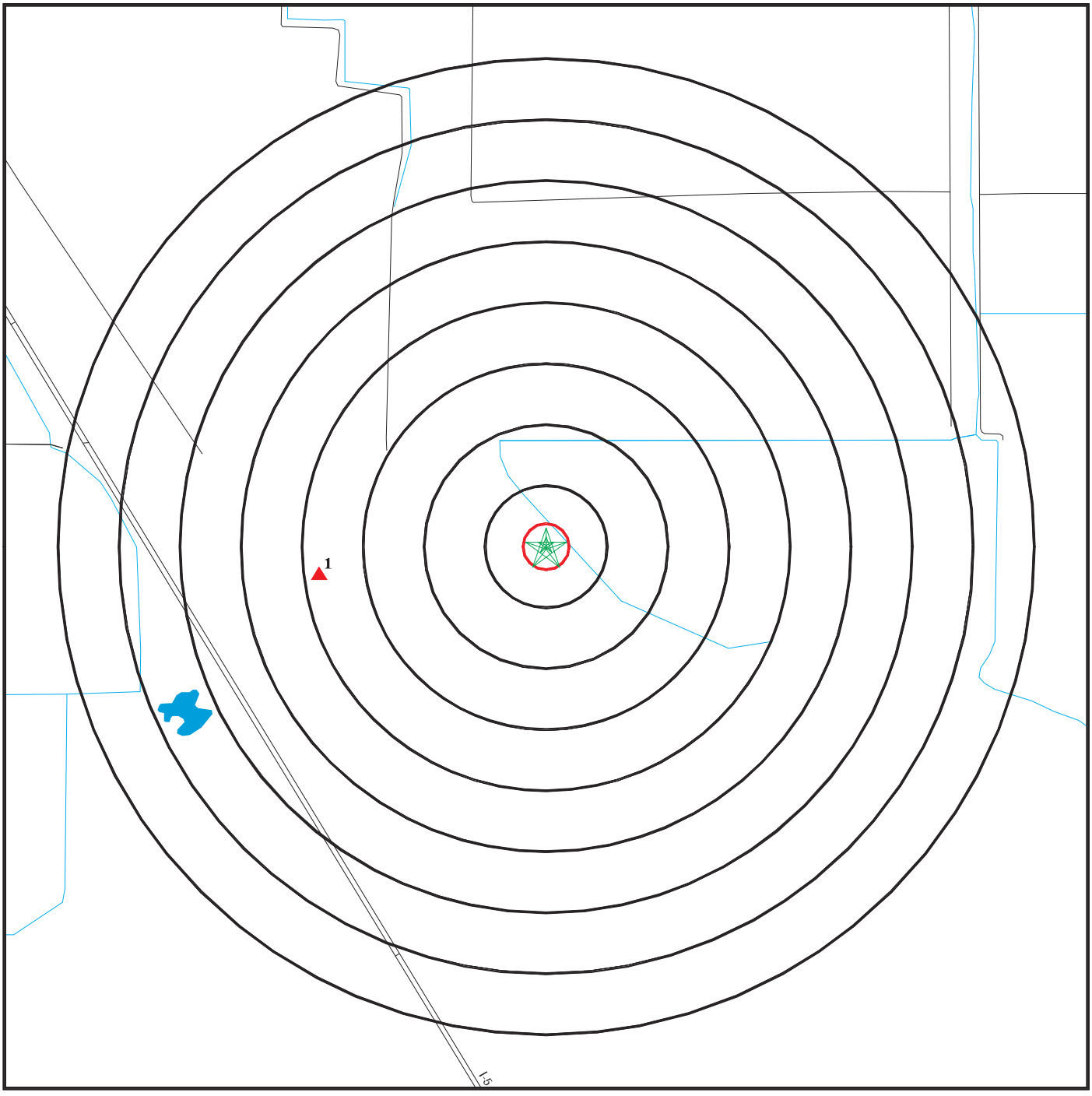
Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: CERCLIS, RCRATSD, LUST, SWL

ROAD 06031 LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.783778 Longitude: 119.749056)

▲ Identified Sites

National Priority List Sites

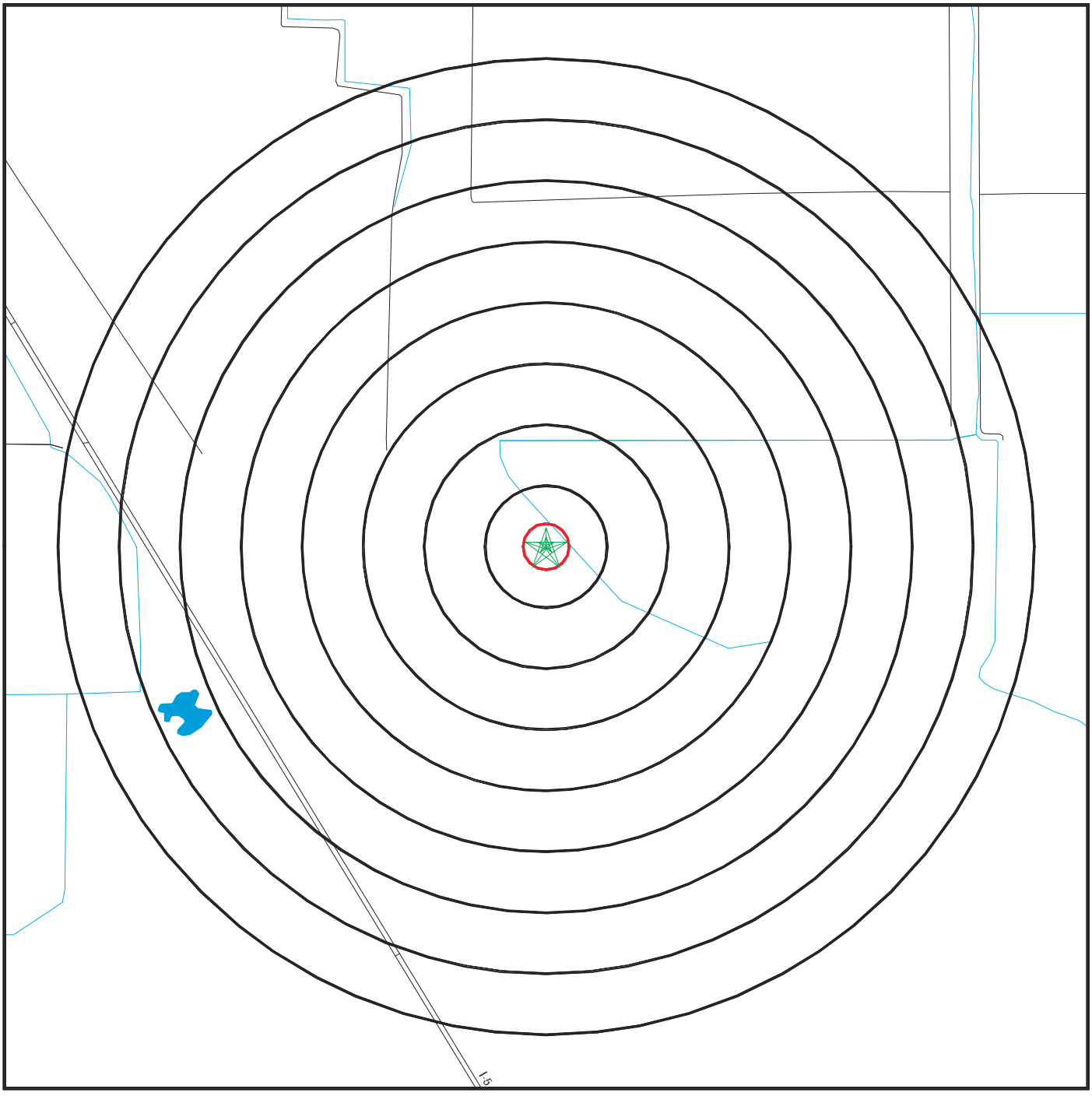
Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius

ASTM MAP: RCRAGEN, ERNS, UST, FED IC/EC, METH LABS

ROAD 06031 LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

★ Target Property (Latitude: 35.783778 Longitude: 119.749056)

▲ Identified Sites

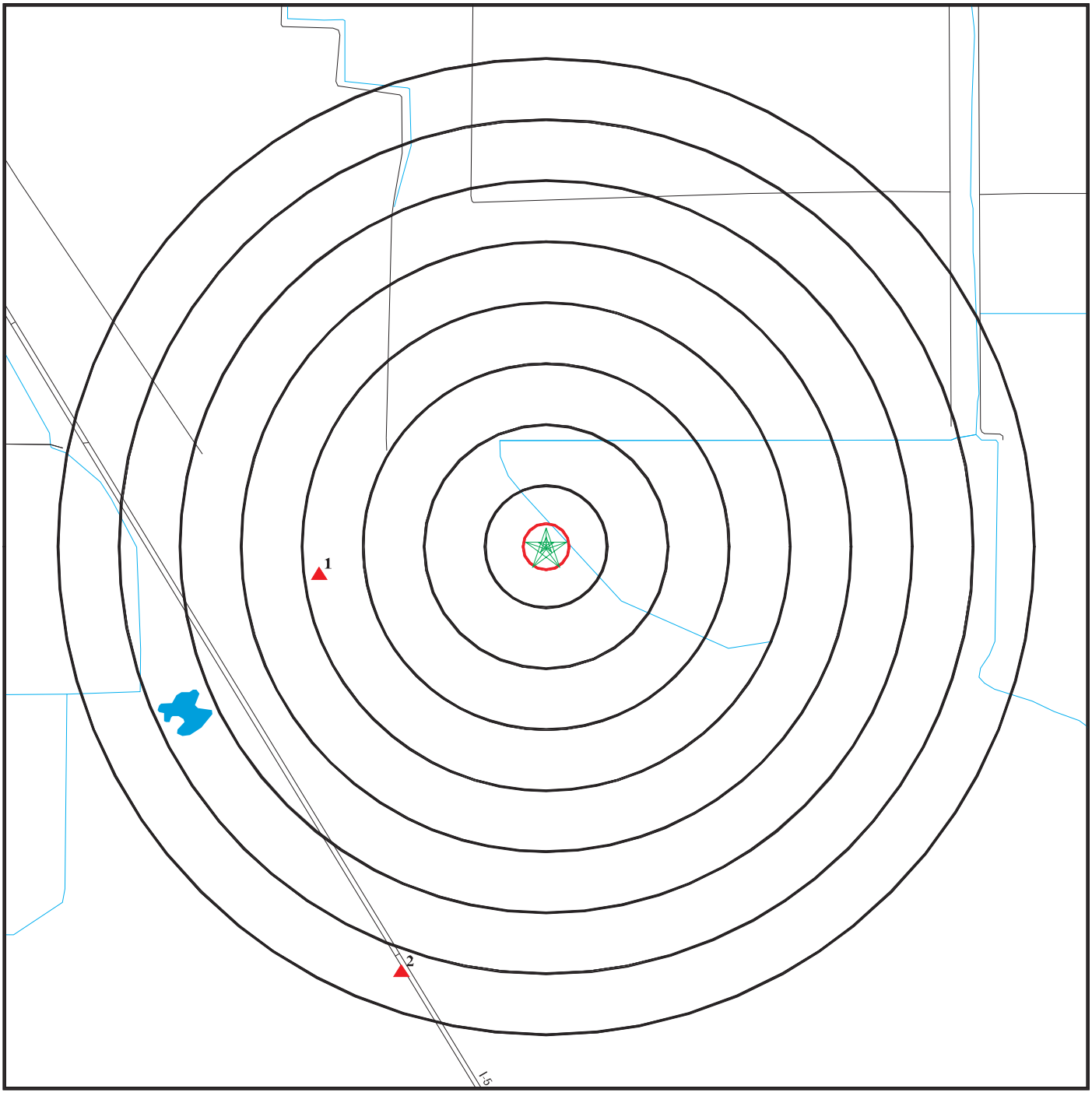
National Priority List Sites

Indian Reservations BIA

Environmental FirstSearch

2.000 Mile Radius
Non ASTM Map, Spills, FINDS

ROAD 06031 LOST HILLS, CA 93249



Black Rings Represent Qtr. Mile Radius; Red Ring Represents 500 ft. Radius

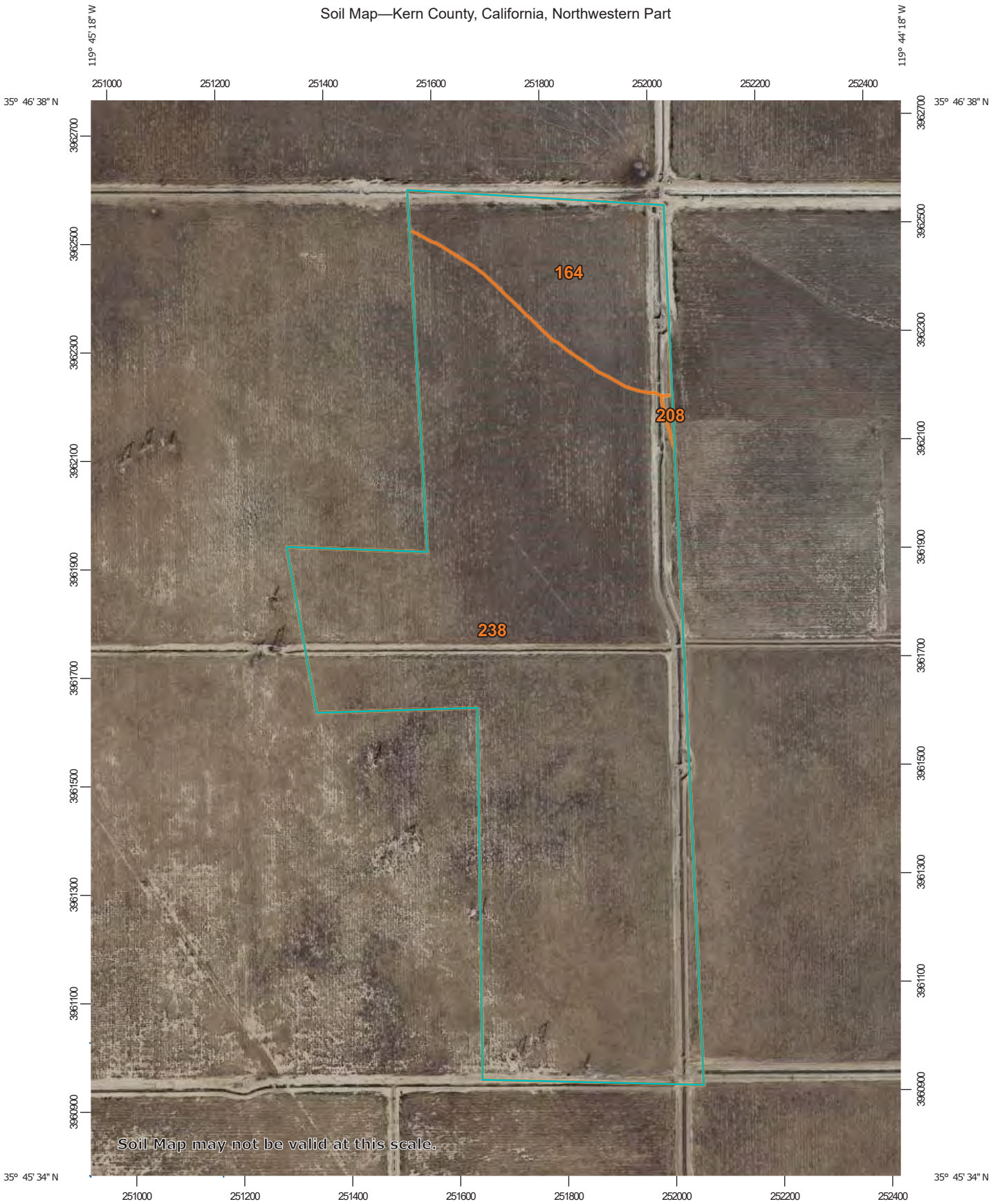
★ Target Property (Latitude: 35.783778 Longitude: 119.749056)

▲ Identified Sites

Sensitive Receptors

National Priority List Sites

Indian Reservations BIA



Map Scale: 1:9,670 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 15, Sep 1, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

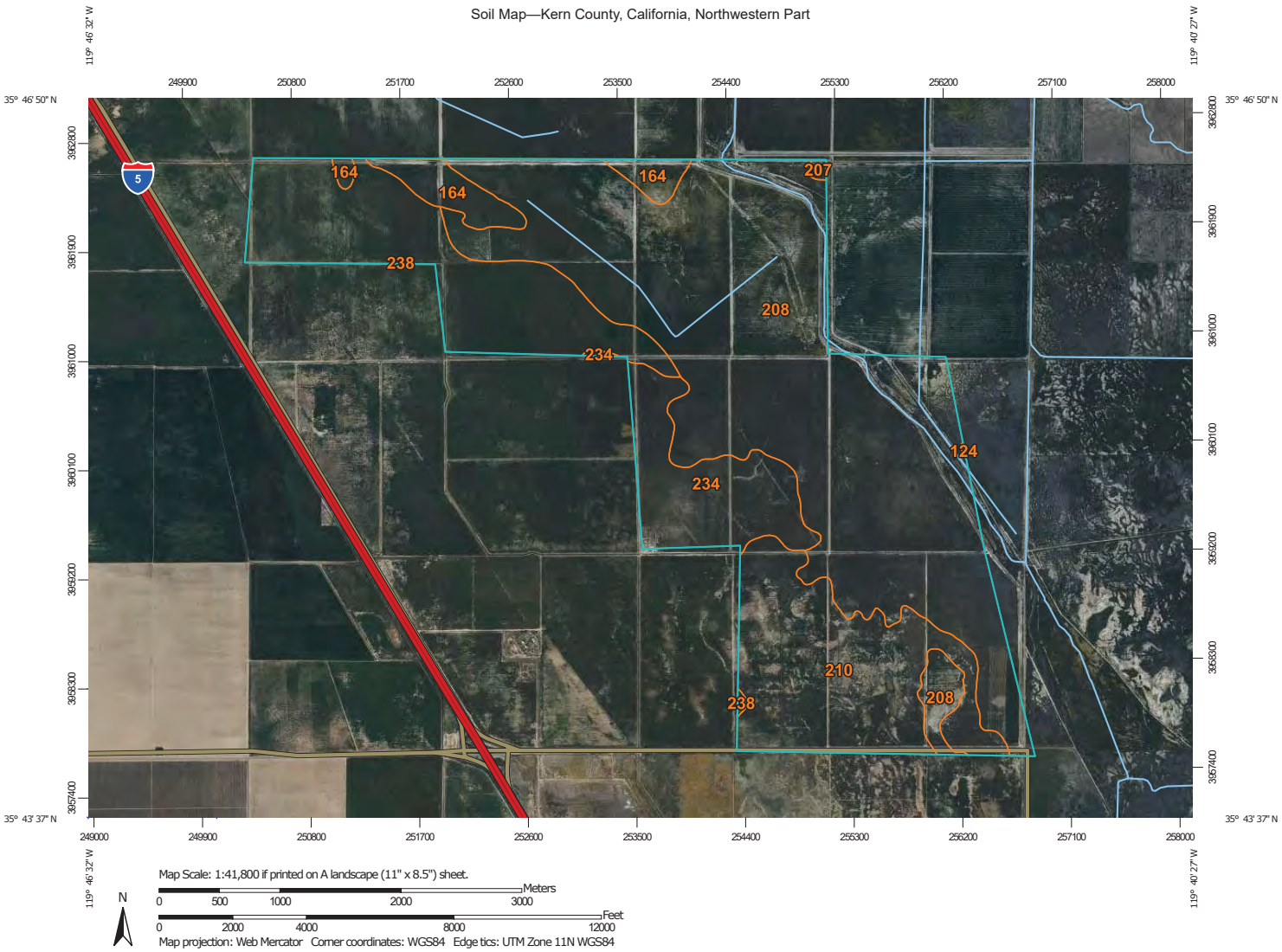
Date(s) aerial images were photographed: Mar 12, 2022—Mar 22, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
164	Houser fine sandy loam, partially drained	27.0	13.8%
208	Nahrub clay, partially drained	0.3	0.1%
238	Twisselman clay, saline-alkali, moderately wet, 0 to 2 percent slopes	168.0	86.0%
Totals for Area of Interest		**195.3**	**100.0%**

Soil Map—Kern County, California, Northwestern Part



Map Scale: 1:41,800 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 14, Sep 3, 2021

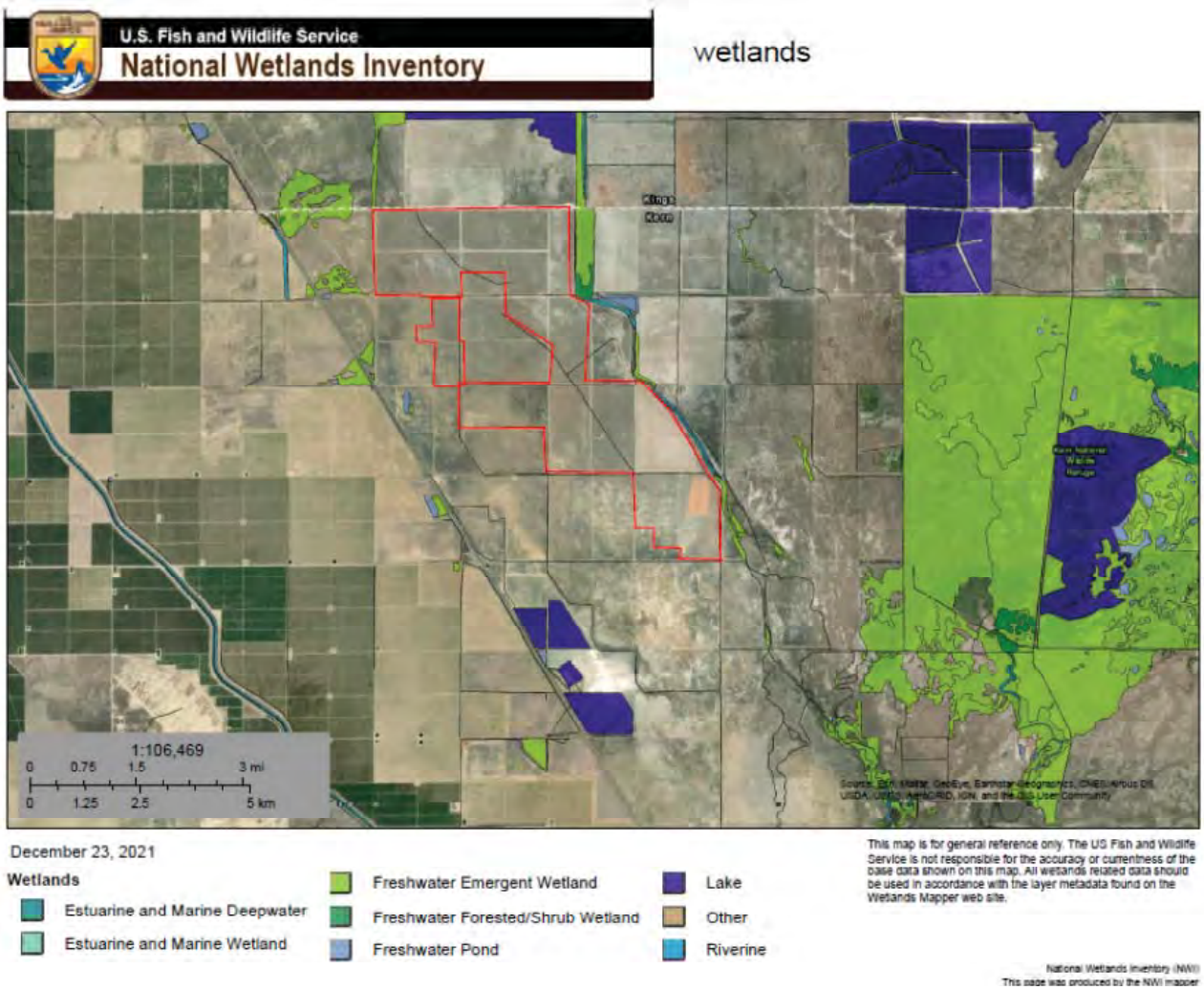
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 12, 2019—Mar 14, 2019

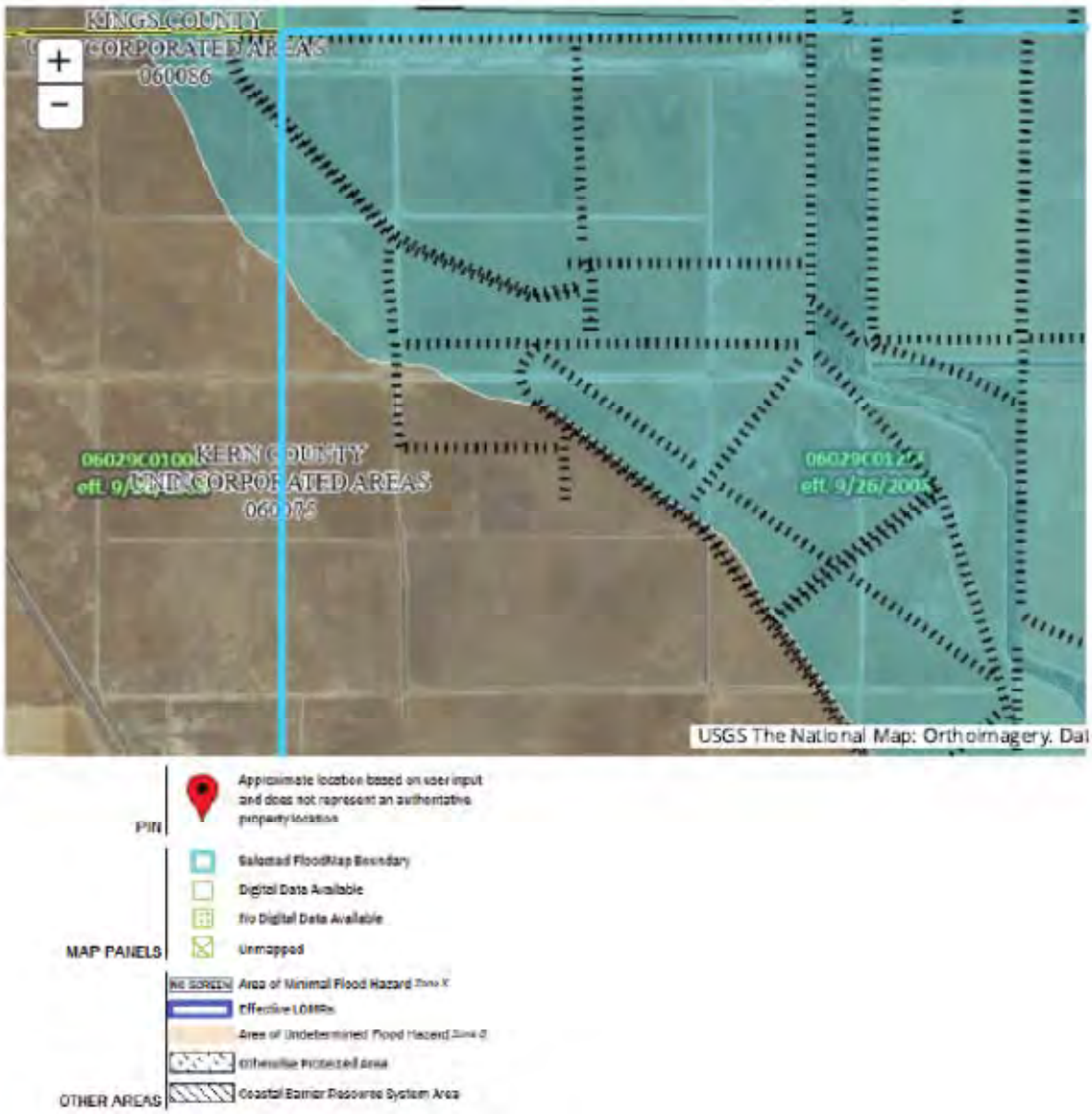
The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

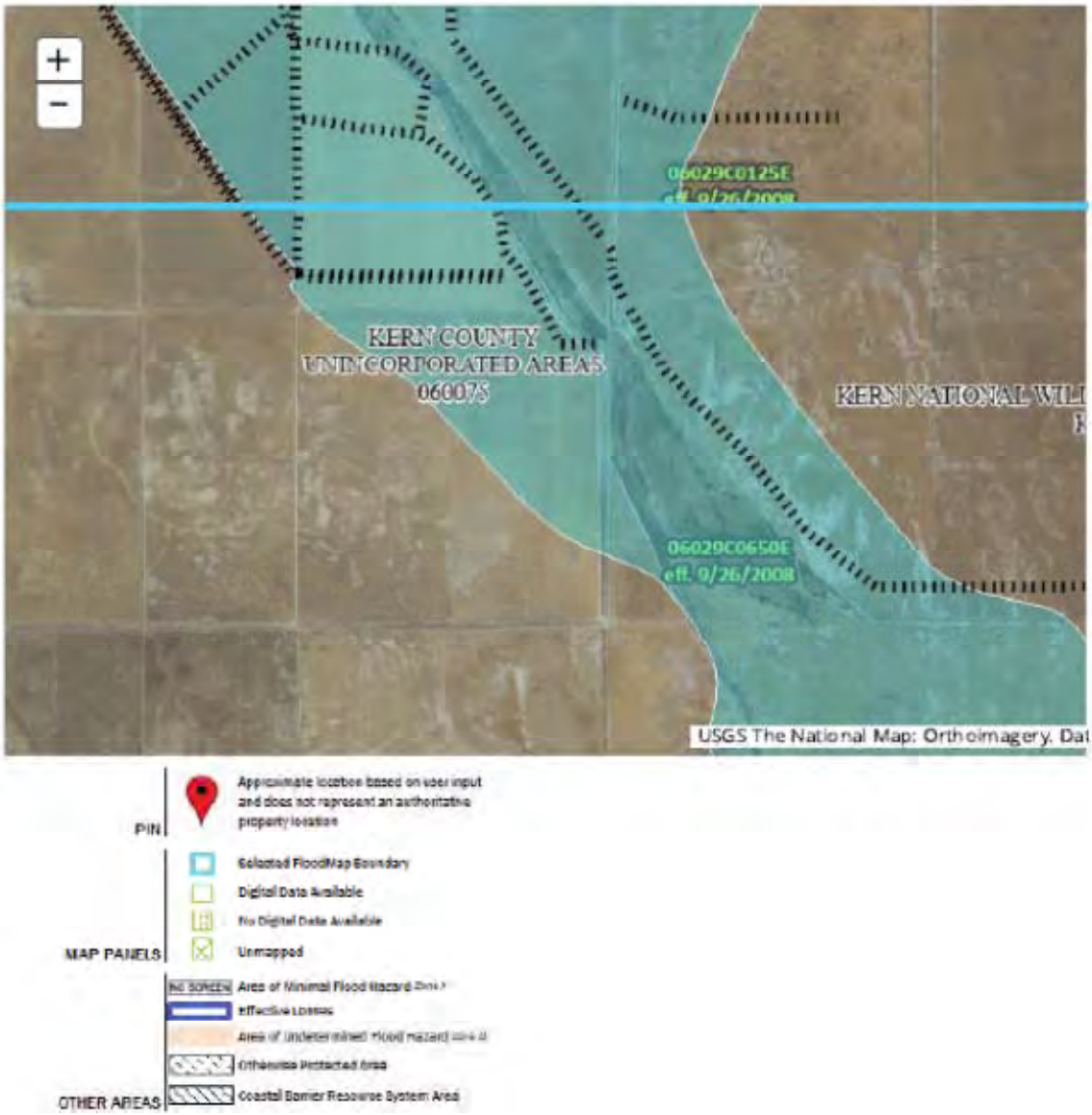
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
124	Buttonwillow clay, partially drained	0.5	0.0%
164	Houser fine sandy loam, partially drained	129.1	3.5%
207	Nahrub clay, drained	5.4	0.1%
208	Nahrub clay, partially drained	2,025.3	55.6%
210	Nahrub, partially drained-Lethent complex	596.2	16.4%
234	Twisselman sandy loam, saline-alkali, moderately wet, 0 to 2 percent slopes	308.4	8.5%
238	Twisselman clay, saline-alkali, moderately wet, 0 to 2 percent slopes	577.8	15.9%
Totals for Area of Interest		**3,642.9**	**100.0%**



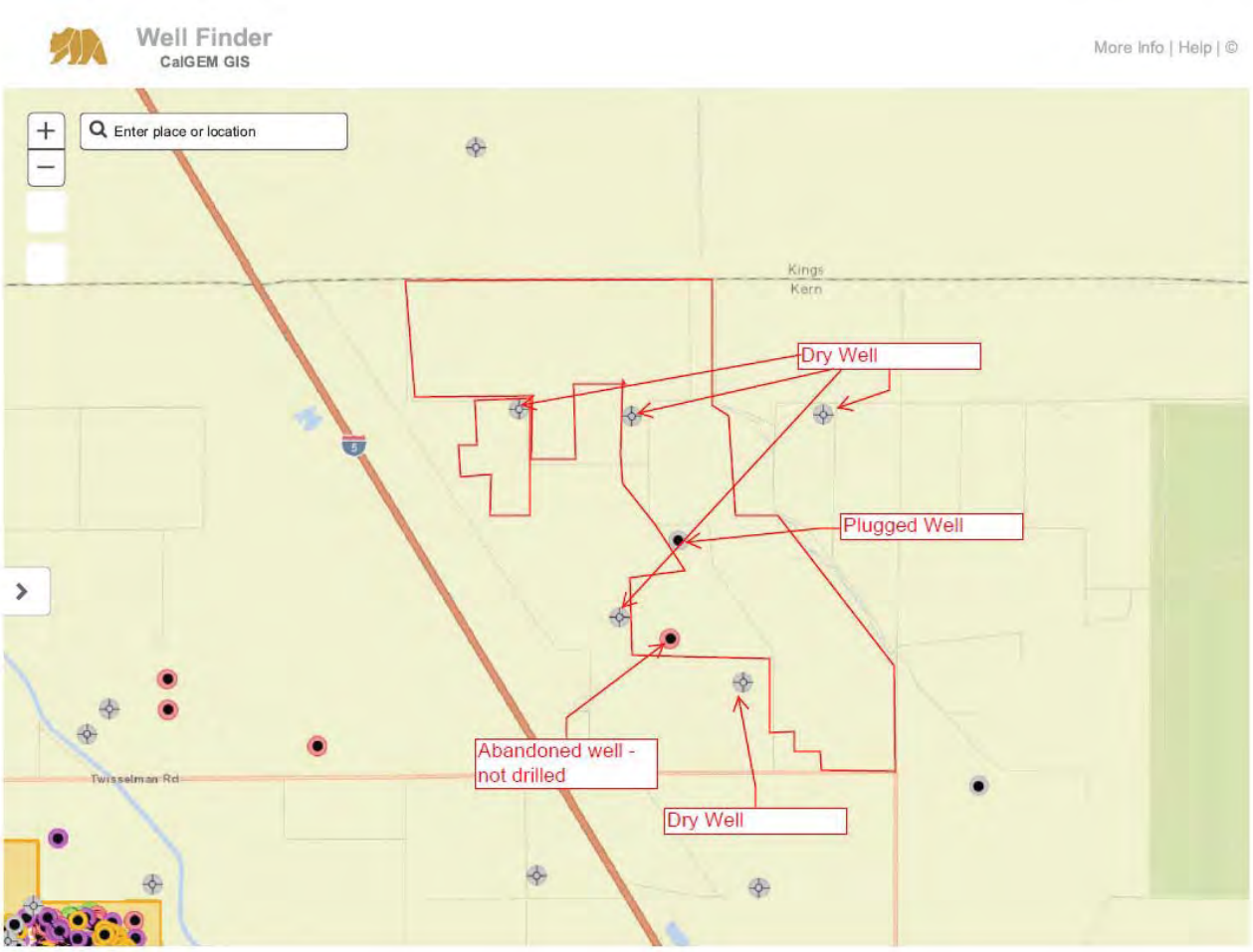
National Wetlands Map



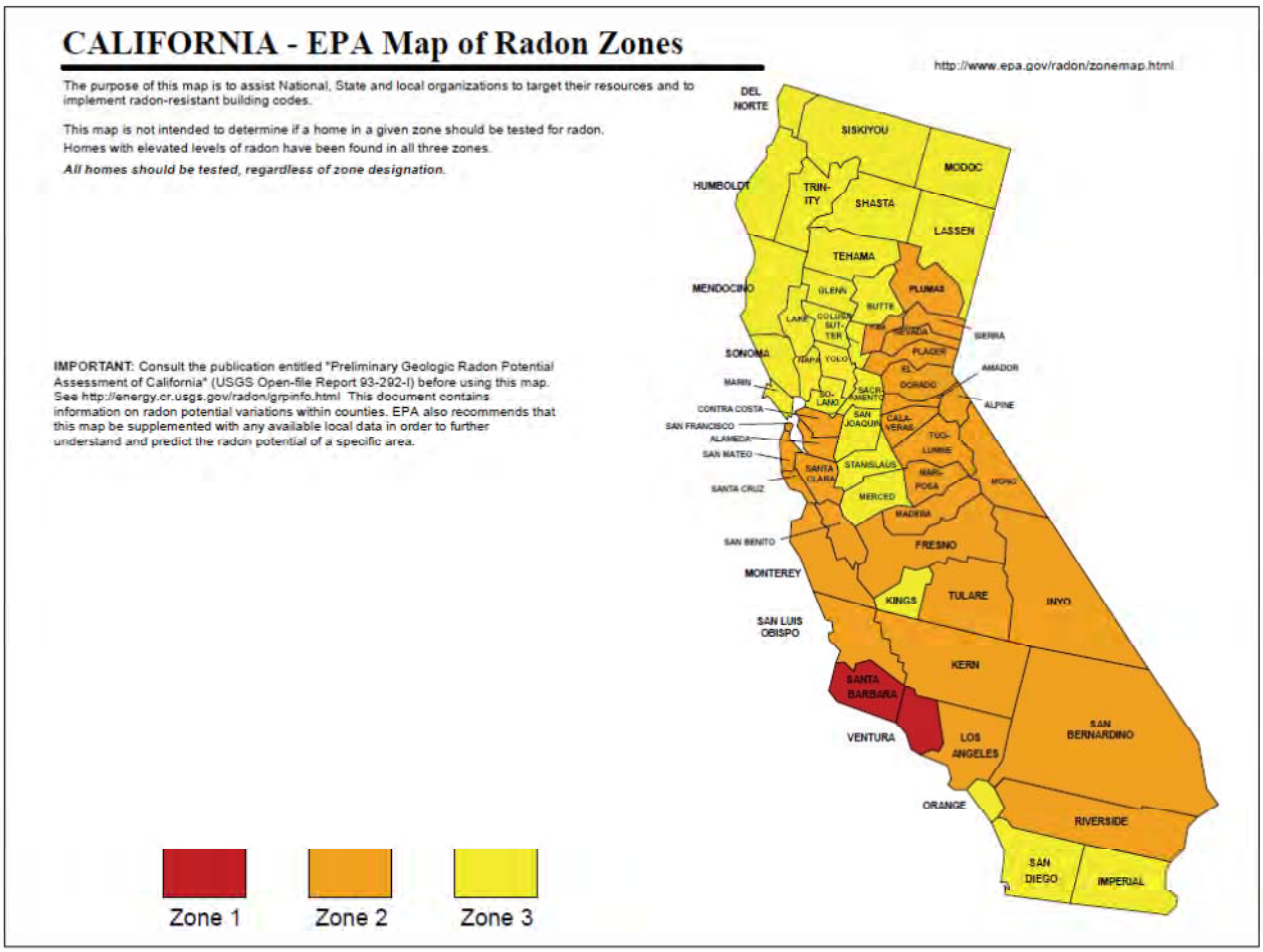
Flood Zone Map



Flood Zone Map



Oil & Gas Well Map


CALIFORNIA - EPA Map of Radon Zones
http://www.epa.gov/radon/zonemap.html
The purpose of this map is to assist National, State and local organizations to target their resources and to implement radon-resistant building codes.
This map is not intended to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones.
All homes should be tested, regardless of zone designation.
IMPORTANT: Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of California" (USGS Open-file Report 93-292-I) before using this map. See http://energy.cr.usgs.gov/radon/grpinfo.html This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.
DEL NORTE
SISKIYOU
MODOC
HUMBOLDT
TRIN-ITY
SHASTA
LASSEN
TEHAMA
MENDOCINO
GLENN
PLUMAS
BUTTE
LAKE
COLUSA
SUT-TER
SIERRA
SONOMA
NAPA
YOLO
PLACER
EL DORADO
AMADOR
MARIN
SO-LANO
SACRA-MENTO
ALPINE
CONTRA COSTA
SAN JOAQUIN
CALA-VERAS
SAN FRANCISCO
ALAMEDA
TUO-LUMNE
SAN MATEO
SANTA CLARA
STANISLAUS
MARI-POSA
MONO
SANTA CRUZ
MERCED
MADERA
SAN BENITO
FRESNO
MONTEREY
KINGS
TULARE
INYO
SAN LUIS OBISPO
KERN
SANTA BARBARA
SAN BERNARDINO
VENTURA
LOS ANGELES
ORANGE
RIVERSIDE
SAN DIEGO
IMPERIAL
Zone 1
Zone 2
Zone 3

RADON MAP

APPENDIX B

RESUME OF ENVIRONMENTAL PROFESSIONAL

MARK J. LAROCQUE

EDUCATION

Bachelor of Sciences in Environmental Science/Biology, University of Massachusetts, Amherst, Massachusetts, 1980 - 1984.

EXPERIENCE

Practical Environmental Solutions, Sanbornton, NH (1998 to present), President and Owner.
Dames & Moore, Willow Grove, PA (1995 to 1998), Senior Project Manager
Lexicon Environmental Associates, Inc., West Chester, PA (1994 to 1995) - Project Manager/Environmental Scientist IV.
Groundwater & Environmental Services, Inc. in Exton, PA (1990 - 1994) - Project Manager/Senior Environmental Scientist.
IEP, Inc. in Northboro, Massachusetts (1984 - 1990) - Environmental Scientist

PROFESSIONAL COURSES

Resource Education Institute, Inc. - Northwest Regional Underground Storage Tank Management and Hydrocarbon Cleanup Conferences 1988 and 1989
University of Massachusetts/Massachusetts Department of Environmental Quality - Hydrocarbon Contaminated Soils Conferences 1991 and 1992
Shell Oil Development - Soil Remediation Workshop 1992
Government Institutes, Inc. - Resource Compensation Recovery Act (RCRA) Regulations Workshop 1994.
Occupational Health and Safety Training 1988 through 1995 - Including 40-hour, 8-hour Refreshers, and Supervisor Training.

CERTIFICATIONS & AFFILIATIONS

National Water Well Association
New Jersey Underground Storage Tank & Subsurface Investigator Certification No. 0013515
Texas Corrective Action Project Manager No.CAPM00197
California Registered Environmental Assessors Class I – No. 07357

EXPERIENCE SUMMARY

Over 30 years of experience in various aspects of environmental assessments and remediation projects. Currently owns his own firm, which conducts due diligence and property transfer assessments nationally and internationally. Conducted and managed numerous single and multi-site Phase I and Phase II pre-purchase assessments on a variety of large and small-scale manufacturing facilities across the United States. Has performed over 2,000 Phase I & NEPA/NHPA assessments for several cellular tower firms across US. NEPA compliance work has included Section 106 reviews, Fish & Wildlife Endangered Species Surveys, FONZI applications, and negotiations with Tribal Historical Officers. He has conducted and prepared several ACM O&M Programs for several radio stations, hotels, and golf courses.

He has also designed and managed over 100 ground water and soil remediation projects utilizing a variety of remedial techniques. Implemented various remedial techniques including ground water pump & treat, soil vapor extraction, air sparging, and bioremediation on numerous sites in MA, MD, NY, NJ, DE, and PA. Conducted soil and ground water sampling, quality control, and decontamination procedures on Super Fund projects in MA and Environmental Compensation Recovery Act (ECRA) projects in NJ.

REPRESENTATIVE PROJECT EXPERIENCE

- Has performed over 2000 Phase 1 and NEPA compliance projects throughout the USA including WA, CA, OR, UT, AZ, NV, FL. GA, SC, NC, MO, IL, IN, MI, MA, CT, RI, VA, OH, MS, AL, TX, and CO. This work has been completed for various cellular tower carriers (Nextel, Sprint, Cingular, AT&T Verizon) and owners (Crown, ATC, AAT).
- Conducts single and multi-site Phase I, Phase II, and Compliance assessments across the USA and internationally on behalf of various law firms for Hick, Muse, Tate & Furst, International Home Foods, Olympus Real Estate Corporation, and Arnold Palmer Golf.
- Conducts Phase I & NEPA/NHPA assessments for several national cell tower firms. Provides full compliance with NHPA and Section 106 of NEPA.
- Conducted Phase I and Compliance Assessments of General Cable Corporation - telecommunication cable manufacturing facilities in MI, IL, GA, and NJ.
- Conducted a Phase I and Compliance Assessment of Simonds Industries, a file manufacturing facility which is actively under a RCRA cleanup in OH.
- Conducted several Phase I assessments of Flex-O-Lite - glass bead manufacturing facilities in IA, KY, TN, and MS.
- Conducted numerous Phase I, Phase II, and Compliance assessments in CA, NC, SC, MS, MA, and AL for various industries including radio station acquisitions, headware manufacturers, computer cable/harness manufacturers, and brass regulating equipment manufacturers.
- Senior Project Manager/Director for engineering firm on a multi-site investigation program for Exxon, that included additional subsurface delineation and preparation of CEAs and RAWs for the NJDEP.
- Designed and managed numerous in-situ ground water remediation projects using bioremediation for Bell Atlantic and NYNEX.

APPENDIX C

HISTORICAL REPORT FROM PIPELINE TO WEST

8587

CAR-00343

AEC

ADVANCED ENVIRONMENTAL CONCEPTS INC

Initials/Date	12/11/92
File Section	ENV
Location Code	BAKX
Topic Code	
Notes	

December 11, 1992

Mr. Carlton Jordan
Shell Pipe Line Corporation
P.O. Box 4848
Anaheim, California 92803

Subject: Soil sampling report referencing the diesel impacted soil excavated from Rectifier Stations B-25, B-36, and B-21, County of Kern, Twisselman Road and Interstate 5.

Dear Mr. Jordan:

This report documents soil sample collection procedures and analytical results pertaining to diesel impacted soil previously excavated from rectifier stations B-25, B-36 and B-21. For more information regarding previous work conducted at the subject site please refer to the Excavation Remediation Report of the subject rectifier station dated October 21, 1992, prepared and submitted by **Advanced Environmental Concepts, Inc.**

This sampling program was approved/authorized by Mr. Mike Mangold of the Central Valley Regional Water Quality Control (CVRWQCB) Board and Mr. Carlton Jordan of Shell Pipe Line Corporation; by receipt and approval of our proposed confirmatory sampling program. The analytical results from this sampling round exhibited acceptable diesel-range hydrocarbon concentrations and levels below detectable limits of volatile aromatics.

Immediately following excavation from the three (3) rectifier sites the diesel-impacted soil was spread over a large area located just west of Mid Pump Station. A power-take-off driven mixing implement was pulled over the pile by a tractor to mix and aerate the diesel-impacted soil. The mixing process continued for approximately six (6) weeks, at which time the equipment contractor noted a substantial decrease in hydrocarbon odor. All of the soil was subsequently placed in one large stockpile (260 feet long x 60 feet wide by 20 feet high), pending sample collection by AEC. The stockpile of diesel-impacted soil and sampling grid are illustrated in **Figure 2, Attachment A.** Three (3) discrete sample locations per quadrant were selected for this sampling program.

On November 30, 1992, twenty (20) composite soil samples were collected by **Advanced Environmental Concepts, Inc.** (AEC) from an aerating stockpile located at the Shell Pipe Line Corporation, Mid Pump Station, which is located at the northeast corner of the intersection of Twisselman Road and Interstate-5 (**Figure 1, Attachment A**). The analytical results indicated an average concentration of total petroleum hydrocarbons as diesel (TPH-d) of 141 parts per million (ppm) and a maximum concentration of 312 ppm. The volatile aromatics were below detectable limits. In accordance with an agreement between Shell Pipeline and the RWQCB, the aerated soil needs to exhibit diesel concentrations less than 1,000 ppm in order for the soil to be used to reinforce the earthen berms surrounding Mid Pump Station.

The following sample collection protocol was observed:

1. A hand auger was used to bore approximately 5 feet into the pile in three (3) discrete locations per each of twenty (20) quadrants;

• ENVIRONMENTAL CONCEPTS WITH DESIGN IN MIND •

4400 ASHE ROAD, #206 • BAKERSFIELD, CA 93313 805/831-1646 • FAX 805/831-1771

2. A brass sleeve was used to retrieve soil from each of three (3) discrete locations per quadrant. Three (3) approximate equal volumes of soil were combined in each brass sleeve;

3. Each sleeve was immediately sealed with teflon tape, capped, sealed with duct tape, labeled, placed into a sealable plastic bag, and put in a cooler with frozen Blue Ice;

4. Soil samples were recorded on a chain-of-custody document to ensure sample integrity and traceability; and,

5. The cooler containing eight (8) samples and chain-of-custody document was delivered to Associated Laboratories, a California Certified Laboratory in Orange, California.

Twenty (20) soil samples were collected from the subject stockpile on November 30, 1992. Samples were analyzed for total petroleum hydrocarbons as diesel (TPH-d) and BTXE (benzene, toluene, xylenes, ethylbenzene) using CA-DHS Method and EPA Method 8020, respectively. Analytical results are presented in Table 1; units are presented in milligrams per kilogram (mg/kg) which are equivalent to parts per million (ppm). The laboratory reports and chain-of-custody documentation are attached to this report.

Table 1
Soil Samples
Stockpile

Sample I.D.	TPH-d EPA 8015M	Benzene EPA 8020	Toluene EPA 8020	Xylenes, Total EPA 8020	Ethylbenzene EPA 8020
SP-1	90	ND	ND	ND	ND
SP-2	55	ND	ND	ND	ND
SP-3	139	ND	ND	ND	ND
SP-4	25	ND	ND	ND	ND
SP-5	170	ND	ND	ND	ND
SP-6	120	ND	ND	ND	ND
SP-7	93	ND	ND	ND	ND
SP-8	114	ND	ND	ND	ND
SP-9	57	ND	ND	ND	ND
SP-10	275	ND	ND	ND	ND
SP-11	251	ND	ND	ND	ND
SP-12	312	ND	ND	ND	ND
SP-13	292	ND	ND	ND	ND
SP-14	169	ND	ND	ND	ND
SP-15	173	ND	ND	ND	ND
SP-16	179	ND	ND	ND	ND
SP-17	169	ND	ND	ND	ND
SP-18	ND	ND	ND	ND	ND
SP-19	128	ND	ND	ND	ND
SP-20	ND	ND	ND	ND	ND
Detection Limit (mg/kg)	10	0.005	0.005	0.005	0.005

• ENVIRONMENTAL CONCEPTS WITH DESIGN IN MIND •

4400 ASHE ROAD, #206 • BAKERSFIELD, CA 93313 805/831-1646 • FAX 805/831-1771

ND: Not-detect at the indicated detection limit.
TPH-d: Total Petroleum hydrocarbons as diesel

AEC concludes that the analytical results presented in this report indicate that the hydrocarbon level of less than 1000 ppm TPH-d established by the RWQCB has been achieved. Further, the treated soil is now acceptable to be used to reinforce existing earthen berms surrounding Mid Pump Station.

This work has been performed in accordance with generally-accepted tank removal procedures and environmental science and engineering practices. Conclusions and recommendations are based upon information collected and compiled during the tank removal and data supplied by the Client. No other warranty, expressed or implied, is given.

The soil samples for this project were obtained on a finite grid; hence, the laboratory results are discrete samples and are not meant to be misconstrued as representative of unsampled areas.

We appreciate the opportunity of providing Shell Pipe Line Corporation with these environmental services. If additional information is required, please call us at (805) 831-1646.

Sincerely,

Advanced Environmental Concepts, Inc.

Christian R. Bellue
Project Engineer, EIT #XE072451

This Summary Letter has been technically reviewed by:

Joseph A. Dunwoody
Registered Geologist #5504

REGISTERED GEOLOGIST
JOSEPH A. DUNWOODY III
5504
STATE OF CALIFORNIA

Attachments: Site Location Map, Figure 1
Sampling Location Map, Figure 2

Distribution: 1/Addressee
1/Mr. Walls, RWQCB
1/Bksfld File

• ENVIRONMENTAL CONCEPTS WITH DESIGN IN MIND •
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"Attachment A"

PROJECT MAPS / FIGURES

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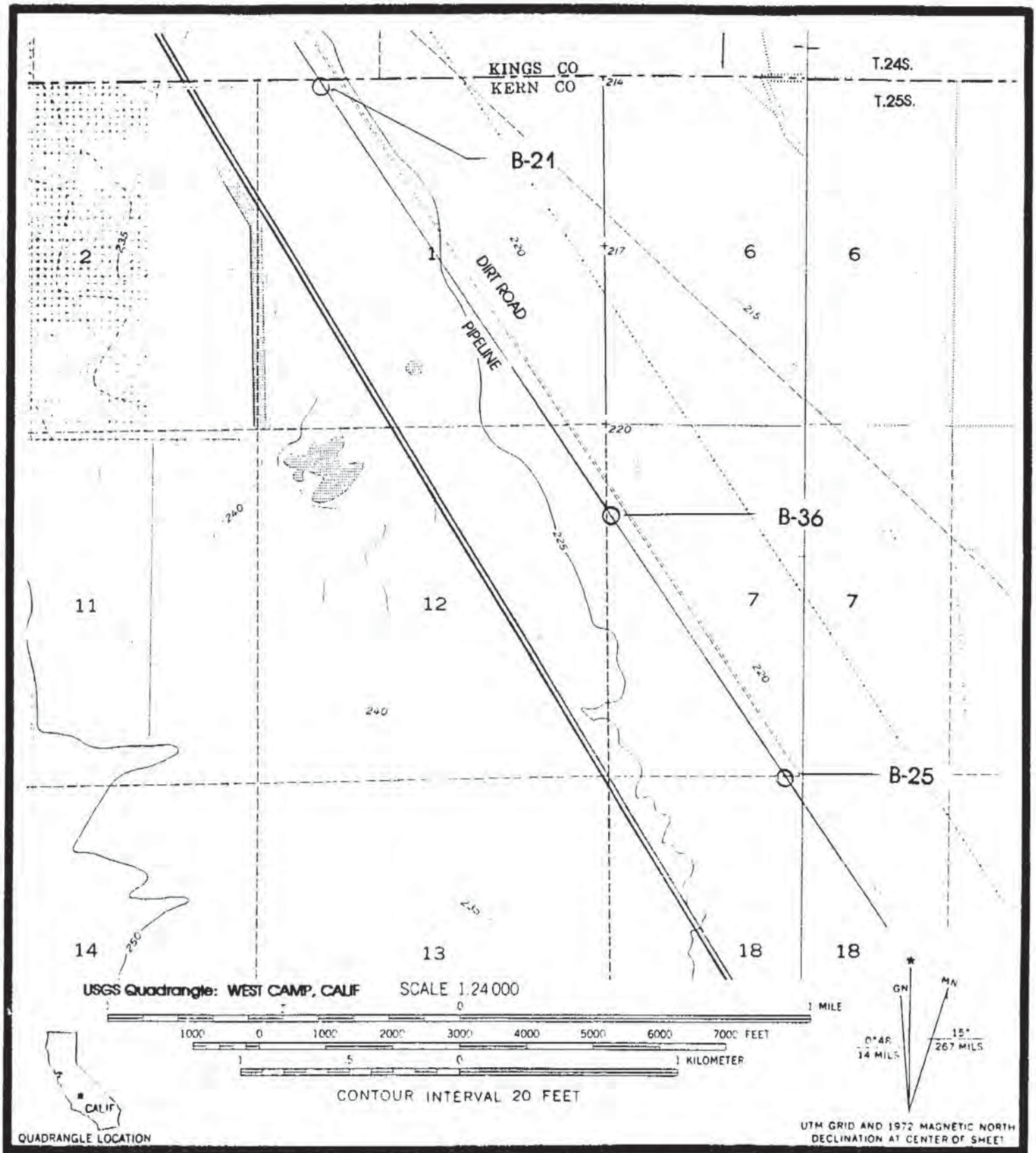
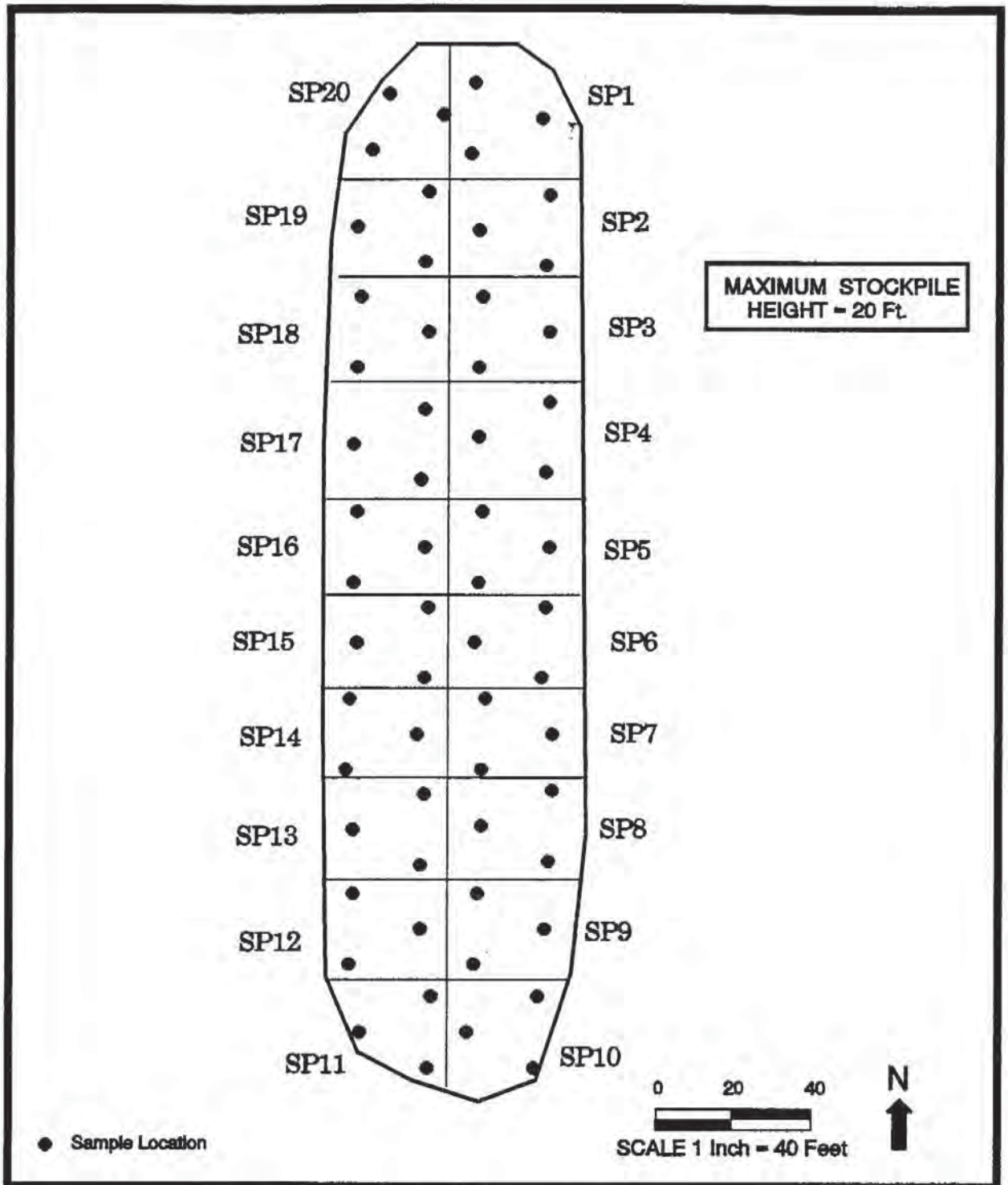


ADVANCED ENVIRONMENTAL CONCEPTS INC
P.O. BOX 40672
BAKERSFIELD, CA 93384

- Site Location Map -

Rectifier Stations B-25, B-36, and B-21
Shell Pipe Line Corporation
Bakersfield Pipeline
Kern County, California

FIGURE 1



ADVANCED ENVIRONMENTAL CONCEPTS INC
P.O. BOX 40672
BAKERSFIELD, CA 93384

- SITE MAP -

Shell Pipe Line Corporation
Rectifier Stations B-25, B-36, and B-21
Kern County • Lost Hills, California

FIGURE 2

"Attachment B"

LABORATORY ANALYSIS REPORTS / CHAIN-OF-CUSTODY DOCUMENTS

ASSOCIATED LABORATORIES
806 North Batavia - Orange, California 92668 - 714/771-6900 FAX 714/538-1209

CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO G42707-01
REPORTED 12/03/92

SAMPLE Soil
IDENTIFICATION SPLC
BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

RECEIVED 12/01/92

	SP1	SP2	SP3
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	90	55	139
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 30 days from date reported.

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C-1 10M

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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO. G42707-02

REPORTED 12/03/92

SAMPLE Soil

RECEIVED 12/01/92

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

	SP4	SP5	SP6
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	25	170	120
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO G42707-03

REPORTED 12/03/92

SAMPLE Soil

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

RECEIVED 12/01/92

	SP7	SP8	SP9
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	93	114	57
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

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TESTING & CONSULTING
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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO. G42707-04

REPORTED 12/03/92

SAMPLE Soil

RECEIVED 12/01/92

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

	SP10	SP11	SP12
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	275	251	312
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO G42707-05

REPORTED 12/03/92

SAMPLE Soil

RECEIVED 12/01/92

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

	SP13	SP14	SP15
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	292	169	173
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

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C-1 10M

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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO G42707-06

REPORTED 12/03/92

SAMPLE Soil

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

RECEIVED 12/01/92

	SP16	SP17	SP18
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	179	169	ND<10
Benzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

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CLIENT

Advanced Environmental Concept (4283)
Attn: Chris Bellue
4400 Ashe Road
Suite #206
Bakersfield, CA 93313

LAB NO G42707-07

REPORTED 12/03/92

SAMPLE Soil

IDENTIFICATION SPLC

BASED ON SAMPLE Twisslelman Rd./I-5
As Submitted

RECEIVED 12/01/92

	SP19	SP20
Total Hydrocarbons (TPH DHS) (mg/kg) -Diesel	128	ND<10
Benzene (mg/kg)	ND< 0.005	ND< 0.005
Toluene (mg/kg)	ND< 0.005	ND< 0.005
Ethylbenzene (mg/kg)	ND< 0.005	ND< 0.005
Total Xylenes (8020) (mg/kg)	ND< 0.015	ND< 0.015

Date Analyzed: 12/01/92

ASSOCIATED LABORATORIES, by:

Edward S. Behare, Ph.D.
Vice President

ESB/ql

NOTE: Unless notified in writing, all samples will be discarded by appropriate disposal protocol 30 days from date reported.

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ASSOCIATED LABORATORIES

" COMMITMENT TO QUALITY "

QUALITY CONTROL /QUALITY ASSURANCE REPORT G42707

QA/QC CONTROL NO. G42706-1 INSTRUMENT LOGBOOK D #4

DATE G42706-1 ANALYZED Dec 2 1992 I.L.B. PAGE LOCATION 135

DATE G42707 ANALYZED Dec 2 1992 SAMPLE LOG PAGE LOCATION 001

EPA 8015M/D.H.S. L.U.F.T. REPORTING UNITS mg/kg SAMPLE MATRIX soil

COMPOUND	*SR*	*SR1*	*RPD*	*S.A.*	*SSR*	*SSR1*	*%RE*	*%RE1*	*RPD*	*BLK*
GASOLINE										
DIESEL	*0*	*0*	*0*	*200*	*195.09*	*190.32*	*97.599*	*95.2*	*2.4*	*0*
AVERAGE			*0*				*97.5999*	*95.2*	*2.4*	
							X	*O*		

SR------ SAMPLE
SR1----- SAMPLE DUPLICATE
RPD---- RELATIVE PERCENT DIFFERENCE
S.A.---- ANALYTE SPIKE IN SAMPLE MATRIX
SSR----- SPIKE RECOVERED AND SAMPLE 'SR'
SSR1---- SPIKE RECOVERED AND SAMPLE 'SR1'
%RE---- PERCENT RECOVERY OF SPIKE IN 'SR'
%RE1--- PERCENT RECOVERY OF SPIKE IN 'SR1'
BLK----- ANALYTE CONCENTRATION DETECTED IN LAB BLANK
99%----- UPPER/LOWER CONTROL LIMIT
95%----- UPPER/LOWER WARNING LIMIT
s--------- STANDARD DEVIATION
2s------- 2 x STANDARD DEVIATION (WARNING LIMIT)
3s------- 3 x STANDARD DEVIATION (CONTROL LIMIT)
MEAN-- TIME WEIGHTED AVERAGE OF SPIKE RECOVERY

SURROGATE SPIKE DATE
BENZENYL FLUORIDE SPIKE CONCENTRATION OF
WITH A RECOVERY OF
BENZENYL FLUORIDE RECOVERY LIMITS OF TO

PASS / NO PASS pass DATE TYPED Dec 3 1992 B133201

ACTION TAKEN

SPIKE SOURCE SH-D STANDARD LOT NO. D-042092

ANALYST Quat Do QA / QC COMPILER

ASSOCIATED LABORATORIES

" COMMITMENT TO QUALITY "

QUALITY CONTROL /QUALITY ASSURANCE REPORT G42707

QA/QC CONTROL NO. G42707-10 INSTRUMENT LOGBOOK Hyd 1-4

DATE G42707-10 ANALYZED Dec 1 1992 I.L.B. PAGE LOCATION 91

DATE G42707 ANALYZED Dec 1 1992 SAMPLE LOG PAGE LOCATION 1

EPA 8020 REPORTING UNITS mg/kg SAMPLE MATRIX soil

COMPOUND	*SR*	*SR1*	*RPD*	*S.A.*	*SSR*	*SSR1*	*%RE*	*%RE1*	*RPD*	*BLK*
BENZENE	*0*	*0*	*0*	*0.05*	*0.04*	*0.05*	*86.0*	*92*	*6*	*0*
TOLUENE	*0*	*0*	*0*	*0.05*	*0.04*	*0.05*	*88.0*	*94*	*6*	*0*
ETHYLBENZENE	*0*	*0*	*0*	*0.05*	*0.04*	*0.05*	*86.0*	*90*	*4*	*0*
XYLENES	*0*	*0*	*0*	*0.15*	*0.14*	*0.14*	*94*	*96*	*2*	*0*
CHLOROBENZENE										
1,2-DICHLOROBENZENE										
1,3-DICHLOROBENZENE										
1,4-DICHLOROBENZENE										
AVERAGE			*0*				*88*	*93*	*4*	

SR------- SAMPLE
SR1----- SAMPLE DUPLICATE
RPD---- RELATIVE PERCENT DIFFERENCE
S.A.---- ANALYTE SPIKE IN SAMPLE MATRIX
SSR----- SPIKE RECOVERED AND SAMPLE 'SR'
SSR1---- SPIKE RECOVERED AND SAMPLE 'SR1'
%RE---- PERCENT RECOVERY OF SPIKE IN 'SR'
%RE1--- PERCENT RECOVERY OF SPIKE IN 'SR1'
BLK----- ANALYTE CONCENTRATION DETECTED IN LAB BLANK
99%----- UPPER/LOWER CONTROL LIMIT
95%----- UPPER/LOWER WARNING LIMIT
s--------- STANDARD DEVIATION
2s------- 2 x STANDARD DEVIATION (WARNING LIMIT)
3s------- 3 x STANDARD DEVIATION (CONTROL LIMIT)
MEAN-- TIME WEIGHTED AVERAGE OF SPIKE RECOVERY

SURROGATE SPIKE DATE
BENZENYL FLUORIDE SPIKE CONCENTRATION OF 150 ng
WITH A RECOVERY OF 87 %
BENZENYL FLUORIDE RECOVERY LIMITS OF81 % TO 129 %

PASS / NO PASS pass DATE TYPED Dec 3 1992 A133201

ACTION TAKEN

SPIKE SOURCE EPA Repository Dil. STANDARD LOT NO. BTX 32092

ANALYST Abe Ahari QA / QC COMPILER

ASSOCIATED LABORATORIES

" COMMITMENT TO QUALITY "

QUALITY CONTROL /QUALITY ASSURANCE REPORT G42707

QA/QC CONTROL NO. G42707-20 INSTRUMENT LOGBOOK Hyd 2-2

DATE G42707-20 ANALYZED Dec 2 1992 I.L.B. PAGE LOCATION 91

DATE G42707 ANALYZED Dec 2 1992 SAMPLE LOG PAGE LOCATION 1

EPA 8020 REPORTING UNITS mg/kg SAMPLE MATRIX soil

COMPOUND	*SR*	*SR1*	*RPD*	*S.A.*	*SSR*	*SSR1*	*%RE*	*%RE1*	*RPD*	*BLK*
BENZENE	*0*	*0*	*0*	*0.05*	*0.06*	*0.05*	*110.0*	*99*	*11*	*0*
TOLUENE	*0*	*0*	*0*	*0.05*	*0.05*	*0.05*	*105.0*	*102*	*3*	*0*
ETHYLBENZENE	*0*	*0*	*0*	*0.05*	*0.05*	*0.05*	*91.0*	*99*	*8*	*0*
XYLENES	*0*	*0*	*0*	*0.15*	*0.15*	*0.15*	*102*	*101*	*1*	*0*
CHLOROBENZENE										
1,2-DICHLOROBENZENE										
1,3-DICHLOROBENZENE										
1,4-DICHLOROBENZENE										
AVERAGE			*0*				*102*	*100*	*5*	

SR------ SAMPLE
SR1---- SAMPLE DUPLICATE
RPD--- RELATIVE PERCENT DIFFERENCE
S.A.---- ANALYTE SPIKE IN SAMPLE MATRIX
SSR----- SPIKE RECOVERED AND SAMPLE 'SR'
SSR1---- SPIKE RECOVERED AND SAMPLE 'SR1'
%RE---- PERCENT RECOVERY OF SPIKE IN 'SR'
%RE1--- PERCENT RECOVERY OF SPIKE IN 'SR1'
BLK----- ANALYTE CONCENTRATION DETECTED IN LAB BLANK
99%---- UPPER/LOWER CONTROL LIMIT
95%---- UPPER/LOWER WARNING LIMIT
s-------- STANDARD DEVIATION
2s------- 2 x STANDARD DEVIATION (WARNING LIMIT)
3s------- 3 x STANDARD DEVIATION (CONTROL LIMIT)
MEAN-- TIME WEIGHTED AVERAGE OF SPIKE RECOVERY

SURROGATE SPIKE DATE
BENZENYL FLUORIDE SPIKE CONCENTRATION OF 150 ng
WITH A RECOVERY OF 83 %
BENZENYL FLUORIDE RECOVERY LIMITS OF81 % TO 129 %

PASS / NO PASS pass DATE TYPED Dec 3 1992 A133201

ACTION TAKEN

SPIKE SOURCE EPA Repository Dil. STANDARD LOT NO. BTX 32042

ANALYST Abe Ahari QA / QC COMPILER

CHAIN-OF-CUSTODY RECORD

Client: AEC

Date: 11/30/92

TTL Project #:

Project Name: SPLC

Client Project #:

Page 1 of 2

Project Address: TWISSELMAN RD / I5 KERN COUNTY, CA

Turn Around Requested:
- ☐ Immediate Attention
- ☐ Rush 24-48 Hours
- ☐ Rush 72-96 Hours
- ☐ Mobile Lab

Lab Use Only.
Sample Condition as received:
Chilled yes / no
Sealed yes / no

Sampler's Signature: [signature]

Analysis Requested

Sample ID	Sample Location	Date	Time	Laboratory Sample Number	Sample Matrix: Soil(S), Sludge(SL), Aqueous(A)	Total Petroleum Hydrocarbons as Gasoline, LUFT Manual (P&T)	TPH as Diesel Fuel, LUFT Manual	TPH as Gasoline, Extractable	TPH by EPA Method 418.1	BTEX by EPA Method 8020	TPH-D/BTXE			Number of Containers	Container / Comments
SP1		11/30/92			S						X			1	
SP2		↓			↓						X			1	
SP3											X			1	
SP4											X			1	
SP5											X			1	
SP6											X			1	
SP7											X			1	
SP8											X			1	
SP9											X			1	
SP10											X			1	

① Relinquished by: (Signature) [signature]	Date 11/30/92	② Received by: (Signature) B. Barnat	Date 12-1
Company: AEC	Time 16:00	Company: ASSOC. Labs.	Time 10:00
③ Relinquished by: (Signature) B. Barnat	Date 12-1	④ Received by Laboratory: (Signature) [signature]	Date 12-1-92
Company: Assoc. Labs	Time	Company: Associated	Time

Total Number of Containers: 10

TERRA TECH LABS, INC.
ENVIRONMENTAL TESTING
16371 Gothard Street, Suite G
Huntington Beach, CA 92647
Tel. (714) 842-6077

CHAIN-OF-CUSTODY RECORD

Client: AEC, BAKERSFIELD, CA
Date: 11/30/92
Project Name: SPLC
Client Project #:
Project Address: TWISSELMANN RD/ES
KERN COUNTY, CA
Sampler's Signature: Chris Bellue
Turn Around Requested:
- ☐ Immediate Attention
- ☐ Rush 24-48 Hours
- ☐ Rush 72-96 Hours
- ☐ Mobile Lab

TTL Project #:
Page 2 of 2

Lab Use Only.
Sample Condition as received:
Chilled yes / no
Sealed yes / no

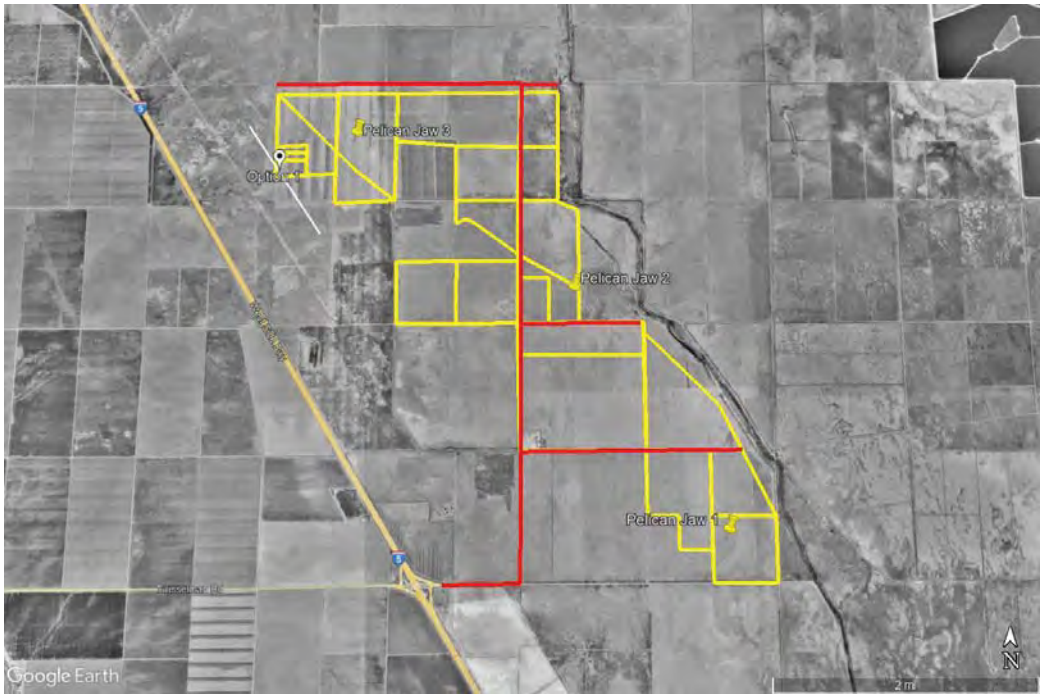
Sample ID	Sample Location	Date	Time	Laboratory Sample Number	Sample Matrix: Soil(S), Sludge(SL), Aqueous(A)	Total Petroleum Hydrocarbons as Gasoline, LUFT Manual (P&T)	TPH as Diesel Fuel, LUFT Manual	TPH as Gasoline, Extractable	TPH by EPA Method 418.1	BTEX by EPA Method 8020	TPH-D / BTXE			Number of Containers	Container / Comments
SP11		11/30/92			S									1	
SP12														1	
SP13														1	
SP14														1	
SP15														1	
SP16														1	
SP17														1	
SP18														1	
SP19														1	
SP20														1	

① Relinquished by: (Signature) Chris Bellue	Date 11/30/92	② Received by: (Signature) B. Barnett	Date 12-1	10	Total Number of Containers
Company: AEC	Time 16:00	Company: Assoc. Labs.	Time 10:00		
③ Relinquished by: (Signature) B. Barnett	Date 12-1	④ Received by Laboratory: (Signature)	Date 12-1-92		TERRA TECH LABS, INC. ENVIRONMENTAL TESTING 16371 Gothard Street, Suite G Huntington Beach, CA 92647 Tel. (714) 842-6077
Company: Assoc. Labs.	Time	Company: ASSOCIATED	Time		

DEC. 1 92 15:50 ASSOCIATED LABS

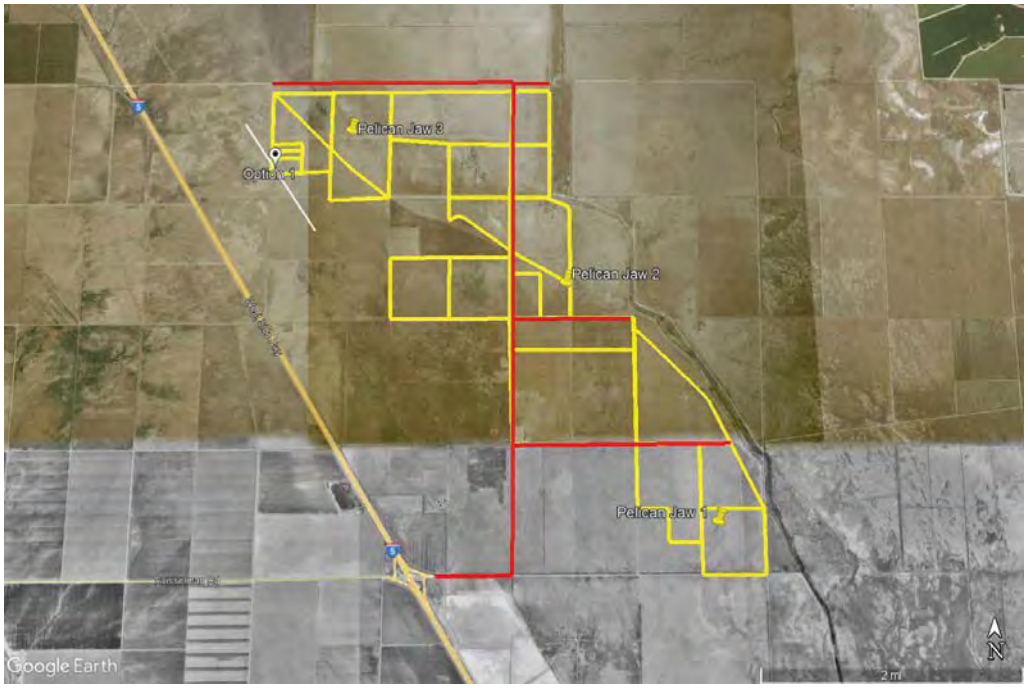
APPENDIX D

PHOTOGRAPHS

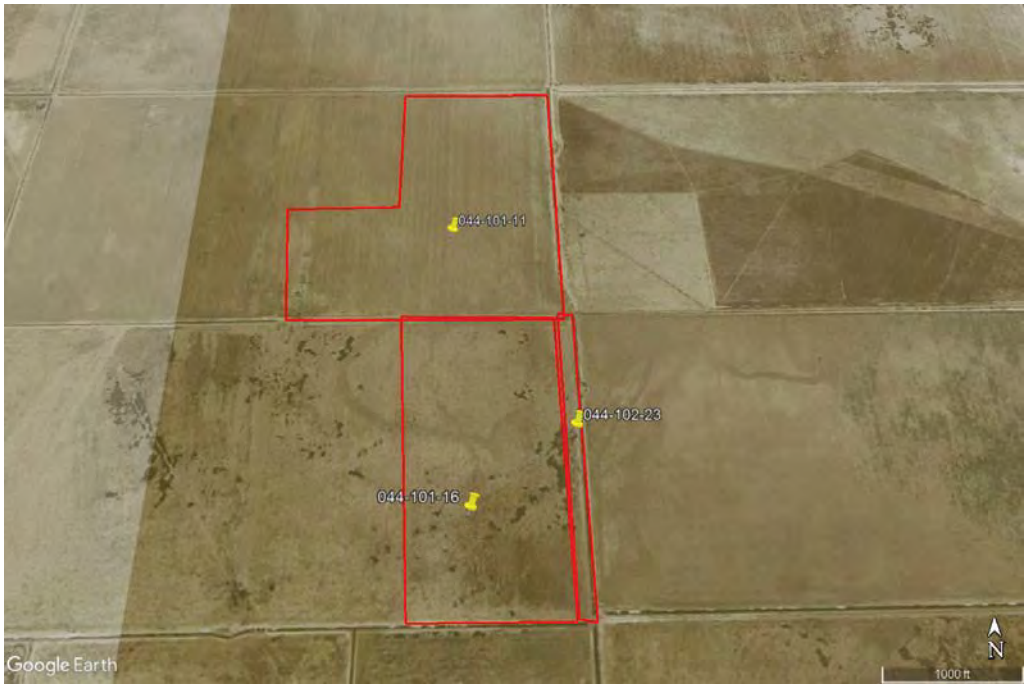


1994 aerial

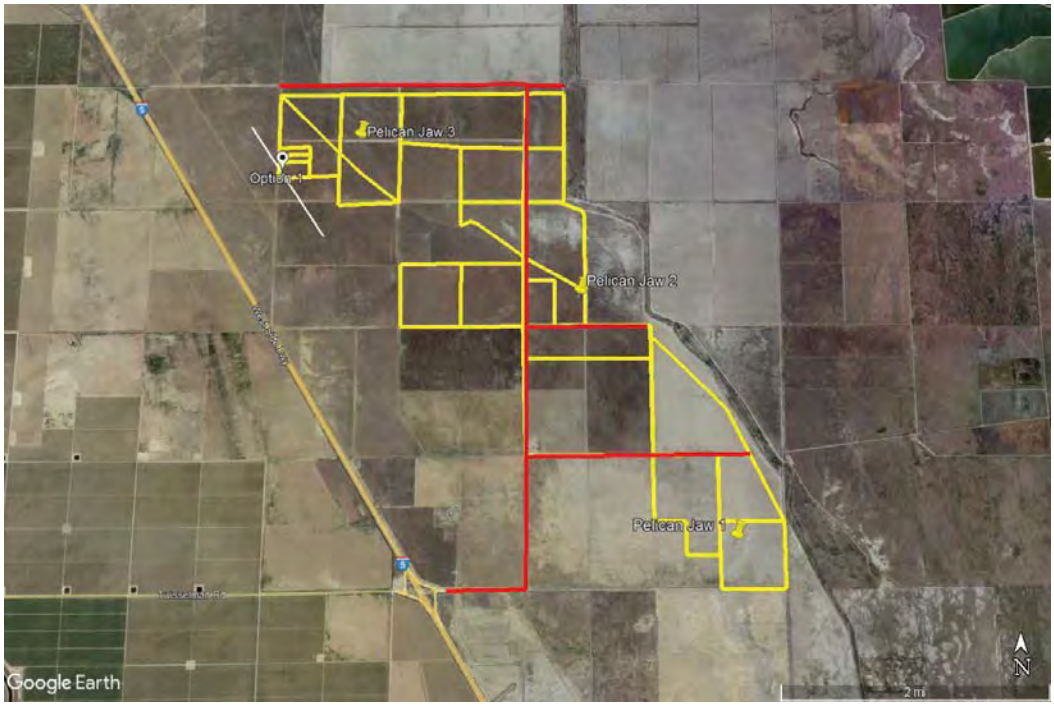
1994 aerial - Parcels - 044-101-11, 16, & 044-102-23



2003 aerial

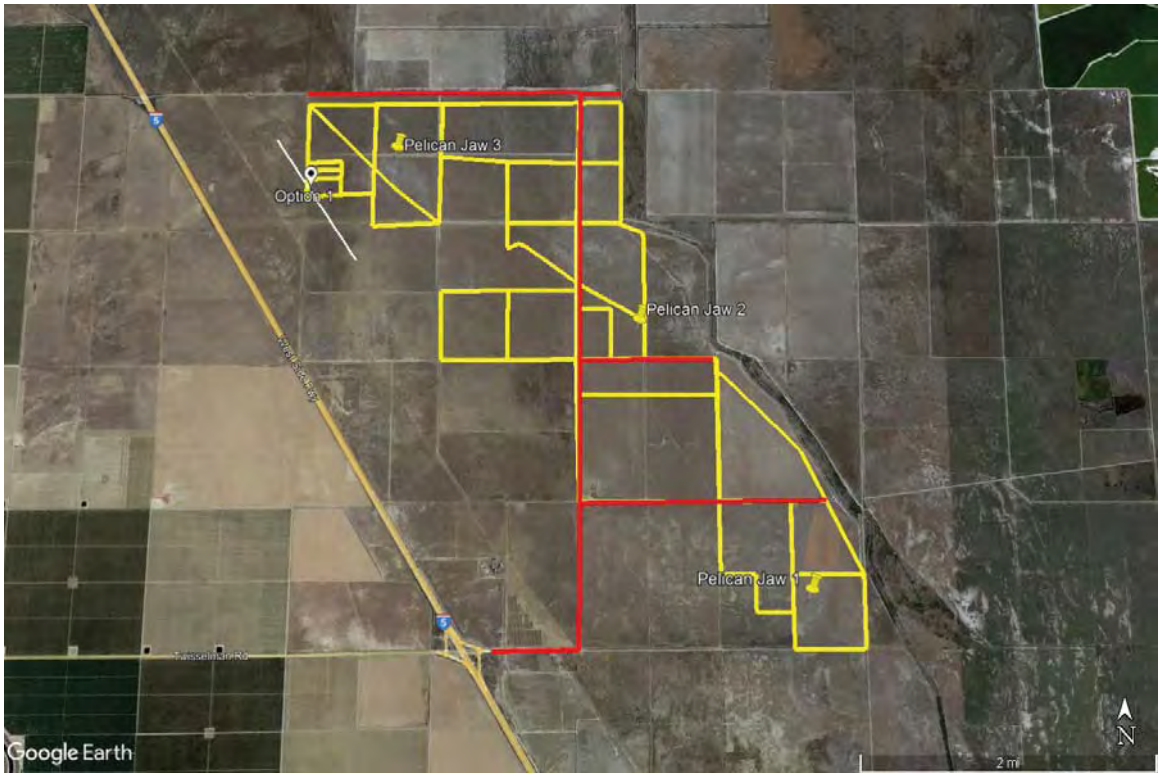


2003 aerial - Parcels - 044-101-11, 16, & 044-102-23



2012 aerial

2012 aerial - Parcels - 044-101-11, 16, & 044-102-23



2021 aerial

2021 aerial - Parcels - 044-101-11, 16, & 044-102-23

Photo Locations - July 2022

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

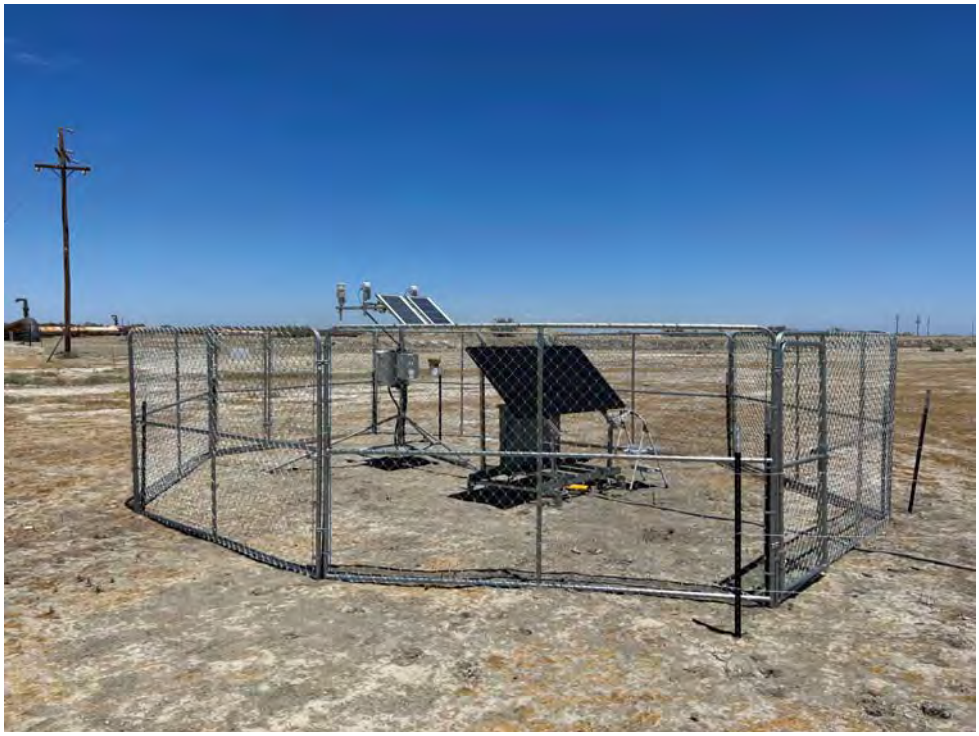


Photo 9 - solar powered monitoring system for water line

Photo 9a - scrap piping

Photo 9b - water line

Photo 10

Photo 11

Photo 12

Photo 13

Photo 14 - well and holding tanks

Photo 15

Photo 16

Photo 17

Photo 18

Photo 19 - silos and cattle corral

Photo 20 - gas pipeline

Photo 21 - power lines

Photo 22

Photo 23

Photo 24 - gas pipeline

Photo 25 - cell tower near main access point

Photo 26 - existing solar farm near main access point

Photo 27 - existing solar farm looking NW

Photo 28

Photo 29

Photo 19a - inside the structure at the corral

Photo Locations - Parcels - 044-101-11, 16, & 044-102-23 - Oct. 2022

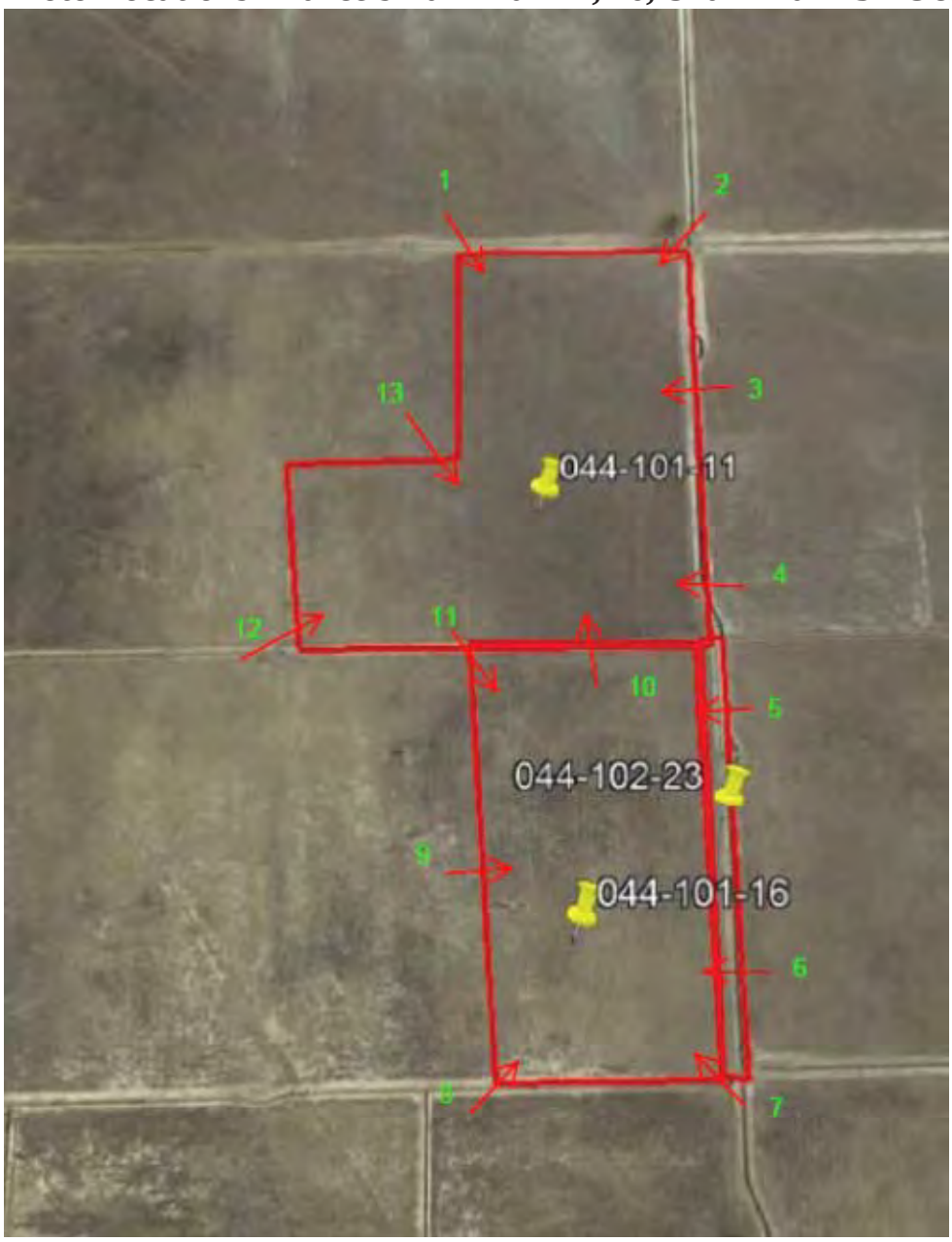


Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

Photo 13

Appendix J-2

Report of Geophysical Investigation

Report of Geophysical Investigation

Prepared for

Sapphos Environmental, Inc.

Acting on behalf of

Pelicans Jaw Solar, LLC

Agricultural Fields
Twisselman Road
Lost Hills, California
Project#7587

spectrum geophysics
REVEALING THE SUBSURFACE
8216 Lankershim Blvd. #12
North Hollywood, California
1-818-886-4500

Report of Geophysical Investigation
Agricultural Fields
Twisselman Road
Lost Hills, California

Prepared For:
Sapphos Environmental, Inc.
430 Halstead Street
Pasadena, California 91107

On behalf of:
Pelicans Jaw Solar, LLC
5601 E. Slauson Avenue, Suite 101
Commerce, CA 90040

Prepared By:
Spectrum Geophysics
8216 Lankershim Blvd. #12
North Hollywood, CA 91605

March 16, 2023

Rebecca Ullett, PGP
License No. 1086
California Professional Geophysicist
Operations Manager

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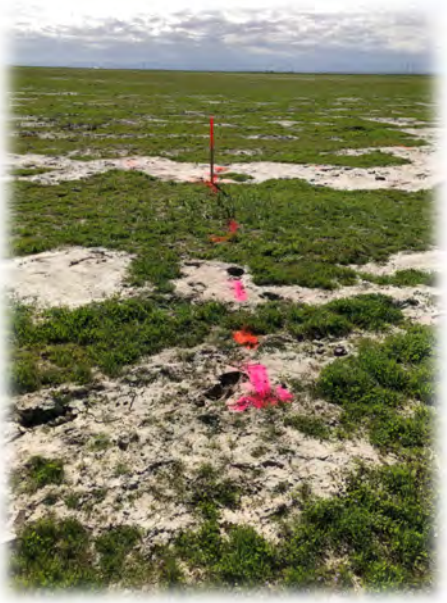

View of De Flon #1 and conduit surface trace
View is to the South

View of De Flon #4 surface trace
View is to Northeast

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View of Westfarmer #1 surface trace
View is to the West

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1.0 INTRODUCTION

On February 14th and 15th, 2023 Spectrum Geophysics conducted a geophysical investigation on portions of agricultural fields located along the north side of Twisselman Road and east of Interstate 5 in Lost Hills, California. The purpose of the investigation was to delineate the surface trace of up to four abandoned steel-cased oil or gas wells. The four areas of investigation include the De Flon #1 and #4, Westfarmer #1 and the Mel #1 as designated by Eric Vander Velde of Sapphos Environmental, Inc. per the direction of a letter from CalGEM dated December 12, 2022, on the Notice of Preparation of an Environmental Impact Report (EIR) for the Pelicans Jaw Hybrid Solar project, circulated for public review by Kern County.

Based on client provided information, Spectrum understands the following:

1. The Project would include up to 500-megawatt (MW) of photovoltaic solar generation and a battery energy storage system (BESS) with a capacity up to 4,000-megawatt hour (MWhr) located on approximately 3,371 acres of private property in Kern County, California.
2. The Project is situated within portions of Sections 4, 5, 6, 8, 9, 15, 16, and 22 of Township 25 South, Range 21 East, San Bernardino Base and Meridian.
3. The Project would primarily consist of photovoltaic (PV) panels, a single-axis tracker system, inverters and transformers, electrical cabling and communication lines, on-site switchgear, a collector substation, generation interconnection (gen-tie) line, access roads, security fence, an O&M facility, and a supervisory control and data acquisition (SCADA) system.
4. The Project would also include a Pacific Gas and Electric (PG&E) switching station that would interconnect with the existing PG&E 230-kilovolt (kV) overhead transmission lines that traverse the Project site. The PG&E switching station would be located on-site, within the Project boundaries. The final location of the PG&E switching station is subject to change pending ongoing environmental surveys and consultation with PG&E.
5. Existing roads would be used to the extent possible. The main Project access roads would be I-5 and Twisselman Road. Twisselman Road is an existing east/west paved two lane County Road. Two points of access are being proposed from Twisselman Road to provide ingress/egress to the Project site. Each access road would include a 24-foot-wide unpaved driveway with up to 5-foot shoulders on either side, for a total width of 34-feet. There is the potential that one or both of the proposed access routes will be developed pending detailed engineering design. Therefore, both access routes are assumed to be constructed, operated, and maintained. All internal access roads within the Project site would be up to 24 feet wide and cleared, graded, and compacted. Up to a 30-foot-wide perimeter road separating the solar arrays from the perimeter fence would be constructed within the entire perimeter of the Project. The roads would be constructed to allow fire, maintenance vehicle and access to previously abandoned oil and gas wells.

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Spectrum Geophysics understands that the locations of the detectable surface trace of potential wells are being provided to the design team of the Pelicans Jaw Hybrid Solar Project, to help avoid conflicts with existing wells during the design and build phase of the project under consideration by Kern County. This scope does not take into consideration whether or not the existing wells are abandoned to current standards. In addition, the data gathered from this investigtion will inform the EIR and will assist coordination with CalGEM and Kern County for related grading and building permits. With exception of this report, all additional submittals with respect to applications and permits for this proposed project are not the responsibility of Spectrum Geophysics. Spectrum's involvement is limited to the geophysical investigation and reporting only.

Extensive background research was conducted using existing well records as well as available aerial photos. The CalGEM Lat/Lon Coordinates were reviewed in advance and compared with the BLM Township and Range plats found in the well records. Approximate well location targets were plotted and sample data were collected in areas around the targeted coordinates. Once the field crew identified increases in the magnetic field, a rough survey grid was established around the regional magnetic high and data were collected around each suspected well location with survey areas having the following approximate dimensions and surface cover:

- *De Flon #1* is approximately 160 x 160-feet in size and is soil covered (Figure 2).
- *De Flon #4* is approximately 120 x 115-feet in size and is soil covered (Figure 4).
- *Westfarmer #1* is approximately 115 x 110-feet in size and is soil covered (Figure 6).

No regional increase was observed in sample data collected around the BLM plat measured location and CalGEM Lat/Lon for Mel #1. The survey area was based on BLM Township and Range plat map data and the CalGEM Lat/Lon for this well. The survey area for Mel #1 had the following approximate dimensions, surface cover and above ground cultural interfernces:

- *Mel #1* is approximately 280 x 220-feet in size and is soil covered. Site interferences included the electric fencing (Figure 8).

A discussion of the equipment used during this investigation is presented in Section 2.0, the methods and field procedures are discussed in Section 3.0, results are presented in Section 4.0, and limitations are presented in Section 5.0.

2.0 EQUIPMENT

The equipment used during this investigation consisted of a Geometrics G-858 cesium-vapor magnetometer, a shallow-focus metal detector (M-scope), electromagnetic (EM) utility-locating equipment. A Trimble Pro 6H Differential submeter GPS unit was used for navigation during magnetics data acquisition and mapping of key features during the field survey.

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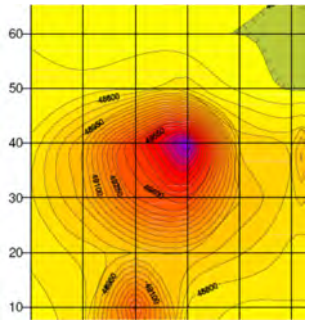
3.0 METHODS AND FIELD PROCEDURES

3.1 Total Field Magnetics

A Geometrics G-858 Cesium Vapor Magnetometer was used in an effort to identify significant magnetic anomalies that might be associated with massive buried ferromagnetic features at the Site, such as the steel casing from an abandoned oil well. The magnetometer used for this survey measures the earth's magnetic field intensity in nanoteslas (nT). A very gradual change in the natural magnetic field is usually observed over background materials across short distances unless there are massive ferrous objects with high magnetic susceptibilities present. The shape and amplitude of a magnetic anomaly over a ferromagnetic object is dependent upon the geometry, mass, magnetic susceptibility of the object; depth to the object; and the inclination of the earth's magnetic field in the survey area. Most magnetic anomalies from buried ferrous infrastructure like underground storage tanks (USTs) or pipes are dipolar with the positive portion of the dipole centered over the southern extent of the ferrous metal and the negative portion located to the north of the object. Vertical ferrous structures like metallic well casings generally produce broad monopolar anomalies – where there is typically just a large positive anomaly – similar to a "bullseye" in the ideal case. In the presence of metallic interference, however, these predictable magnetic signatures of buried ferrous materials change and become quite a bit more complex to interpret – especially in the magnetics total field data.

Cesium Vapor Magnetometer

During this investigation, readings of the earth's total magnetic field were collected and stored in a handheld computer at approximate 1-foot intervals along traverses spaced approximately 5 feet apart. These data were processed in the field and used to generate a contour map to assist in identifying anomalous areas that may be caused by buried ferromagnetic features of interest.



Typical anomaly associated with a buried steel-cased well

In the absence of interference total magnetic field anomalies typical of steel-cased wells are characterized by a regional monopolar magnetic high with a magnitude ranging from 100's to 1000's of nanoteslas above the background magnetic field. These circular monopoles can have a radius of 10 to 30 feet or more depending on several factors like vintage of the well, total mass of the casing and depth to the well head. It should be noted that, based on our experience, oil wells established in the early 1900's may not always produce "typical" oil well magnetic anomalies as these wells may have been cased or abandoned with different materials than are now standard in the industry.

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3.2 Metal Detection

Utility locators and shallow metal detectors were used to further investigate magnetometer anomalies for the presence of buried steel well casings and/or to determine the source of these anomalies.

The M-Scope metal detector operates on the principal of electromagnetic induction and has a transmitter and a receiver at the ends of a short boom. The transmitter emits a radio-frequency source signal that induces a secondary magnetic field in metallic material in its immediate vicinity. The receiver measures the signal strength of this secondary magnetic field and emits an audible response, the volume and pitch of which increase in the presence of metallic material.

The Schonstedt is a fluxgate magnetometer consisting of two magnetic cores of material that have very high magnetic permeability at low magnetic fields and are wound with primary and secondary coils. Cores that are as identical as possible are mounted so that their coils are wound in opposite directions. The two primary windings are connected in series and energized by a low-frequency alternating current. Twice each cycle, the maximum current magnetizes the cores to saturation but in opposite polarity, and the signal from the secondary coils is received. A differential amplifier produces output proportional to the difference between input signals from the secondary coils. Under background conditions the input signals from the secondary coils cancel; however, in the presence of ferromagnetic material an audible response is emitted.

Utility locators typically consist of a transmitter and a receiver. These instruments operate on the principle of electromagnetic induction, where the transmitter sends out a radio frequency signal (primary field) that induces a secondary electromagnetic field in long, linear conductive objects such as buried metallic pipes and conduits. The receiver detects the signal from the secondary field and allows the precise location of the utility.

3.3 Electromagnetic (EM) Utility Location

Passive and active EM utility-locating methods were used in an effort to identify possible sources of magnetics anomalies and to delineate the surface trace of detectable underground utilities and abandoned piping.

Electromagnetic (EM) utility location (archive photo)

Passive locating is possible when electrically conductive conduits are energized by ambient radio frequencies (RF) that are often produced by 50/60 cycle electrical, radio, audio, television, and communication transmissions. A receiver tuned to these frequencies can be used to locate the re-radiated signal emitted by the conductor (i.e., conduit).

Active locating is initiated by conducting an EM signal at a known frequency (8 and 33 kHz for this site) on a conduit exposed at the surface. A receiver, tuned to these frequencies, is then used to locate the signal maxima (or surface trace) of the applied signal.

Detected utilities were marked on the ground with surveyor's paint using the color code found below.

Table 1: APWA Color Code

Utility	Color
Electric	Red
Telephone/Communication	Orange
Storm Drain/Sanitary Sewer	Green
Natural Gas	Yellow
Water	Blue
Unknown Conduit	Pink

4.0 RESULTS

A map of the approximate location of the areas of investigation is presented in Figure 1. The geophysical interpretation maps for each area are presented in Figures 2, 4, 6, and 8. The contour maps of the total magnetic field data are presented in Figures 3, 5, 7, and 9.

4.1 Total Field Magnetics

Four significant anomalies were observed in the total field data that could not be attributed to above ground cultural features and/or detected utilities.

De Flon #1

Anomaly A is centered at Eastings 6048914 and Northings 2472454. Follow up using a schonstedt magnetic locator detected a ferromagnetic object within the bounds of the anomaly however, a source could not be determined. A conduit was detected using EM-Utility locating methods, however, it could not be determined as the sole source of the anomaly. The size and magnitude of this magnetic anomaly are consistent with those associated with abandoned steel-cased oil wells.

Anomaly B is a moderate magnetic monopolar high centered at Eastings 6048880 and Northings 2472413. EM-Utility locating methods provided no futher information. Spectrum recommends excavation of this anomaly to confirm its source.

De Flon #4

Anomaly C is centered at Eastings 6044251 and Northings 2472708. Follow up using a schonstedt magnetic locator detected a ferromagnetic object within the bounds of the anomaly however, a source could not be determined. EM-Utility locating methods provided no futher

information. The size and magnitude of this magnetic anomaly are consistent with those associated with abandoned steel-cased oil wells.

Westfarmer #1

Anomaly D is a strong magnetic monopolar high centered at Eastings 6051017 and Northings 2467115. Follow up using a schonstedt magnetic locator detected a ferromagnetic object within the bounds of the anomaly however, a source could not be determined. EM-Utility locating methods provided no futher information. The size and magnitude of this magnetic anomaly are consistent with those associated with abandoned steel-cased oil wells.

Mel #1

No significant anomalies were observed in the contour map of the total magnetic field data in the region surrounding the expected location of the Mel #1. The absence of a significant magnetic anomaly indicates that at a minimum, no steel casing associated with the Mel #1 well is present within the area of investigation.

During a review of the CalGEM well record, a cancellation notice dated May 25, 2016 was discovered for the Mel #1 Permit #413-4006 (Appendix A). The document addressed to Megan Graves of Aera Energy entitled "Report of Well Correction or Cancellation" notes the following:

> *In accordance with Section 1722 (d) of the Calif. Code of Regulations the following changes pertaining to your well "Mel" 1, A.P.I. No. 030-47440, -- field, Kern County, Section 16, T. 25S, R. 21E, MD B.&M., are being made in our records: Your notice to Supplementary Drill dated 6/4/2013, and received 6/5/2013, and our report No. 413-4006 issued 6/14/2013 are cancelled, since the work will not be done. If you have an individual bond on file covering this notice, it will be returned. No request for such return is necessary.*

Along with this notice, two additional documents from the Mel #1 well record were both marked with a "CANCELLED" stamp – "Permit to Conduct Well Operations" and a checklist of expected work.

Based on the lack of a significant magnetics anomaly indicating the presence of a steel well casing and the documentation of cancellation acquired from CalGEM it is likely the Mel #1 well was never drilled.

5.0 LIMITATIONS

The detection of subsurface objects and utilities is dependent upon acquiring reliable data with geophysical instruments above ground. These data may be interpreted as representative of subsurface objects. The electromagnetic waves or fields being measured, however, may be attenuated and/or distorted by a number of factors including soil moisture, corrosion, and

proximity to other surface and subsurface structures. A discussion of the limitations of each method follows.

5.1 Magnetics

In the absence of cultural interference, provided the abandoned well is steel cased and depending on the vintage of the well, most abandoned wells are detectable with the magnetic method to depths of 10 feet or more. Magnetometry surveys for abandoned wells are subject to interference by induced magnetic fields associated with surface and subsurface cultural features that contain ferrous materials. These features may be located within the survey area or along the survey perimeter. Such features include metallic trailers, buildings, reinforcing steel bars in concrete, vehicles, chain link fences and underground utilities. As there were no buildings or sources of cultural interference in the investigation area, magnetic interference was not a concern for this project.

5.2 General

It should be understood that the location of subsurface objects and utilities is dependent upon the recognition of physical phenomena at the ground surface. These phenomena can be magnetic fields or electro-magnetic waves that give rise to a surface expression which in turn is interpreted as representative of subsurface objects. These waves, however, may be attenuated and/or distorted by a number of factors including soil moisture, corrosion, and proximity to other surface and subsurface facilities.

5.3 Positioning

The features identified in Figures 1 thru 9 were located using GPS for positioning (sub-meter accuracy). In addition, because the total field magnetics data were created using GPS for positioning, the anomaly identified may also contain some positioning error. Although this error is not considered a major concern for this project, all features depicted in these figures may be in error with regards to their true GPS position by as much as 3 feet.

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Area of Investigation

N
W E
S
North

Scale: (Feet)
0 500 1000 2000

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Location of Areas of Investigation Overview Map**

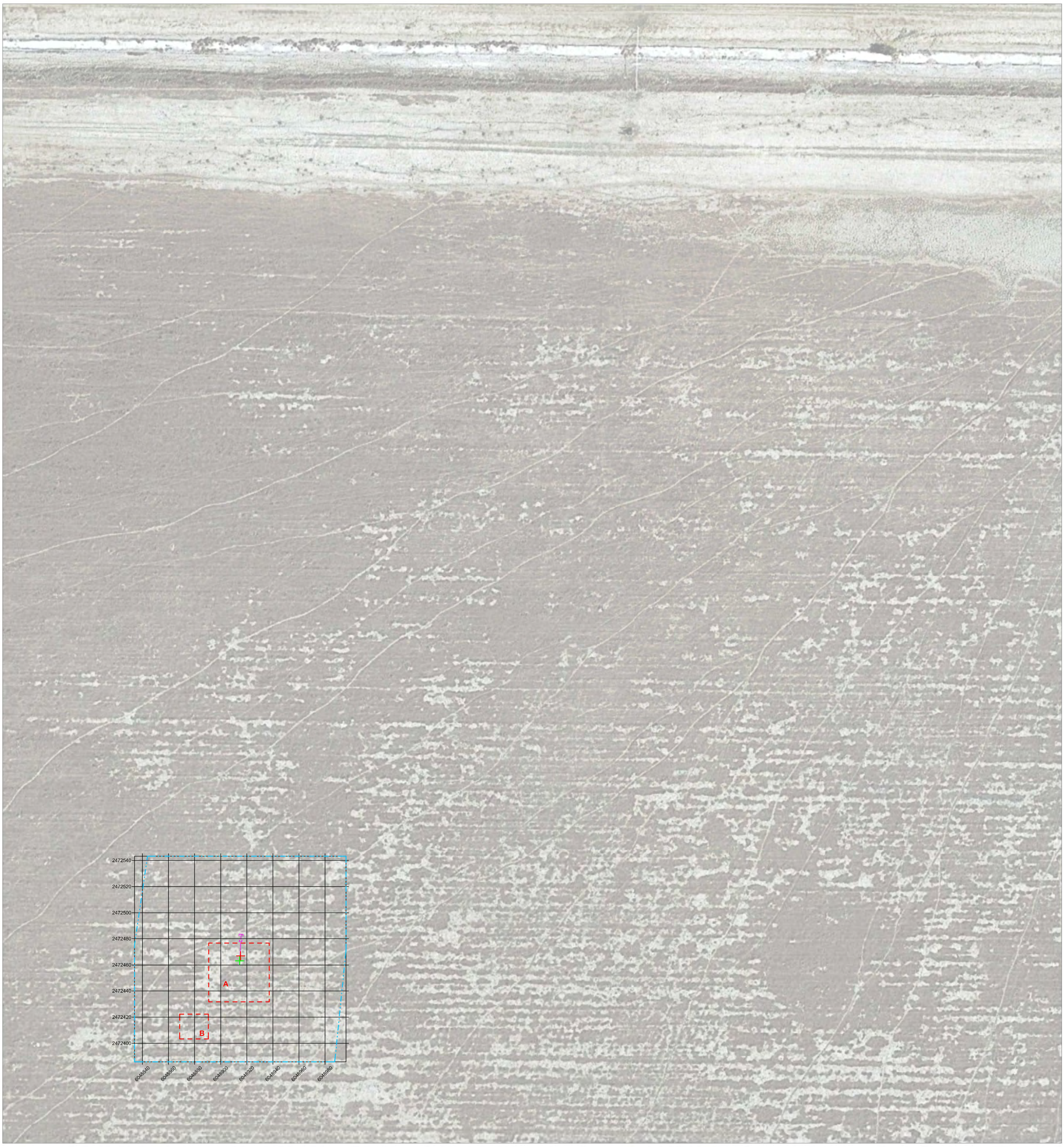
PROJECT: Agricultural Fields
Twisselman Road
Lost Hills, California

FIGURE NO.: **1**

PREPARED FOR: Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.: 7587

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = 1000 feet	RJW	BAU	3/1/2023



Area of Investigation

Magnetic Anomaly

Conduit

Ferromagnetic Object

Magnetic Peak

Scale: (Feet)

0 20 40 80

N

W E

S

North

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Geophysical Interpretation Map**
De Flon #1

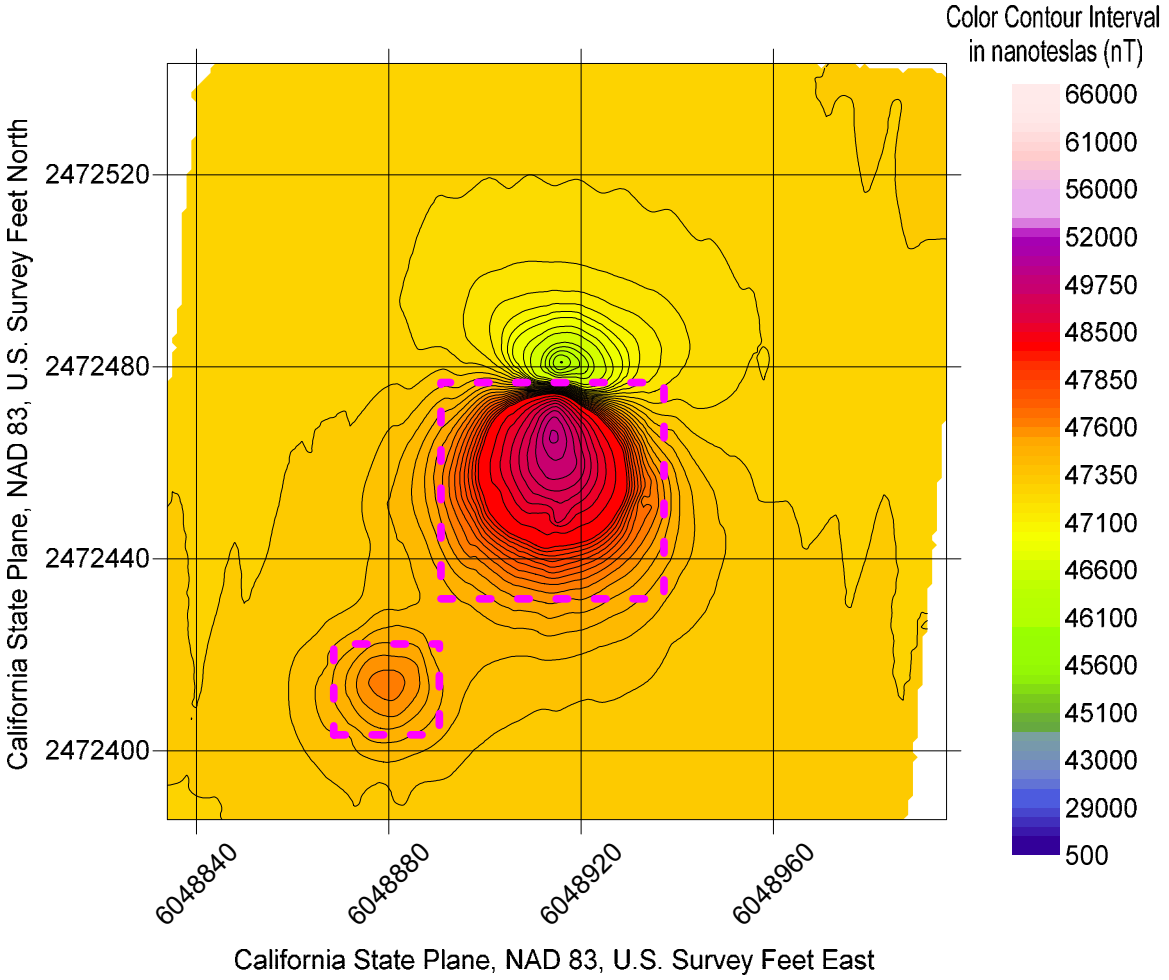
PROJECT: Agricultural Fields
Twisselman Road
Lost Hills, California

FIGURE NO.: 2

PREPARED FOR: Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.: 7587

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	3/1/2023



Magnetics Anomaly

N
W E
S
NORTH
0 20 40

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MAP: Contour Map of Total Magnetic Field Data-De Flon #1

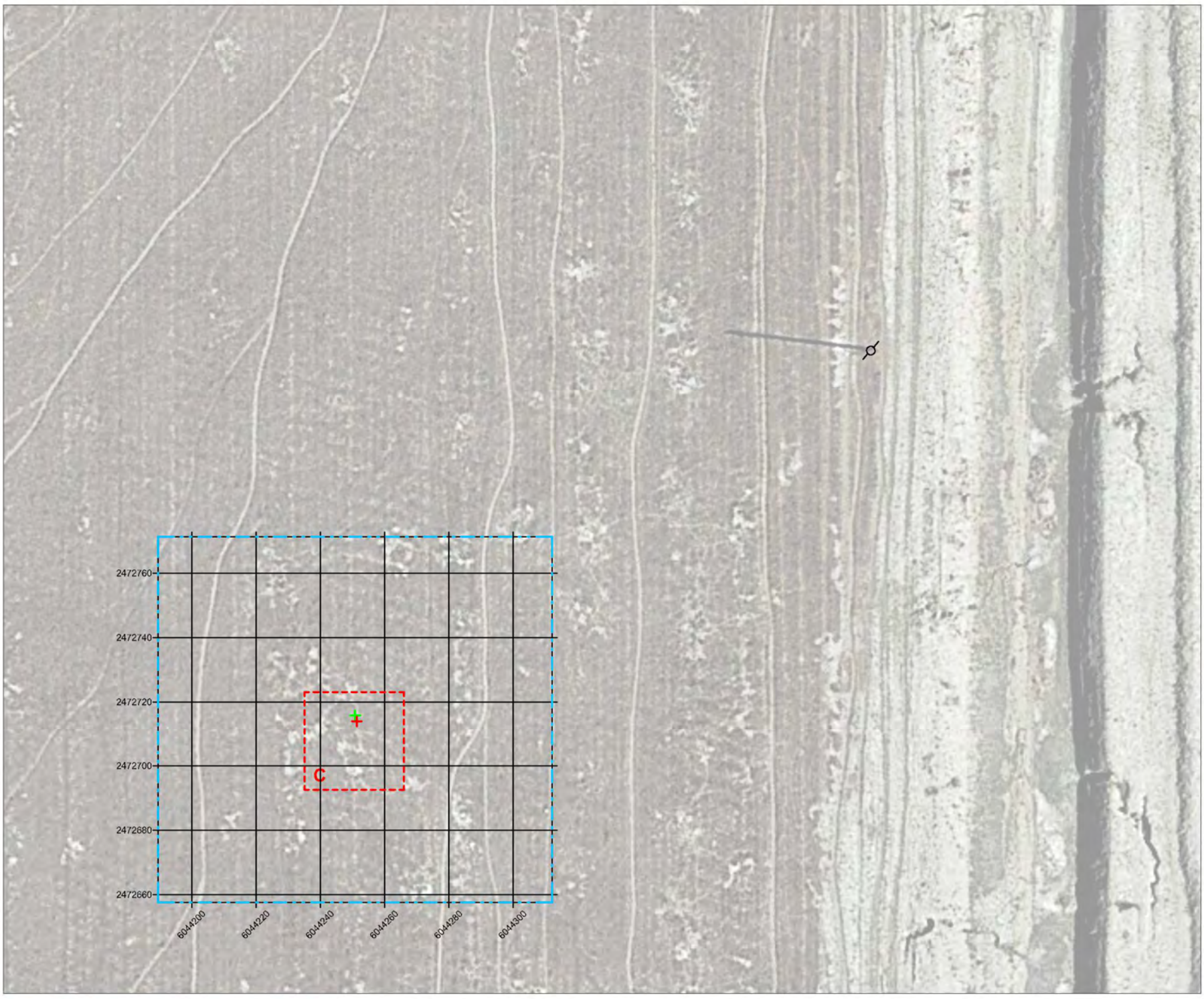
PROJECT: Agricultural Fields
Twisselman Road
Lost Hills, California

Figure: 3

PREPARED FOR: Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.: 7587

SCALE	DWG BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	2/27/2023



Area of Investigation

Magnetic Anomaly

Ferromagnetic Object

Magnetic Peak

Utility Pole

N
W E
S
North
Scale: (Feet)
0 20 40 80

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Geophysical Interpretation Map**
De Flon #4

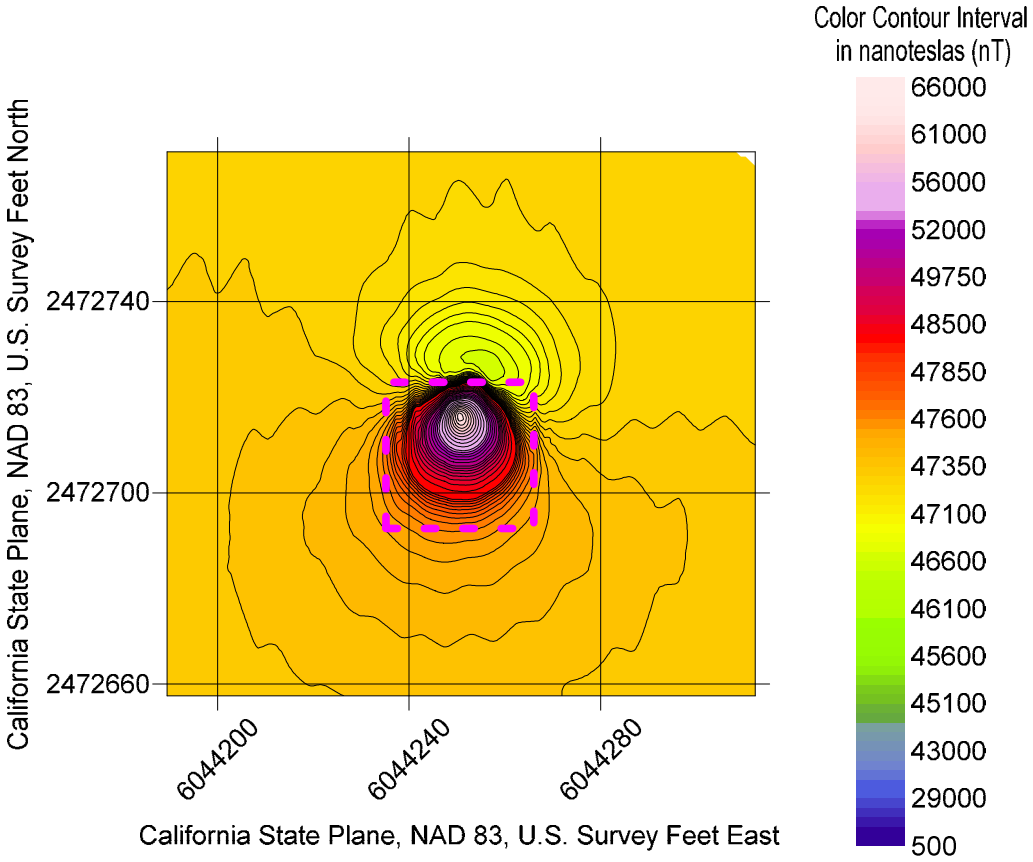
PROJECT: Agricultural Fields
Twisselman Road
Lost Hills, California

FIGURE NO.: **4**

PREPARED FOR: Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.: 7587

SCALE	FIGURE BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	3/1/2023



Magnetics Anomaly

N
W E
S
NORTH
0 20 40

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MAP
Contour Map of Total Magnetic Field Data-De Flon #4

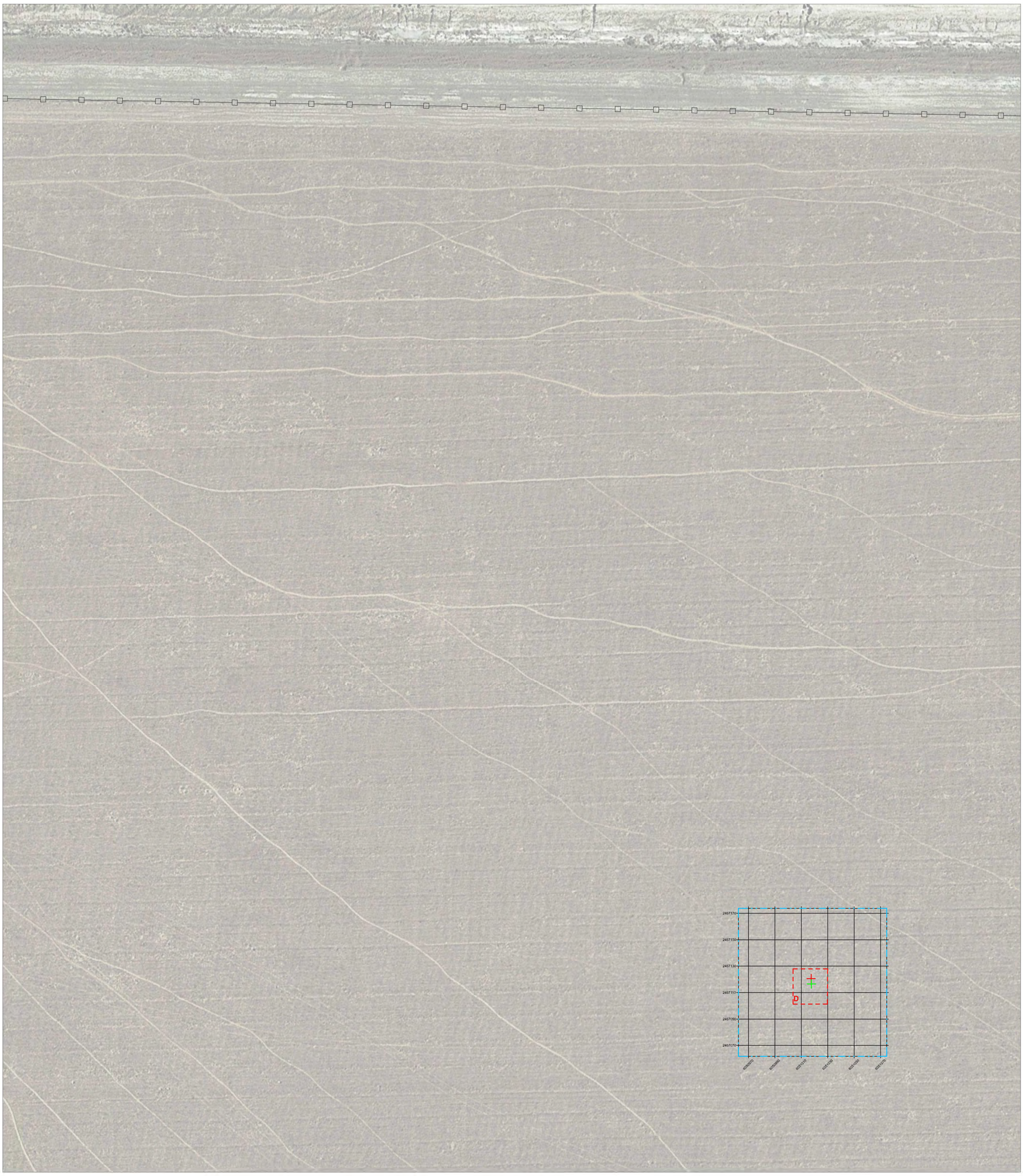
PROJECT
Agricultural Fields
Twisselman Road
Lost Hills, California

Figure
5

PREPARED FOR
Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.
7587

SCALE	DWG BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	2/27/2023



Area of Investigation

Magnetic Anomaly

Electric Fence

Ferromagnetic Object

Magnetics Peak

Scale: (Feet)

0 20 40 80

N

W E

S

North

***Note: Not all below ground utilities or features may be represented on this map

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MAP: **Geophysical Interpretation Map**
Westfarmer #1

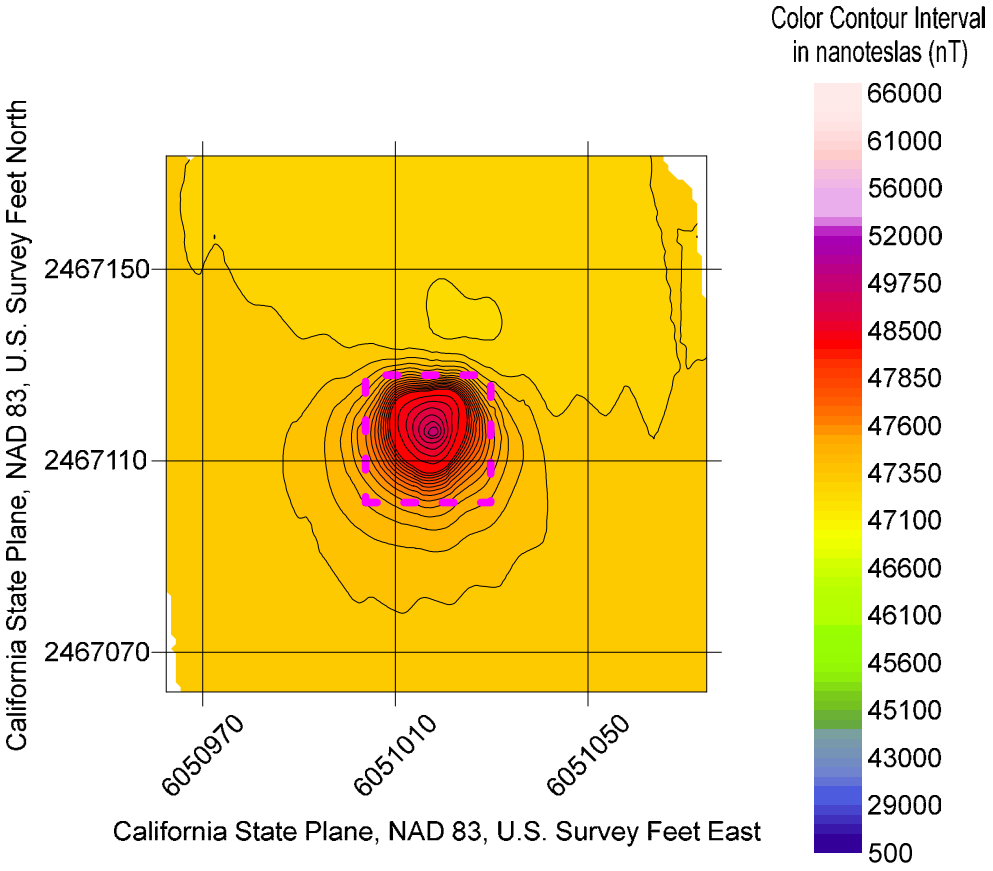
PROJECT:
Agricultural Fields
Twisselman Road
Lost Hills, California

FIGURE NO.: 6

PREPARED FOR: Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.: 7587

SCALE	PROJECT	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	3/1/2023



Magnetics Anomaly

N
W E
S
NORTH
0 20 40

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MAP
Contour Map of Total Magnetic Field Data-Westfarmer #1

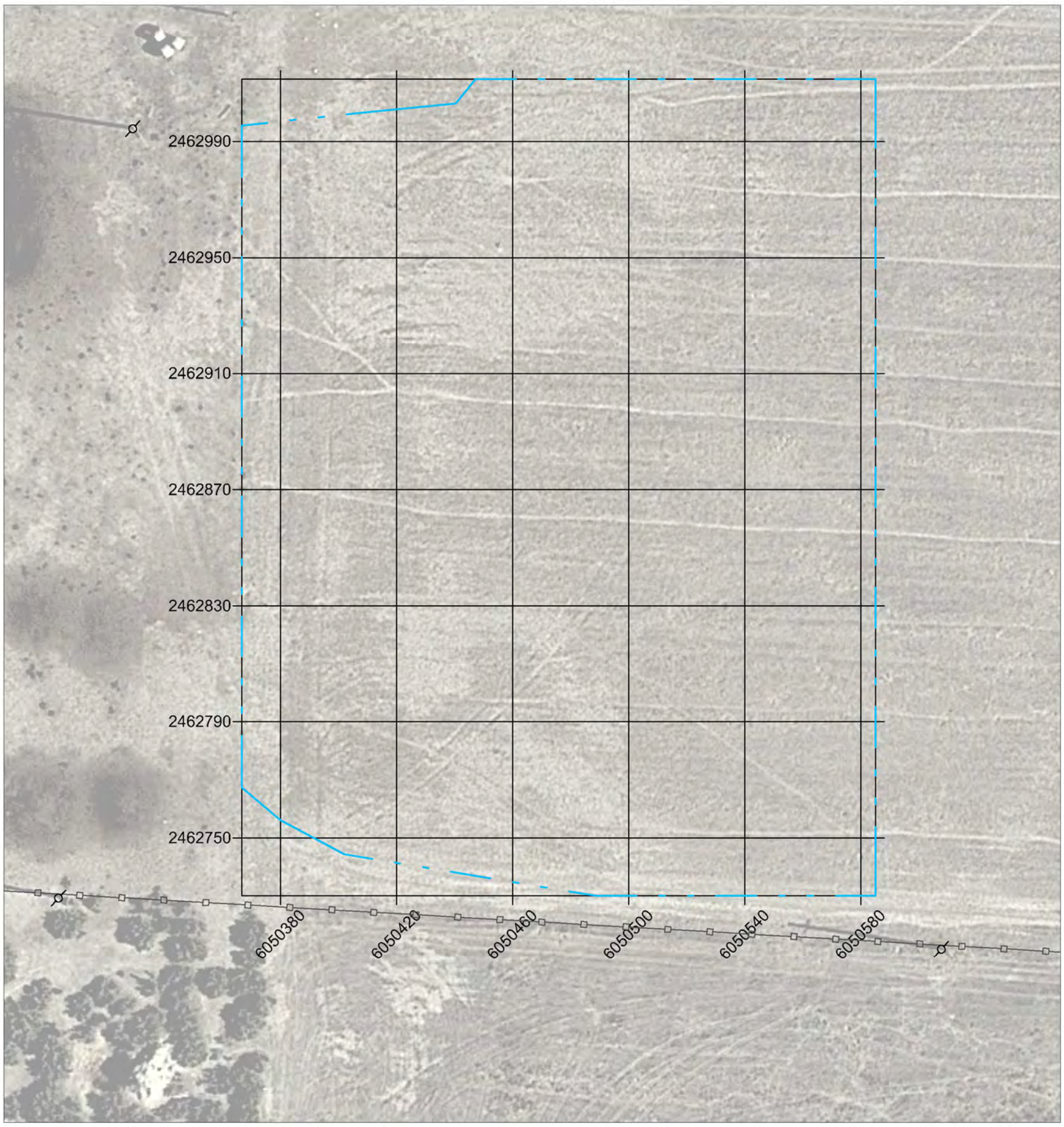
PROJECT
Agricultural Fields
Twisselman Road
Lost Hills, California

Figure
7

PREPARED FOR
Sapphos Environmental, Inc.
Pasadena, California

PROJECT NO.
7587

SCALE	DWG BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	2/27/2023



Area of Investigation

Electric Fence

Utility Pole

N

W E

S

North

Scale: (Feet)

0 20 40 80

***Note: Not all below ground utilities or features may be represented on this map

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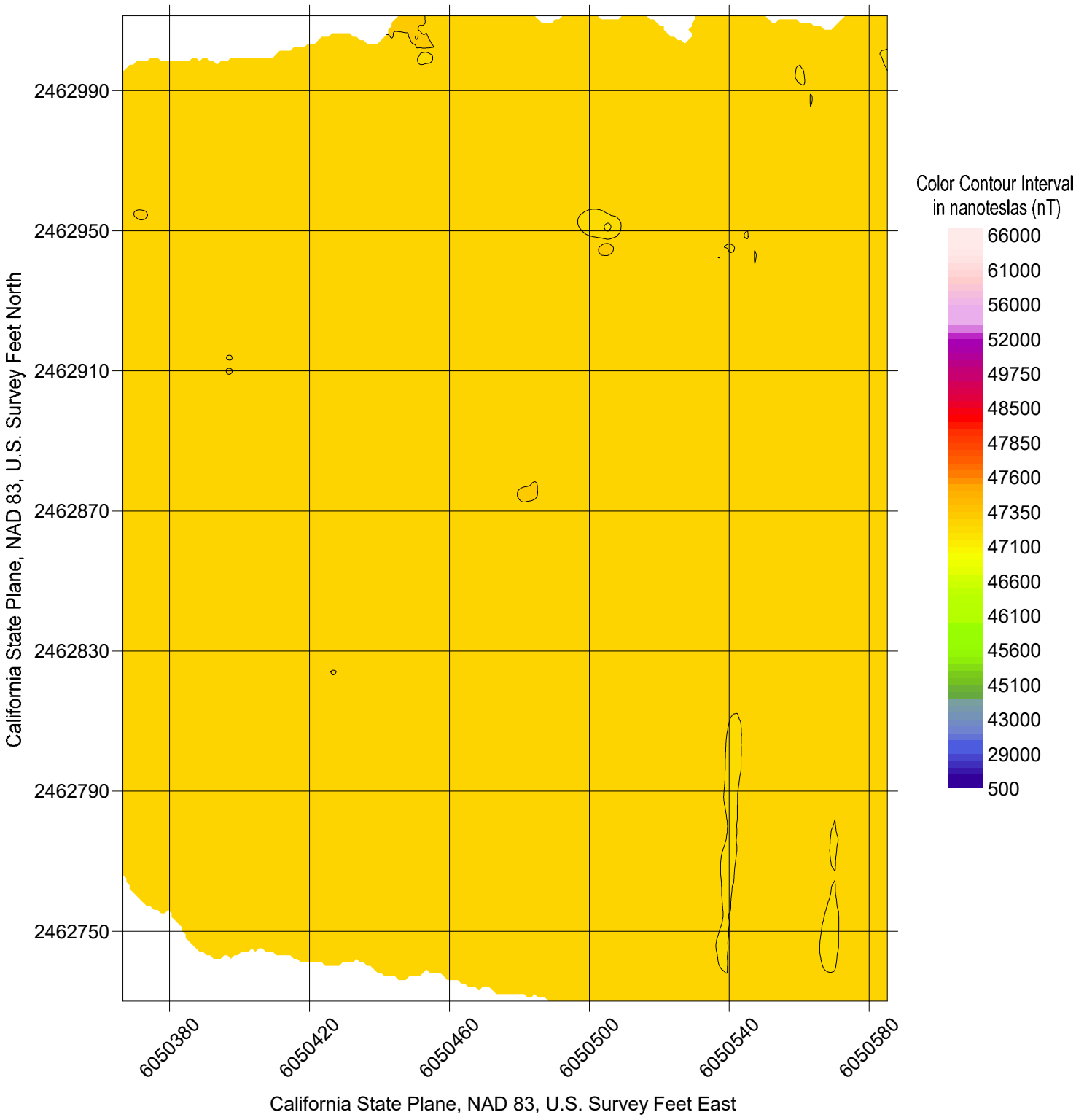
MAP: Geophysical Interpretation Map Mel #1				FIGURE NO. 8
PROJECT: Agricultural Fields, Twisselman Road, Lost Hills, California				
PREPARED FOR: Sapphos Environmental, Inc. Pasadena, California				PROJECT NO. 7587
SCALE: 1 inch = 40 feet	FIGURE BY: RJW	REVIEWED BY: BAU	DATE: 3/1/2023	



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MAP
Contour Map of Total Magnetic Field Data-Mel #1

PROJECT
Agricultural Fields
Twisselman Road
Lost Hills, California

PREPARED FOR
Sapphos Environmental, Inc.
Pasadena, California

SCALE	DWG BY	REVIEWED BY	DATE
1 inch = 40 feet	RJW	BAU	2/27/2023

Figure
9

PROJECT NO.
7587

SPECTRUM GEOPHYSICS, 8216 LANKERSHIM BLVD., #12, NORTH HOLLYWOOD, CALIFORNIA 91605

APPENDIX A

DEPARTMENT OF CONSERVATION
DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
4800 Stockdale Hwy., Suite 100, Bakersfield, CA 93309-0279
Phone:(661) 322-4031 Fax:(661) 861-0279

REPORT OF WELL CORRECTION OR CANCELLATION

Bakersfield, California
May 25, 2016

Ms Megan Graves
Aera Energy LLC (A0610)
P.O. Box 11164
Bakersfield, CA 93389-1164

In accordance with **Section 1722 (d) of the Calif. Code of Regulations** the following changes pertaining to your well **"Mel" 1**, A.P.I. No. **030-47440**, -- field, **Kern** County, Section **16**, T. **25S**, R. **21E**, **MD** B.&M., are being made in our records:

Your notice to Supplementary Drill dated 6/4/2013, and received 6/5/2013, and our report No. 413-4006 issued 6/14/2013 are cancelled, since the work will not be done. If you have an individual bond on file covering this notice, it will be returned. No request for such return is necessary.

Kenneth A. Harris Jr.
State Oil and Gas Supervisor

By Michael L Weeks
William A. Bartling,District Deputy

MW:cmc

OG165

DEPARTMENT OF CONSERVATION

DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES
4800 Stockdale Hwy., Suite 417 Bakersfield, CA 93309 - 0279

No. P413-4006

PERMIT TO CONDUCT WELL OPERATIONS

	Old	New
FIELD CODE	--	000
AREA CODE	--	00
POOL	--	00

CONFIDENTIAL WELL
Spot Location

Megan Graves
Aera Energy LLC (A0610)
P.O. Box 11164
Bakersfield, CA 93389-1164

Bakersfield, California
June 14, 2013

Your **Supplementary** proposal to **DRILL** well **"Mel" 1**, A.P.I. No. **030-47440**, Section **16**, T. **25S**, R. **21E**, **MD** B. & M., -- field, -- area, -- pool, **Kern** County, dated **6/4/2013**, received **6/5/2013** has been examined in conjunction with records filed in this office.

CANCELLED

THE PROPOSAL IS APPROVED PROVIDED:

1. In all other respects, the operations are to be conducted in accordance with provisions outlined in Permit P**412-2435** - dated **April 18, 2012**.
2. No program changes are made without prior Division approval.

NOTE:

1. This permit is valid until February 28, 2014, after which time no more extensions on this permit will be allowed.

CANCELLED

Blanket Bond Dated:2/19/1998

Tim Kustic
State Oil & Gas Supervisor

Engineer Rich Thesken
Direct (661) 334-3661
Office (661) 322-4031

By Burton R. Ellison
Burton R. Ellison, District Deputy

RT/bgr

A copy of this permit and the proposal must be posted at the well site prior to commencing operations.
Records for work done under this permit are due within 60 days after the work has been completed or the operations have been suspended.
OG111

A.P.I. No. 030 - 47440

Intent & Well Type NF	Drill/CE							
"P" Report No.	P412-							
Supp. No. #1								
Supp. No.								
Proposed	00							
Completed								
STATUS & ATT.								
	Checked	Hold	Checked	Hold	Checked	Hold	Checked	Hold
Notice								
History								
Summary/Signature								
E-Log								
Density/Neutron								
SWS/Core								
Mud Log								
CBL								
Fracked								
Directional Survey H = Horizontal								
"T" Report								
Environmental Date/ENGR								
Location							Map Change	
Elevation (KB)					Dry Hole (Year/TD)		Lease Line	
MAP LETTER								
Drill Card								
Initial Production								
6 Mo. Production								
Hold (Date & Init.)								
RECORDS APPROVED								
EDP Clerk	04/15/15 6-CL							
Confidential Clerk	Released 4/15/15							
CalWIMS/Miscellaneous								
Bond No. Date								
Bond Release Date								
Form 150 (Release)								

CANCELLED

CANCELLED 5/20/14

Remarks:	
Rig Release Date (confidential wells only)	
Final Letter Approval: NTS☐ BLM☐	Form 159 Final Letter:

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Appendix K

Preliminary Hydrology and Hydraulic Technical Study

Preliminary Hydrology and Hydraulic Technical Study

Pelicans Jaw Hybrid Solar Project

FEBRUARY 2023

Prepared for:

PELICANS JAW SOLAR, LLC
3 Lagoon Drive, Suite 280
Redwood City, CA 94065
Contact: Tandy McMannes

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024

Executive Summary

The Pelicans Jaw Hybrid Solar Project (PJHSP, or Project) has been determined, by Kern County (County), acting as lead agency, to require preparation of an environmental impact report (EIR) pursuant to the California Environmental Quality Act (CEQA), based on their experience with other comparable projects. This hydrology and hydraulics technical study (Preliminary Technical Study) has been prepared to identify existing baseline hydrology and hydraulic conditions of the Project site in accordance with the Kern County Hydrology Manual (KCHM) to support preparation of the EIR. Pelicans Jaw Solar, LLC proposes to entitle, construct, operate, and maintain the Project, which would consist of up to 500-megawatt of photovoltaic solar generation and battery energy storage. The approximately 3,371-acre Project site is located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 located approximately two miles to the west. This Preliminary Technical Study was prepared under the supervision of Kipp Vilker, a licensed professional engineer (CA PE No. 90011) and Jonathan Martin.

This Preliminary Technical Study has found that a portion of the Project site is within a Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas (SFHA) Zone A for the Kern River Channel that is susceptible to 100-year floods. Flood zone A in this location has no detailed hydraulic analysis and no base flood elevation information available. Using a peak flow of 11,000 cubic feet per second (cfs; DWR 2022), which is the estimated flow of a 100-year event, a hydraulic model was prepared for the Kern River Channel, and it was determined that flood depths of up to 5-feet could occur in the buildable areas of the northeast portion of the Project site.

A separate hydrological analysis was performed to model the discharge from the local watershed resultant from the 100-year 24-hour rainfall event. This analysis included modeling of runoff generated from excess rainfall within the Project boundary as well as the watershed contributing runoff to the Project. It was determined that the peak flow at the Project's concentration point for a 100-year 24-hour rainfall event is 2,953 cfs and the total discharge volume is 1,101 acre-feet. A hydraulic model for this scenario was prepared and it was determined that flood depths of up to 1-foot can be expected within the buildable areas Project site.

The Project must comply with the Kern County municipal code and a development permit must be obtained from Kern County before any construction or development begins within any SFHA. For development activities proposed to be located in the SFHA, there must be hydrologic and hydraulic analyses completed that demonstrate that the cumulative effect of the proposed development, will not increase the base flood elevation (a Final Drainage Study). In addition, work proposed within 300 feet of a Floodway (i.e., Kern River Channel) as designated by the Central Valley Flood Protection Board (CVFPB) will need to meet state standards and apply for an encroachment easement.

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BESS	Battery Energy Storage System
CEQA	California Environmental Quality Act
cfs	Cubic feet per second
CVFPB	Central Valley Flood Protection Board
DEM	Digital Elevation Model
FEMA	Federal Emergency Management Agency
fps	Feet per second
KCHM	Kern County Hydrology Manual
HEC-HMS	Hydrologic Engineering Center's Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center's River Analysis System
I-5	Interstate 5
MS4	Municipal Separate Storm Sewer System
NHD	National Hydrography Dataset
NOAA	National Oceanic and Atmospheric Association
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
RWQCBCVR	Regional Water Quality Control Board Central Valley Region

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1 Introduction

1.1 Background

Results from the preliminary hydrology and hydraulics technical study conducted for existing conditions of the Pelicans Jaw Hybrid Solar Project (Project) site are provided in this report (Preliminary Technical Report). The Preliminary Technical Report was prepared for the Project to satisfy California Environmental Quality Act (CEQA) requirements and to identify existing baseline hydrology and hydraulic conditions of the Project site in accordance with the Kern County Hydrology Manual (KCHM). The Preliminary Technical Report was prepared under the supervision of Kipp Vilker, a licensed professional engineer (CA PE No. 90011) and Jonathan Martin (Appendix A).

Two analyses were conducted for the Project site: one analyzing the hydraulics of the Kern River Channel (utilizing the existing 100-year design flow for the channel), and the second analyzing the hydrology and hydraulics associated with a 100-year 24-hour storm event occurring within the local watershed. Peak runoff calculations for the local watershed were performed in accordance with the Unit Hydrograph Method as described in the KCHM. The tools used for the two analyses consisted of ArcGIS (characterize landcover, soils, and delineate contributing watershed), U.S. Army Corps of Engineers Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS) to develop runoff hydrographs for the local watershed, and U.S. Army Corps of Engineers Hydrologic Engineering Center's River Analysis System (HEC-RAS) to evaluate flow depths and velocities within the Project boundary. In addition, the Project was evaluated in the context of water quality standards contained in the Tulare Lake Hydrologic Basin Planning Area (RWQCBCVR 2018). Post-Project hydrologic and hydraulic analyses are not included in this Preliminary Technical Report.

The analyses in this Preliminary Technical Report are preliminary in nature and subject to change should the boundary, site plan, or other components of the Project change. Plans, specifications, and recommendations found within this Technical Report are not approved and are not for construction purposes; contractors shall refer to the final approved construction documents for construction details.

1.2 Project Description

The Project would include up to 500-megawatts of photovoltaic solar generation and a battery energy storage system (BESS) located on approximately 3,371 acres of private property in Kern County, California.

The Project would primarily consist of photovoltaic panels, a single-axis tracker system, inverters and transformers, electrical cabling and communication lines, on-site switchgear, a collector substation, generation interconnection (gen-tie) line, access roads, security fence, an operations and maintenance facility, and a supervisory control and data acquisition system. The Project would also include a Pacific Gas and Electric (PG&E) switching station that would interconnect with the existing PG&E 230-kilovolt overhead transmission lines that traverse the Project site.

An integrated BESS would be constructed within a portion of the Project site to store energy produced from the Project or other resources during low demand times and release the energy during high demand times. The batteries would be installed in racks that are housed in outdoor BESS enclosures that would be accessed from the outside via cabinet doors for maintenance needs. The Project area containing the battery enclosures would encompass no more than 100 acres.

2 Environmental Setting

The Project site is located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 (I-5) located approximately two miles to the west (Figure 1). The Project is situated within portions of Sections 4, 5, 6, 8, 9, 15, 16, and 22 of Township 25 South, Range 21 East, San Bernardino Base and Meridian. The Project site is generally bordered by Twisselman Road to the south, Lost Hills Road to the east, Kern and Kings County line to the north, and I-5 to the west.

The Project site is located west of the Kern River Channel and south of the Kern County and Kings County border. The topography is characterized by an overall slope to the east/northeast. The Project site and surrounding properties are currently vacant and have been used for cattle and sheep grazing over the past 10 years. No crop cultivation has occurred within the last 10 years on Project site, between the years 2012 and 2022.

2.1 Surface Water Hydrology

According to the Central Valley Region Regional Water Quality Control Board, the Project site falls within the Antelope Plain Hydrologic Area (HA; 558.60) which is located within the South Valley Floor Hydrologic Unit (HU; 558) of the Central Valley Region (RWQCB 1986). These watersheds are used as a way to identify beneficial uses and associated water quality objectives in the Tulare Lake Basin Plan (RWQCBCVR 2018). Figure 2a shows the Project site within the context of the RWQCB HU and HA. The Project area is approximately 0.006% of the area encompassed by the affected HA.

The USGS Watershed Boundary Dataset indicates the Project site is encompassed by three subwatersheds within the 234 square-mile Antelope Plain watershed within the Tulare Lake Bed subbasin. The subbasin, watershed, and subwatersheds, which are identified by a Hydrologic Unit Code (HUC), are identified in Table 1 along with the size and the estimated project area contribution to the drainage feature based on size. Figure 2b shows the Project site within the context of the USGS Watershed Boundary Dataset.

Table 1. Project Contribution to Hydrologic Subarea

HUC Digit / HUC	Name	Analysis Scale	Area (Sq. Mi.)	Approximate Proposed Project Area (Sq. Mi.)	Estimated Project Contribution (Percent)
8/18030012	Tulare Lake Bed	Subbasin	3,787	5.1	0.13%
10/1803001215	Antelope Plain	Watershed	234	5.1	2.18%
12/180300121504	Town of Lost Hills	Subwatershed	51	0.6	1.18%
12/180300121505	—	Subwatershed	43	2.8	6.51%
12/180300121506	—	Subwatershed	38	1.7	4.47%

Source: USGS 2022a.
Note: Sq. Mi. = Square Miles

The region's hydrology is shaped by the infrequent rainfall events (approximately 6.4 inches annually, with three quarters of this amount falling between December and March; NOAA 2022). Normally all native surface water supplies, imported water supplies, and direct precipitation percolate into valley ground water if not lost through consumptive use, evapotranspiration, or evaporation (RWQCB 2018).

Hydrology on the Project site is manipulated through the presence of inactive irrigation ditches that also drain expansive upland flats that were previously utilized for agriculture. The majority of the ditches are isolated with closed gates and culverts clogged by sediment, as observed during a June 3, 2022 site reconnaissance. Flow exceeding their storage capacity would enter the Kern River Channel which flows north to the Tulare Lake Basin. Many culverts and irrigation gates exist between ditch endpoints.

The ditches on the northeastern edge of the Project site are likely associated with the Kern River Flood Canal and appear to connect to the historical Tulare Lake area to the north and showed evidence of recent use. These ditches are likely actively conveying water south to north beyond the boundaries of the site. Regardless, all ditches on the site appear to receive runoff from upland portions of the site and likely remain inundated for extended periods of time.

There are several areas outside of the ditches on the Project site that appeared to be subject to seasonal ponding and inundation as well, but these are limited to small depressions, road ruts and generally unvegetated disturbed areas with evidence of cattle grazing. These areas showed clear indicators of wetland hydrology in the form of well-defined surface soil cracking (Dudek 2022a, see seasonal wetland features in Figure 3).

The National Hydrography Dataset (NHD) is maintained by the United States Geological Service (USGS) for the purpose of portraying surface waters on a national scale. The NHD is maintained at a broad nationwide level to represent features, such as rivers, streams, canals, lakes, ponds, coastlines, dams, and stream gages. Due to its scale, the NHD provides only an estimate of the waterbodies, is not comprehensive, and may not be accurate. The United States Fish and Wildlife Service (USFWS) maintains the National Wetlands Inventory (NWI) and the NWI Wetlands Mapper, which provide access to wetland data on a national scale. The USFWS created NWI maps by analyzing remote-sensing data and aerial imagery and by drawing polygons around areas that appear to have wetland signatures. Similar to the NHD, the NWI maps are reconnaissance-level information and not a comprehensive database of wetlands. The USFWS NWI Mapper shows a series of riverine features flowing throughout the site while the NHD displays a series of canal/ditch features flowing through the site (Figure 3).

An aquatic resources delineation report was prepared in accordance with the U.S. Army Corps of Engineers Wetland Delineation Manual, the Regional Supplement to the Wetland Delineation Manual: Arid West Region, and the Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region (Dudek 2022a). Dudek conducted field delineations in December 2020 and September 2022 to identify aquatic resources in an approximately 3,371-acre review area potentially subject to agency jurisdiction pursuant to regulations in Section 404 of the Clean Water Act (CWA). The aquatic features identified differ from those identified by the NHD the NWI maps. Table 1 and Figure 6 of the aquatic resources delineation report summarize the findings of the investigation (Dudek 2022a).

The Kern River Channel (Figure 3) is a south-to-north flowing river located between 0 and 2,400 feet east of the Project site. This section of the river only sees flow during flood events typically generated east in the Sierras above Bakersfield (in the headwaters) either through intense rainfall events or periods of above-average snowmelt-runoff.

The Kern River Channel parallels the northeastern section of the Project boundary, after which it flows through the Hacienda Spillway before discharging into the enclosed Tulare Lake (Dudek 2022a).

An important surface water feature, the Kern National Wildlife Refuge (KNWR) is located approximately 2.5 miles to the northeast of the Project site. Established in 1960, habitats within the KNWR consist of:

- Seasonal Wetlands of which a significant portion are irrigated via deliveries from the Central Valley Project (CVP);
- Moist Soil Units are wetland habitats that are divided into irrigated and seasonal units;
- Seasonal Marsh are areas within the KNWR that maintain water depths of between 4 feet and a few inches and do not typically receive summer irrigation;
- Riparian Areas are located along former or seasonal stream courses within the KNWR; and
- Upland Areas are drier and are not irrigated during the summer and rely solely on precipitation as their source of water. Upland areas within the KNWR are generally closed to the public and are located in the northeast and northwest portions of the refuge.

2.2 Flood Zones

Federal Emergency Management Agency (FEMA) Flood insurance Rate Maps (FIRM) identify Special Flood Hazard Areas (SFHA) that are susceptible to 100-year floods, these areas are labeled as Zone A, AE, AH, AO, AR, A99, V or VE. Approximately 2,061 acres of the Project site are encompassed by FEMA flood zone A as identified in FIRM panels 06029C0125E and 06029C0650E (FEMA 2008). Flood zone A in this location has no detailed hydraulic analysis and no base flood elevation information available. The 100-year flood zone is depicted on Figure 4.

The California Department of Water Resources (DWR) developed the Best Available Maps (BAM) which display floodplains and designated floodway data. According to the BAM, the design flow for the segment of the Kern River Flood Canal (Figure 3) adjacent to the Project site is estimated to be 9,000 to 11,000 cubic feet per second (cfs; DWR 2022). This flow, which is for informational purposes only, is for a 100-year storm frequency.

2.3 Groundwater

Groundwater from one or more new and/or rehabilitated on-site wells is the primary proposed source of water for the construction and operational phases of the Project. The Project site is located in the northwestern part of the San Joaquin Valley – Kern County Groundwater Subbasin (SJVKCGS or Subbasin) (California Department of Water Resources [DWR] Basin no. 5-022.14) is a 1,945,000-acre subbasin located within the southernmost portion of the Tulare Lake Hydrologic Region of the San Joaquin River Basin of the SJVKCGS. As discussed in further detail in the Water Supply Assessment for the Pelicans Jaw Hybrid Solar Project, the Project has enough water, through use of on-site groundwater, import of water from the Buena Vista Water Storage District, use of the Lost Hills Utility District metered hydrant, and/or commercial water hauler to support both the construction and O&M demands of the project over the next 20 years, even in multiple dry-year conditions (Dudek 2022b).

2.4 Beneficial Uses for Surface and Groundwater

California Water Code Section 13050(f) describes the beneficial uses of surface and ground waters that may be designated by the State Water Resources Control Board or Regional Water Quality Control Board for protection as follows:

> Beneficial uses of the waters of the state that may be protected against quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

To comply with the California Water Code and the federal Clean Water Act, surface waters downstream of the Project have been assigned the following beneficial uses in the Water Quality Control Plan for the Tulare Lake Basin as shown in Table 2.

Table 2. Surface Water Beneficial Uses

Stream	Hydrologic Unit Basin Number	Beneficial Use										
		MUN	AGR	IND	PRO	POW	REC-1	REC-2	WARM	WILD	RARE	GWR
Kern River – Below KR-1[a]	558	●	●	●	●	●	●	●	●	●	●	●

[a] Southern California Edison Kern River Powerhouse No. 1

● Existing beneficial uses.

According to the Tulare Lake Basin Plan, the Project site lies within the Kern County Basin Hydrologic Unit, specifically Detailed Analysis Unit (DAU) 255. To comply with the California Water Code and the federal Clean Water Act, groundwater within the Project area has been assigned the following beneficial uses in the Water Quality Control Plan for the Tulare Lake Basin as shown in Table 3.

Table 3. Groundwater Water Beneficial Uses

Hydrologic Unit	Detailed Analysis Unit	Beneficial Use			
		MUN	AGR	IND	WILD
Kern County Basin	255	●	●	●	●

● Existing beneficial uses.

Definitions of the beneficial uses mentioned in Tables 2 and 3 are as follows:

Municipal and Domestic Supply (MUN) – Includes uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Agricultural Supply (AGR) – Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support vegetation for range grazing.

Industrial Service Supply (IND) –Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization.

Industrial Process Supply (PRO) –Uses of water for industrial activities that depend primarily on water quality.

Hydropower Generation (POW) –Uses of water for hydropower generation.

Water Contact Recreation (REC-1) – Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-contact Water Recreation (REC-2) – Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Warm Freshwater Habitat (WARM) – Uses of water that support reproduction and early development of warm water fish.

Wildlife Habitat (WILD) – Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Rare, Threatened, or Endangered Species (RARE) – Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal laws as rare, threatened, or endangered.

Groundwater Recharge (GWR) – Uses of water for natural or artificial maintenance of surface water quantity or quality.

2.5 303 (d) Listed Impaired Water Bodies

Run-on and runoff from the proposed Project will discharge to the Kern River Channel which is not listed as an impaired waterbody according to the 2018 Integrated Report (Clean Water Act Sections 305(b) and 303(d)) published by the State Water Resources Control Board (SWRCB 2020). As discussed in Section 2.1 there are no downstream tributaries of the Project site, hence no impaired water bodies downstream of the site.

3 Regulatory Setting

3.1 Federal

3.1.1 Clean Water Act

The Clean Water Act (CWA) (33 U.S. Code Section 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of waters of the United States. The CWA required states to set standards to protect, maintain, and restore water quality through the regulation of point-source and certain nonpoint-source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCBs).

Section 401, Water Quality Certification. Section 401 of the CWA requires that, prior to issuance of any federal permit or license, any activity, including river or stream crossings during road, pipeline, or transmission line construction, that may result in discharges into waters of the United States must be certified by the state, as administered by the RWQCB. This certification ensures that the proposed activity does not violate state and/or federal water quality standards.

Section 402, National Pollutant Discharge Elimination System. Section 402 of the CWA authorizes the State Water Resources Control Board (SWRCB) to issue a NPDES General Construction Storm Water Permit (Water Quality Order 2009-0009-DWQ), referred to as the "Construction General Permit." On September 8, 2022, the SWRCB adopted a new Construction General Permit (Water Quality Order 2022-0057-DWQ) which becomes effective on September 1, 2023. Depending on the construction timelines, construction activities can comply with and be covered under the applicable Construction General Permit provided that they do the following:

1. Develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that specifies best management practices (BMPs) that will prevent all construction pollutants from contacting stormwater and with the intent of keeping all products of erosion from moving off site into receiving waters.
2. Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the United States.
3. Perform inspections of all BMPs.

NPDES regulations are administered by the RWQCBCVR. Projects that disturb 1 or more acres, including the proposed Project, are required to obtain NPDES coverage under the Construction General Permit.

Section 404, Discharge of Dredged or Fill Materials. Section 404 of the CWA establishes programs to regulate the discharge of dredged and fill material in waters of the United States, including wetlands. For purposes of Section 404 of the CWA, the limits of non-tidal waters extend to the ordinary high-water mark, defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics, such as a natural line impressed on the bank, changes in the character of the soil, and presence of debris. When an application for a Section 404 permit is made, the applicant must show it has done the following:

- Taken steps to avoid impacts to wetlands or waters of the United States, where practicable

- Minimized unavoidable impacts to waters of the United States and wetlands
- Provided mitigation for unavoidable impacts

Section 404 of the CWA requires a permit for construction activities involving placement of any kind of fill material into waters of the United States or wetlands. A water quality certification pursuant to Section 401 of the CWA is required for Section 404 permit actions. If applicable, construction would also require a request for water quality certification (or waiver thereof) from the Central Valley RWQCB. Project activities would adhere to state and federal water quality standards, and would be in compliance with Sections 401 and 404 of the CWA.

3.1.2 National Flood Insurance Act

FEMA is responsible for managing the National Flood Insurance Program, which makes federally backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The National Flood Insurance Program, established in 1968 under the National Flood Insurance Act, requires that participating communities adopt certain minimum floodplain management standards, including restrictions on new development in designated floodways, a requirement that new structures in the 100-year flood zone be elevated to or above the 100-year flood level (known as base flood elevation), and a requirement that subdivisions be designed to minimize exposure to flood hazards.

To facilitate identifying areas with flood potential, FEMA has developed Flood Insurance Rate Maps that can be used for planning purposes, including floodplain management, flood insurance, and enforcement of mandatory flood insurance purchase requirements. The County of Kern is a participating jurisdiction in the National Flood Insurance Program and, therefore, all new development must comply with the minimum requirements of the National Flood Insurance Program set forth in Title 44 Code of Regulations Part 60, *Criteria for Land Management and Use* and implemented via the County of Kern's Floodplain Management Ordinance.

3.2 State

3.2.1 Department of Water Resources

The major responsibilities of DWR include preparing and updating the California Water Plan to guide development and management of the state's water resources; planning, designing, constructing, operating, and maintaining the State Water Resources Development System; regulating dams; providing flood protection; assisting in emergency management to safeguard life and property; educating the public; and serving local water needs by providing technical assistance. In addition, DWR cooperates with local agencies on water resources investigations; supports watershed and river restoration programs; encourages water conservation; explores conjunctive use of groundwater and surface water; facilitates voluntary water transfers; and, when needed, operates a state drought water bank.

DWR identified the Kern River as a designated floodway. The CVFPB requires projects built inside or 30 feet from a designated floodway, such as the Kern River, to procure an encroachment permit. An encroachment permit may also be required if a project is within 300 feet of a designated floodway if it is determined that the project could have negative flood control impacts. The CVFPB is the regional state regulatory agency for the Central Valley floodways who is responsible for construction, maintenance, and protection of the central valley flood control system. The Project will need to demonstrate compliance with California Code of Regulations Title 23. Chapter 1, Article 8 standards for development within the 300-foot buffer of the designated floodway.

3.2.2 Streambed Alteration Agreement (California Fish and Game Code)

Section 1602 of the California Fish and Game Code protects the natural flow, bed, channel, and bank of any river, stream, or lake designated by the California Department of Fish and Wildlife (CDFW) in which there is, at any time, any existing fish or wildlife resources, or benefit for the resources. Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state, and requires any person, state or local governmental agency, or public utility to notify CDFW before beginning any activity that will do any of the following:

- Substantially divert or obstruct the natural flow of any river, stream or lake
- Substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake

During final engineering and design of a project, if it is determined that any project-related actions would have the potential to necessitate a Streambed Alteration Agreement, such an agreement would be prepared and implemented prior to construction of the project, thus maintaining compliance with Section 1602 of the California Fish and Game Code. A Streambed Alteration Agreement is required if CDFW determines that the activity could substantially adversely affect an existing fish and wildlife resource. The agreement includes measures to protect fish and wildlife resources while conducting the project.

3.2.4 NPDES Permit for MS4

The RWQCBCVR Order R5-2016-0040 NPDES is a General Permit for discharges from Municipal Separate Storm Sewer System (MS4s) in Kern County. The permit requires each permittee to implement programs to control and reduce the discharge of pollutants in storm water from new development.

3.3 Local

3.3.1 Kern County General Plan

The Kern County General Plan (County of Kern 2009) contains policies, goals, and implementation measures that are more general in nature and not specific to development, such as the Project.

3.3.2 Kern County Floodplain Management Ordinance (17.48)

Any construction that takes place within areas of special flood hazards, areas of flood-related erosion hazards, and areas of mudslide hazards within the jurisdiction of unincorporated Kern County will comply with the requirements and construction design specifications of this ordinance. A development permit shall be obtained before any construction or other development begins within any area of special flood hazards, areas of flood-related erosion hazards, or areas of mudslide. Sections 17.48.250 through 17.48.350 of the ordinances elaborate on the standards of construction in the special flood hazards area.

As stated in Section 17.48.270, nonresidential construction shall:

- Be flood proofed one (1) foot above the base flood level so that the structure is watertight with walls substantially impermeable to the passage of water;
- Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and
- Be certified by a registered professional engineer or architect.

4 Project Hydrology Analysis

The hydrology analysis for the Project's local watershed (Figure 2b) was conducted following KCHM unit hydrograph methodology in order to calculate the peak flow for the 100-year 24-hour storm event. Hydrology study methods are provided in detail in Section 4.1, followed by results for the existing conditions.

4.1 Methodology

Peak discharge resultant from the 100-year 24-hour rainfall event was calculated for the Project site's concentration point[1] using the unit hydrograph method as defined in the KCHM. Drainage design specifications established in Section E.2 of the KCHM (County of Kern n.d.) require that projects with watershed areas greater than 640 acres have their peak flows calculated using the unit hydrograph method. The total discharge volume for a given rainfall event is calculated using the curve number method from the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) (County of Kern n.d., Section C). The total discharge volume is then distributed temporally using a County-provided S-graph (County of Kern n.d., Figure E-3d) and a watershed-specific lag time (County of Kern n.d., Equation E.2) in the U.S. Army Corps of Engineers' HEC-HMS. The HEC-HMS "User Specified S-Graph" transformation produces a runoff hydrograph by first calculating each time-step's total runoff (based on effective rainfall and basin area), and then temporally distributes discharge based on basin lag-time and the County-provided S-Graph. This results in a final runoff hydrograph that provides a peak-discharge value in cfs.

4.1.1 Watershed Delineation and Topography

The Project's local watershed (including areas contributing run-on) is comprised of a complicated network of irrigation channels, levees, gates and culverts. This part of the Central Valley utilizes gates across irrigation channels to impound surface flows and direct them into the fields for flood irrigation (when flow is present). The initial step in defining potential contributing watershed areas to the Project site consisted of review of the existing USGS and RWQCB watershed boundaries (Figures 2a and 2b), NHD flowlines and wetland delineations (Figure 3), and FEMA floodplain zones. Flow originating within the upper Antelope Plain watershed (Figure 2b) is captured within the oil and gas fields west of Lost Hills, or impounded along the State Aqueduct (DWR, 2022). Surface flows established between the State Aqueduct and I-5 are conveyed through a network of irrigation canals within active orchards. Based on the condition of the culverts beneath I-5 adjacent the Project boundary, surface flows generated west of I-5 do not reach this area (no visible evidence of scour or deposition at the culverts during October 19, 2022 site visit). Based on this review of hydrologic conditions, the contributing watershed is confined to the area between I-5 and the Project.

Within the Project site, the topography is relatively flat and gradually slopes towards the east and north at an approximate average grade of 0.05%. The elevation at the highest point on the Project site (northwest corner and various spots along the western boundary) is 222 feet above mean sea level and at the lowest point is 210 feet above mean sea level. The existing topography of the Project site and its surroundings is presented in Figure 3

[1] The concentration point is the point at which all flow from the project area discharges downstream. This point also includes upland flow from areas outside the project boundary.

using 10-foot contours lines derived from a USGS 1/3 arc-second (32.8 feet) Digital Elevation Model (DEM) (USGS 2022).

For modeling purposes, the Project's local watershed (Basin 100) was delineated using the Spatial Analyst Extension (SAE) tool in ArcGIS and topographic data from both a site-specific survey (which provided high resolution topography within the Project boundary and in a 1-mile buffer west of the Project boundary) and the 1/3 arc-second USGS DEM (USGS 2022). Due to a three-foot difference between the site-specific survey and the USGS DEM at the northern boundary, the entire USGS DEM was altered by uniformly reducing elevation by 3 feet; this was primarily to assist with establishing downstream hydraulic controls for the later hydraulic analyses.

Basin 100 encompasses 7,410 acres and is bounded on the west by the I-5 freeway (the basin boundary extends into the west meridian of I-5 to capture all runoff generated along the interstate). The hydrological activity in Basin 100 is characterized by a series of ditches built for agricultural purposes which generally convey flow to the northeast towards the concentration point. Directly downstream of the concentration point is the Kern River Channel, which is discussed in Section 2.1. The Basin 100 boundary and concentration point are shown in Figure 5.

4.1.2 Existing Hydrologic Soil Groups and Land Use

The two components required for developing a basin's curve number are the spatial distribution of the basin's soils and land cover. Figure C-2 of the KCHM (County of Kern, n.d.) provides a table linking soil hydrologic group types with land cover types and was used in developing weighted curve numbers for Basin 100.

Soils are classified by NRCS (USDA 2022) into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soil Groups are A, B, C and D. Group A generally has the smallest runoff potential and Group D the greatest. The Hydrologic Soil Groups are defined as follows:

- **Group A.** Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
- **Group B.** Soils having a moderate infiltration rate when thoroughly wet. These consist primarily of moderately deep or deep, moderately well-drained or well-drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- **Group C.** Soils having a slow infiltration rate when thoroughly wet. These consist mostly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
- **Group D.** Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist largely of clays that have a high shrink–swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

All soils within Basin 100 and the Project area are in Hydrologic Soil group D (Appendix B).

The land uses for each project basin were characterized using the 2019 National Land Cover Database (NLCD 2022). These land cover classifications were then converted to match the descriptions in Figure C-2 of the KCHM

(e.g., shrub/scrub = open brush; County of Kern n.d.). The dominant land cover for Basin 100 is defined as cultivated crops by NLCD which can be converted to pasture as defined by the KCHM. Basin 100 has a low percentage of impervious surfaces (0.01%). A land cover map can be found in Figure 5.

The existing condition basin curve number is provided in Table 4.

Table 4. Basin Losses

Basin	Curve Number	Runoff Yield Fraction	Low Loss Fraction	Area-Weighted Maximum Loss Rate (in/hr; Fm)
Basin 100	84	0.52	0.48	0.30

Notes: in/hr = inches per hour, Fm = maximum loss rate

4.1.3 Basin Losses and Design Rainfall Event

Per the KCHM, basin discharge is modeled using "effective rainfall," or the fraction of precipitation that becomes surface flow (County of Kern n.d.). To calculate effective rainfall, "losses" (i.e., precipitation that infiltrates the soil rather than being converted to surface flow) are subtracted from the design 24-hour storm depth. Losses are calculated using the infiltration properties of soil and land cover in a basin.

Basin 100's hydrologic soil groups (USDA 2022) and land cover types (NLCD 2022) are assigned area-weighted curve numbers following the NRCS methodology established in the KCHM. A Level II Antecedent Moisture Condition was used in developing the curve number for the basin; this is a conservative approach, as it assumes soil moisture content is near field capacity, which is infrequent in this arid region. Low loss rates (F*, a loss rate proportional to rainfall intensity) and maximum loss rates (Fm, which the calculated loss rates may not exceed) are then calculated and applied to each time increment in the Basin 100's design rainfall event to create a hyetograph of only effective rainfall. The area-weighted component for calculating existing condition losses of Basin 100 is 0.30 inches per hour.

The development of a design rainfall event for an individual basin incorporates information from isohyetal maps, the basin area, and a critical storm pattern specified in the KCHM. First, the 100-year 24-hour total rainfall depth was identified at the centroid of each basin with the National Oceanic and Atmospheric Administration's Atlas-14 Point Precipitation Frequency Estimates (Appendix C, Project Basin Rainfall Depths/Frequencies – NOAA Atlas 14) (NOAA 2022).

Second, per the KCHM, point precipitation values must be adjusted to account for area as watersheds increase in size. This depth-area adjusted 100-year 24-hour rainfall event was created following KCHM's protocol (County of Kern n.d., Figures E-4 and E-5). Area-averaged rainfall depths for each basin are provided in Table 5.

Table 5. NOAA Atlas-14 Rainfall Depths and Depth-Area Adjusted Depths 100-Year Rainfall Event

Basin	NOAA Atlas-14 Rainfall Depth (in) Storm Duration						Depth-Area Adjusted Rainfall Depth (in) Storm Duration					
	5-min	30-min	1-hr	3-hr	6-hr	24-hr	5-min	30-min	1-hr	3-hr	6-hr	24-hr
100	0.26	0.61	0.86	1.42	1.90	3.18	0.18	0.42	0.59	1.33	1.85	3.13

Source: NOAA 2022.
Notes: NOAA = National Oceanic and Atmospheric Administration; in = inches; min = minute; hr = hour.

Third, this total volume is distributed across a synthetic 24-hour critical storm pattern (County of Kern n.d., Figure E-5) to create a rainfall hyetograph. Lastly, basin losses (Table 4) are subtracted from the total rainfall to create a rainfall hyetograph consisting only of effective rainfall (County of Kern n.d., Section E.7). The final design rainfall event for Basin 100 is then loaded into the HEC-HMS model as time-series data.

4.1.4 Lag Time and S Graph

The remaining components required for developing Basin 100's unit hydrograph is lag and summation hydrographs with time expressed as percent of lag (S-Graphs). Lag was calculated for the basin using the KCHM's equation E.2, which used watershed slope, shape, longest flow path length (both total length and length from the watershed centroid), and basin factor as defined in Figure E-2 of the KCHM (a basin factor of 0.030 was assigned to Basin 100). The lag-time for Basin 100 was calculated to be 1.15 hours (Appendix D).

Lastly, the KCHM provides five previously developed S-Graphs for regions within Kern County. The S-Graph developed for the Undeveloped Region (County of Kern n.d., Figure E-3a) was used for this study.

Along with basin area, these components are used to define each basin in the HEC-HMS model. Runoff hydrographs were developed within HEC-HMS using these basin attributes with user-specified S-Graph transformation and the design rainfall event time-series discussed previously.

4.2 Model Results

Total 100-year 24-hour rainfall event peak discharge and runoff volume modeled at Basin 100's concentration point was 2,953 cfs and 1,101 acre-feet, respectively. Hydrologic modeling results are included in Appendix E, HEC-HMS hydrographs.

5 Project Hydraulic Analysis

Hydraulic modeling was performed using HEC-RAS software (version 6.2) to model maximum flow depths and velocities for different scenarios under existing site conditions. All culverts and gates connecting drainages through the Project site and surrounding areas were treated as barriers in all scenarios. The only hydrologic control included in the hydraulic model is topography. Two scenarios were modeled:

- Basin 100: 100-year, 24-hour Storm Event
- Kern River Flood Zone A: 100-year Flood Event

5.1 Basin 100 Hydraulic Model Discussion and Results

An unsteady flow analysis was used to model the conditions of the 100-year, 24-hour storm within the Basin 100 boundary. Delineation of the Basin 100 boundary is discussed in Section 4.1.1. The topographic data used is a mosaic of the detailed survey area and the 10-meter DEM discussed in Section 4.1.1. A flow area computational mesh was generated using cells of 60-feet by 60-feet. Additional break lines were added to better define the ditch drainage features. A Manning's value of 0.03 was assigned to the computational mesh.

The flow hydrograph of the 100-year, 24-hour storm discussed in Section 4 was applied as an inflow boundary condition along the southern and western boundary of Basin 100, while the concentration point in the northeastern corner of Basin 100 serves as the outflow. The application of the flow hydrograph calculated at the concentration point being applied at the southern and western boundaries makes this a conservative model. The Diffusion Wave method was used to solve for the flow moving over the computation mesh using a 30-second computation interval.

Approximately 1,791 acres of the Project site (54%) become inundated in this scenario. Flow is primarily conveyed through the ditches which fill up entirely and overtop into some of the agricultural areas. Maximum flood depths in the agricultural areas are generally at or below 1 foot and maximum velocities are generally at or below 1 foot per second (fps). Modeling results indicate that maximum water depths and velocities in the ditches reach approximately 8 feet and 20 fps, respectively. Maximum flood depths and maximum flow velocities can be found in Figures 6 and 7.

5.2 Kern River Flood Zone A Model Discussion and Results

An unsteady flow analysis was used to model the conditions within the Kern River Channel floodplain during the 100-year flood event. The model boundaries were defined as follows:

Inflow Boundary: The entire extent of the 100-year flood for the Kern River Channel approximately 1,000 feet south of Twisselman Road
Eastern Boundary: Combined use of FEMA's 100-year flood zone and a road/levee identified that runs north-south beginning approximately 1-mile east of the intersection between Twisselman Road and Lost Hills Road.
Western Boundary: I-5

Outflow Boundary: A 6-mile stretch beginning at I-5 and running perpendicular to the Kern River Channel's flood plain located approximately 400 feet north from the Project boundary

The topographic data used are a mosaic of the detailed survey area and the USGS DEM discussed in Section 4.1.1. A flow area computational mesh was generated using cells of 60-feet by 60-feet. A 15-foot by 15-foot refinement region and break lines were developed around the Kern Channel to channelize the flow of water. Manning's value was assigned to the mesh based on the 2019 National Land Cover Database Land Cover classification (NLCD 2022), this allowed for spatial variation in Manning's n.

A triangular 24-hour flow hydrograph with a peak flow of 11,000 cfs (Appendix F) was used as in inflow boundary condition at a cross-section of the Kern River approximately 2,000 feet upstream (south) of the Project site. A cross-section along the Kern River at the northern end of the Project serves as the outflow. The Diffusion Wave method was used to solve for the flow moving over the computation mesh using a 6-second computation interval.

Approximately 2,337 acres of the Project site (71%) become inundated in this scenario. Flow is primarily conveyed through the Kern River and spills over onto the Project site. The northeastern portion of the Project site experiences the largest flood depths and velocities reaching up to 4.3 feet and 5.4 fps, respectively. Average flow depth and velocities reached during the maximum modelled flow were 1.78 feet and 0.86 fps. Maximum flood depth and maximum flow velocities can be found in Figures 8 and 9.

5.3 Combined Scenarios Model Discussion and Results

The two scenarios were evaluated concurrently to identify the maximum flood depth and velocities resultant from either of the events. Figures 10 and 11 show the maximum flood depths and velocities, respectively, between the two scenarios throughout the modeled area. Approximately 2,567, acres of the Project site (78%) becomes inundated in this scenario.

6 Design Considerations

Because a portion of the Project site is within a SFHA, the Project must comply with the Kern County municipal code and a development permit must be obtained from Kern County before any construction or development begins within any SFHA. Per initial discussions with Kern County (November 15, 2022), CVFPB has primary jurisdiction over work conducted within 300-feet of the Designated Floodways. Work conducted within that 300-foot buffer zone will need to meet State Title 23 Standards and attain an encroachment permit from CVFPB. Design criteria for both the county and state will include minimum freeboard for Project infrastructure within the flood zones, secured footings (e.g. solar panel and fence posts), proper alignment of infrastructure (i.e. parallel to flow), and maximization of infrastructure efficiency.

A Final Drainage Study is required to establish the base flood elevation for the Project site. For development activities proposed to be located in the SFHA, there must be hydrologic and hydraulic analyses completed that demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated flood hazard area encroachments, will not increase the base flood elevation more than one foot at any point within the community (Kern County 2022).

Once final site and grading design is established, a hydrological analysis should be completed in accordance with the Kern County guidelines. Due to the introduction of impervious surfaces such as concrete pads and access roads, erosion or siltation could potentially occur on the Project site or downstream. Hence, a Post Construction Stormwater Management Program, which includes low impact development (LID) design standards, may be required for this Project.

Infrastructure within the floodplain area should be designed to withstand flood flows. If solar panel posts and inverter pads are located within the SFHA, a minimum of one foot of freeboard clearance is recommended between the bottom of the inverter pads and the base flood elevation. The required freeboard increases to two feet inside the 300-foot buffer as required by the CVFPB. Scour potential exists at the Project site and local scour could occur on the solar panel posts. Scour was not evaluated as part of this Preliminary Technical Report but should be considered once the final site design has been established.

Additional Best Management Practices (BMPs) should be adopted by the Project to ensure stormwater discharges meet NPDES requirements (Order R5-2016-0040) in order for the Project to comply with the Federal Clean Water Act. Stormwater and pollution control measures provided below (Table 6) are intended to meet Clean Water Act objectives during the long-term operation of the Project. The potential pollutants related to the Project's long-term operation can be managed through site design, BMPs, and LID measures. The measures provided in Table 6 are referenced from the California Department of Transportation (Caltrans) Treatment BMP Technology Report (2010) and are recommended based on the preliminary project plans. A SWPPP will be required to cover project-related construction activities.

Table 6. Recommended Project BMPs

Type of BMP	Design Concept	Description Applicable to the Proposed Project
Source Control BMPs	Non-Stormwater Discharge Controls	• **Solar Panel and Equipment Washing:** When the use of wet methods or acid-based solvents are required for equipment cleaning, direct application techniques will be used to limit non-stormwater discharges and other potential impacts to the drainage area.
	Good Housekeeping	• **Site Maintenance:** Recurring site inspections will be established to identify potential maintenance needs. • **Material Storage:** The collection or stockpiling of project materials/debris will need to take place within a secure facility that eliminates the exposure and transport of potential pollutants. If hazardous materials are involved, this will require the implementation of a secondary containment system.
	Non-Toxic Roofing Materials	Building materials that do not require toxic materials for weatherproofing (e.g., tar) will be used where possible.
LID Measures	Native Trees/Shrubs	Native vegetation can be incorporated across the proposed project site to reduce the peak hydrograph through rainfall interception. This can consist of low-lying groundcover that would not interfere with solar panel operations.
	Minimization of Impervious Footprint	Impermeable surfaces will be reduced through efficient site design.
	Construction Considerations	Soil compaction will be minimized (e.g., through the use of large treads, mow and roll grading), the site will be graded to promote sheet flow/preclude concentrated flows.
	Maintenance of Natural Drainage Patterns and Avoidance of Flood Flow Interference	Perimeter fencing will be designed in a manner that does not trap trash and/or debris during flood flows and that allows the free flow of water. Freeboard will be incorporated in all Project infrastructure to meet CVFPB's requirement of 2-feet within the Designated Floodway (Kern River Channel) and Kern County's requirement of 1-foot within the FEMA 100-year flood zone. Retention basins will be built to meet Kern County's Development Standards (Chapter 8, Section 408-1 of the County's 2010 Development Standards). Lastly, the Final Drainage Study is to confirm no impact to flood stage within the Kern River Channel (per CVFPB requirements).

Source: Caltrans 2010.

Note: BMP = best management practice; LID = low-impact development

7 Impact Analysis

7.1 Method of Analysis

Impacts with respect to hydrology and water quality are assessed by comparing conditions expected under the proposed Project to the existing environmental setting described above. While preliminary Project grading plans were not available for evaluating post-Project hydrology in this Preliminary Technical Report, actions required to implement the County, regional (RWQCB and CVFPB), and state policies related to hydrology and water quality (see Section 3) are considered as components of the Project in the evaluation of impacts. These actions include design standards that will limit Project impacts to flooding, erosion, and water quality.

7.2 Thresholds of Significance

Kern County uses the questions in Appendix G of the CEQA Guidelines as the thresholds of significance for projects requiring environmental review under CEQA (14 CCR 15000 et seq.). Therefore, according to Appendix G, a significant impact would occur if development of the Project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - result in substantial erosion or siltation on or off site;
    - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    - create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    - impede or redirect flood flows.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

7.3 Impact Analysis

Impact HYD-1: Would the project violate water quality standards or waste discharge requirements or degrade surface or ground water quality?

Standard construction management practices, as required through the statewide Construction General Permit, would minimize construction-related impacts on water quality from the Project. For long-term (operational) impacts, the Project is required to adhere to County and State design requirements (e.g., Kern County's NPDES permit and CVFPB's Title 23 Standards) that ensure preservation of site hydrology and water quality. The Project's construction related and long-term impacts on water quality standards and waste discharge requirements would be less than significant.

Impact HYD-2: Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

This impact criterion is outside the scope of this report and is addressed in the project's Water Supply Assessment.

Impact HYD-3: Would the project substantially alter the existing drainage pattern of the site or area through the addition of impervious surfaces resulting in erosion or siltation on- or off-site; increasing the rate or amount of surface runoff resulting in flooding on- or off-site; contributing runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide polluted runoff; or impede or redirect flood flows?

The current site hydrology consists of a series of fallowed agricultural fields separated by large irrigation ditches which are separated by sealed or collapsed/plugged culverts. Surface water that accumulates is typically retained within these fields or irrigation ditches, and would only overtop the berms and reach the Kern River Channel during high-flow (e.g., 100-year) events. This existing hydrologic condition will be preserved in the final Project design through minimal use of impervious surfaces, implementation of on-site retention basins (as required by Kern County), and restrictions on impacts to flood stage in the Kern River Channel (as required by the CVFPB). The Project's impact to surface hydrology (as it would affect erosion, siltation, runoff, or flooding) would be less-than-significant.

Impact HYD-4: Would the project release pollutants during flooding?

All Project infrastructure located within CVFPB's Designated Floodway (Kern River Channel) and FEMA's 100-year flood zone have specific freeboard requirements (excluding fencing, solar panel posts, graded features such as roads and basins, and underground utilities lines). This freeboard requirement will make sure that any inverters/transformer proposed within these areas will be sufficiently elevated above floodwaters and will not release pollutants during flooding. The Final Drainage Study is also required to demonstrate that proposed fencing within the Designated Floodway will not impede debris carried in flood waters (e.g., logs) and serve as a blockage to flow; this additional analysis will be used to guide the Project's final design such that it preserves the Kern River

Channel's banks and minimizes scour within the Project site (which would result in increased sediment transport downstream). The Project's impact to pollutants during flooding would be less-than-significant.

Impact HYD-5: Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

This impact criterion is outside the scope of this report and is addressed in the project's Water Supply Assessment.

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8 References

Caltrans (California Department of Transportation). 2010. *Treatment BMP Technology Report CTSW-RT-09-239.06*. Sacramento, California: Caltrans, Division of Environmental Analysis. April 2010. http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-09-239-06.pdf.

County of Kern, n.d. Kern County Hydrology Manual. Prepared by T.V. Hromadka II. California State University, Fullerton.

Dudek. 2022a. Aquatic Resources Delineation Report. Pelicans Jaw Hybrid Solar Project. December 2022.

Dudek. 2022b. Water Supply Assessment for the Pelicans Jaw Hybrid Solar Project. June 2022.

DWR (Department of Water Resources). 2022. Designated Floodways and Regulated Streams Map. Accessed July 2022. https://gis.bam.water.ca.gov/bam/

FEMA (Federal Emergency Management Agency). 2008. Flood Insurance Rate Maps: 06029C0125E and 06029C0650E. Accessed May 2022. https://msc.fema.gov/portal.

FEMA (Federal Emergency Management Agency). 2022. What Should I consider if I choose to Develop in a Floodplain. Accessed July 2022. https://www.fema.gov/floodplain-management/wildlife-conservation/consider-develop

Kern County. 2022. Kern County, California – Code of Ordinances. Accessed July 2022. https://library.municode.com/ca/kern_county/codes/code_of_ordinances?nodeId=TIT17BUCO

NLCD (National Land Cover Database). 2022. MRLC NLCD Viewer. Accessed June, 2022. https://www.mrlc.gov/viewer/.

NOAA (National Oceanic and Atmospheric Administration). 2022. NOAA Online Weather Data. Accessed June 10, 2022. https://www.weather.gov/wrh/climate?wfo=hnx

Regional Water Quality Control Board Central Valley Region (RWQCBCVR). 2018. Water Quality Control Plan for the Tulare Lake Basin Third Edition. Revised May 2018. Accessed May 25, 2022. https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp_201805.pdf

USDA (U.S. Department of Agriculture). 2022. Web Soil Survey. USDA, Natural Resources Conservation Service, Soil Survey Service. Accessed June 2022. https://websoilsurvey.nrcs.usda.gov/.

USGS. 2022b. “Watershed Boundary Dataset” [digital GIS data]. Accessed June 2022. https://apps.nationalmap.gov/viewer/

USGS. 2022c. “Watershed Boundary Dataset” [digital GIS data]. Accessed June 2022. https://apps.nationalmap.gov/viewer/

USGS. 2022d. “Data Download Application”. Accessed May 20, 2022. https://apps.nationalmap.gov/downloader/

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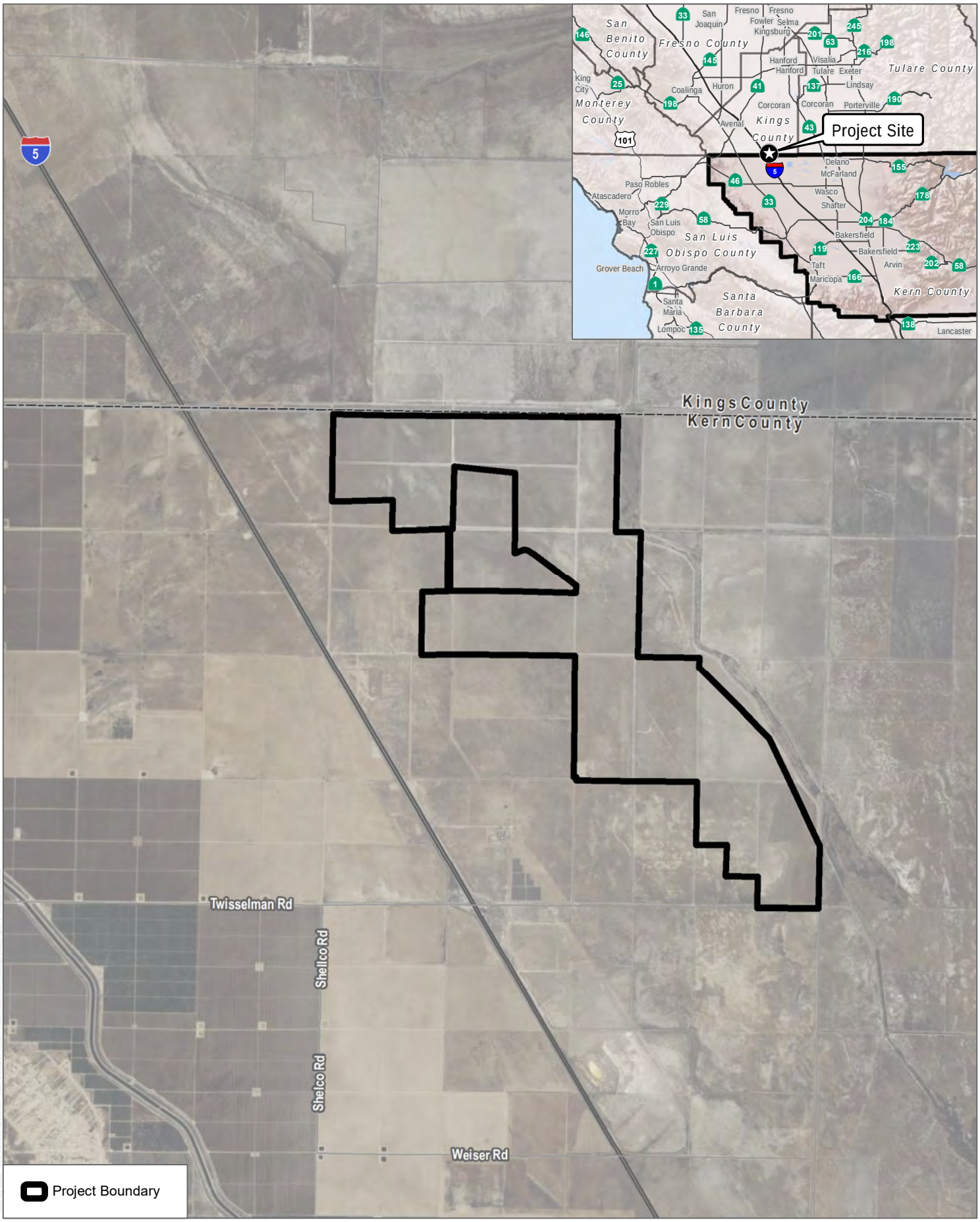

SOURCE: Bing 2022, Open Street Map 2019

FIGURE 1

Project Location

Hydrology and Hydraulic Technical Study - Pelicans Jaw Hybrid Solar Project

DUDEK

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SOURCE: Bing; RWQCB 2018

FIGURE 2A

RWQCB Hydrologic Setting

Hydrology and Hydraulic Technical Study - Pelicans Jaw Hybrid Solar Project

DUDEK

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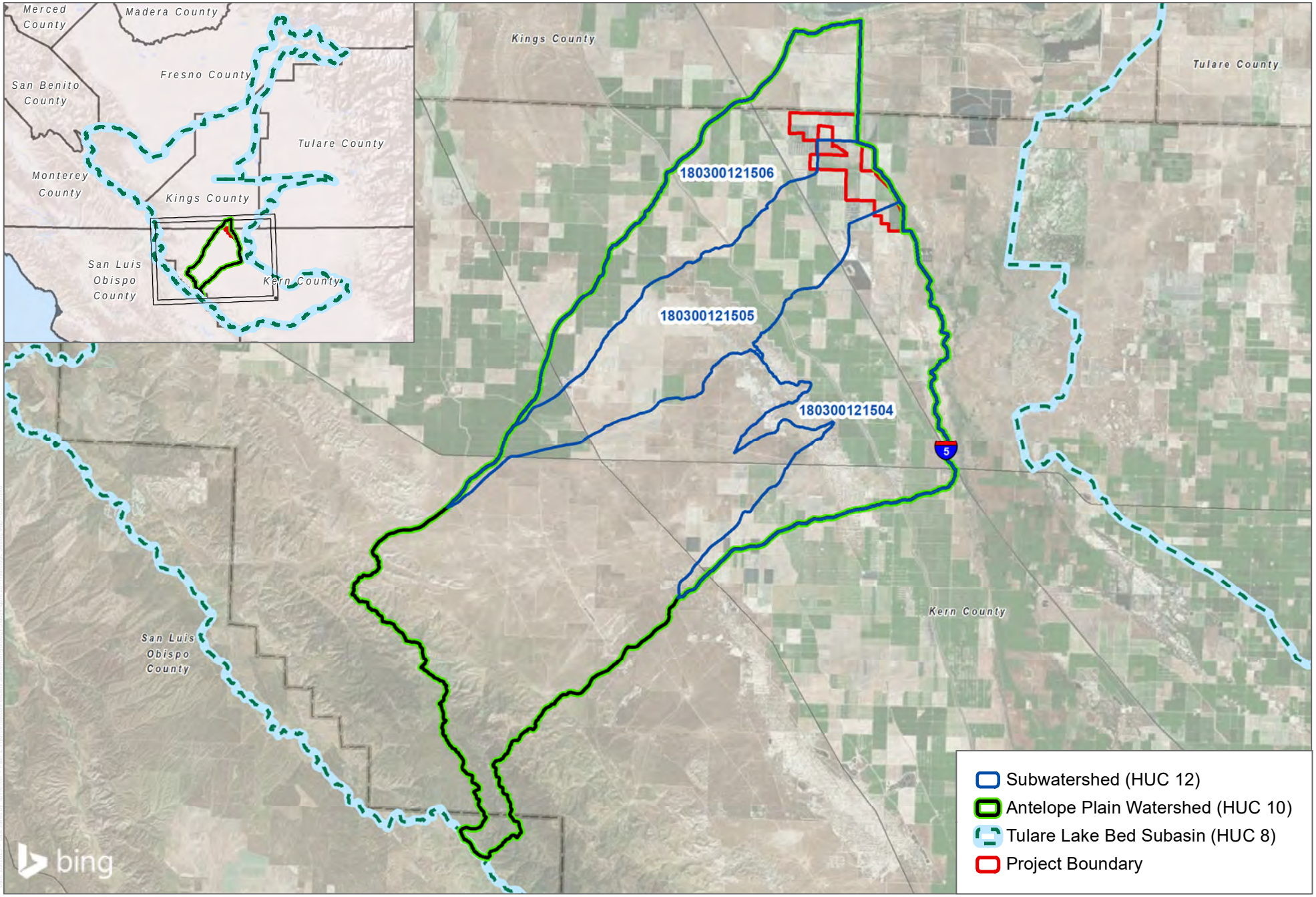

SOURCE: Bing; USGS 2022

DUDEK

0 3.25 6.5 Miles

FIGURE 2B

USGS Hydrologic Setting

Hydrology and Hydraulic Technical Study - Pelicans Jaw Hybrid Solar Project

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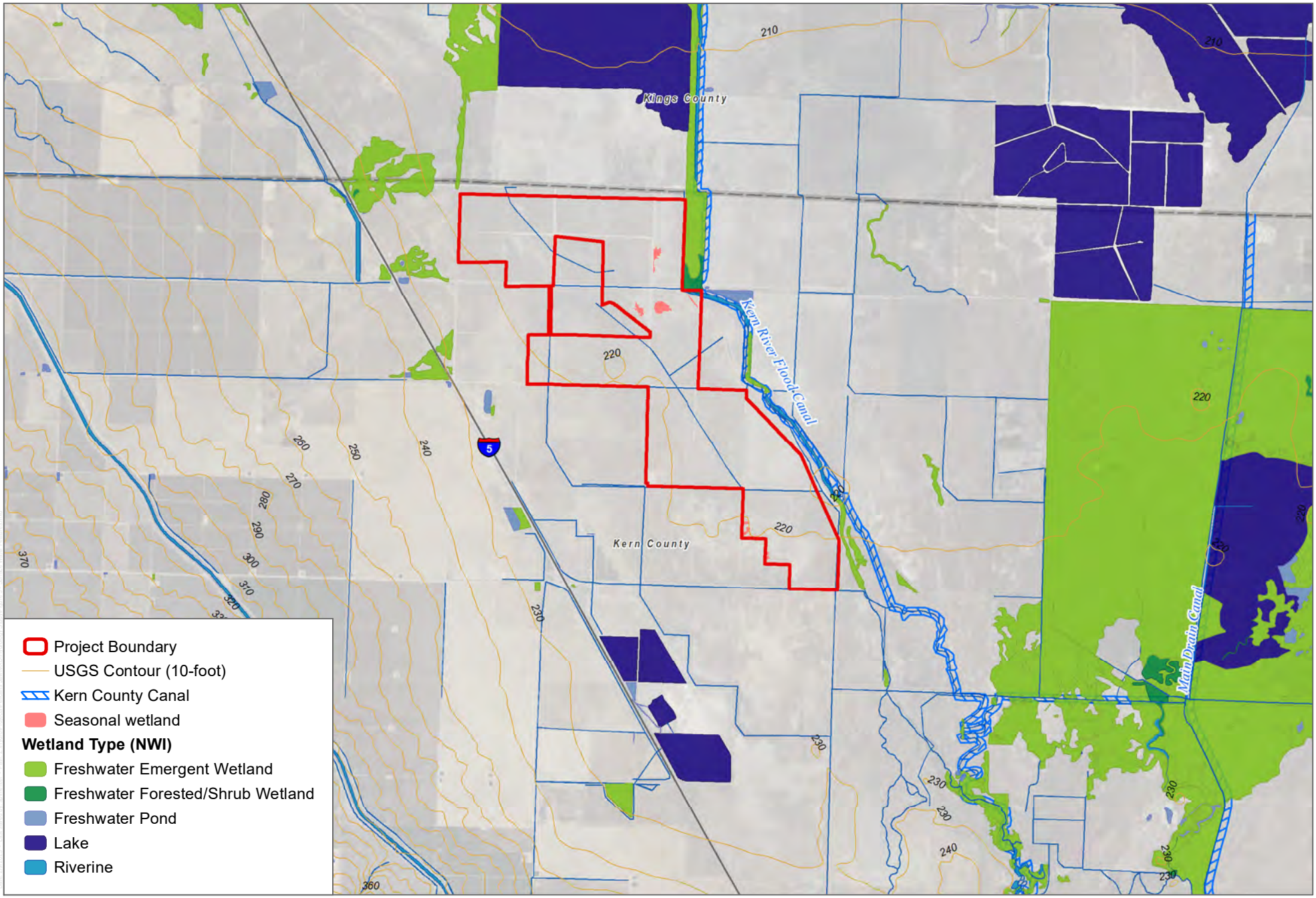

SOURCE: Bing; USGS; USFWS; Kern County; Dudek 2022a

DUDEK

0 1 2 Miles

FIGURE 3

Surface Water Features

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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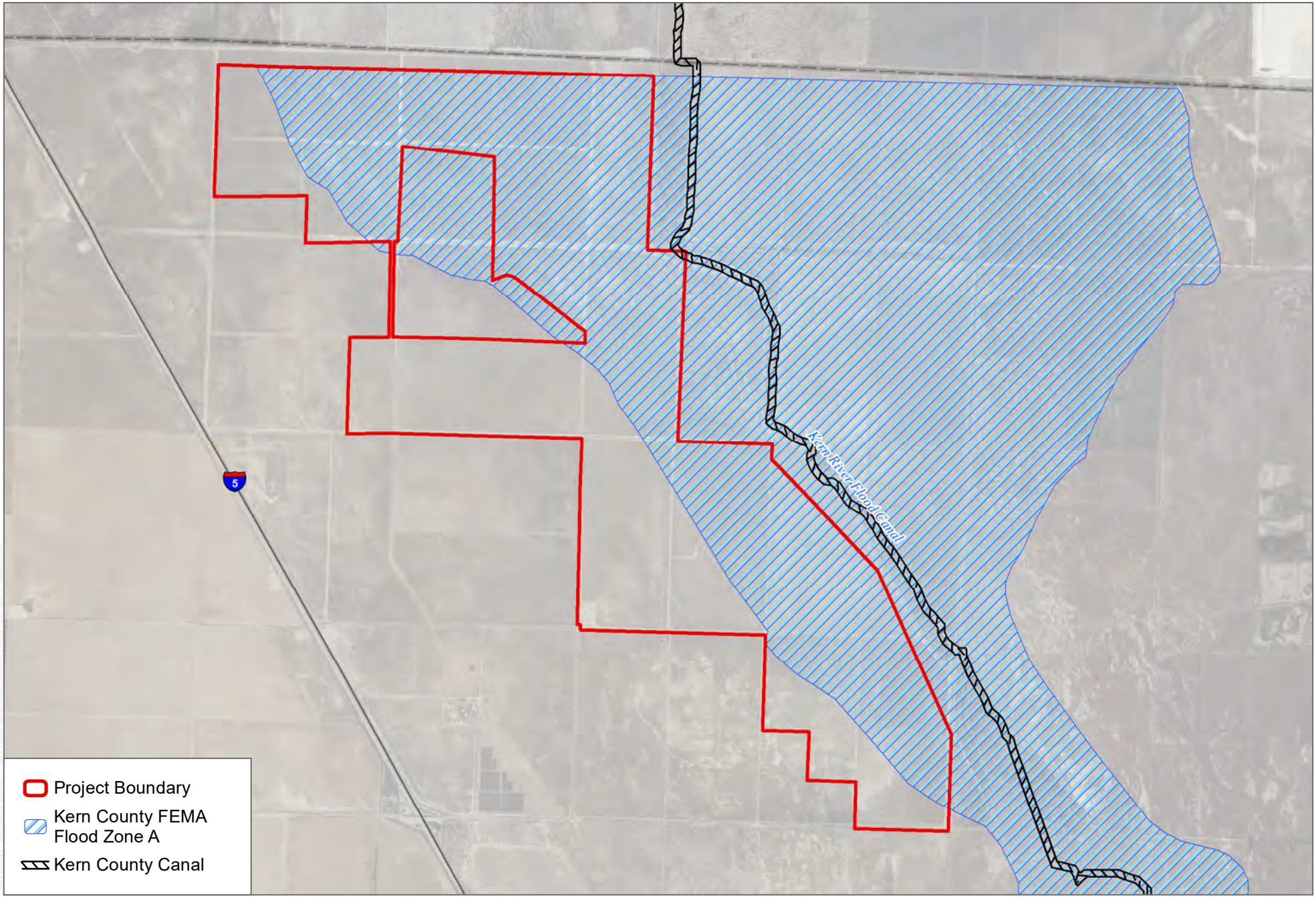

SOURCE: Bing; FEMA; Kern County

DUDEK

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Figure 4

FEMA Flood Zone A

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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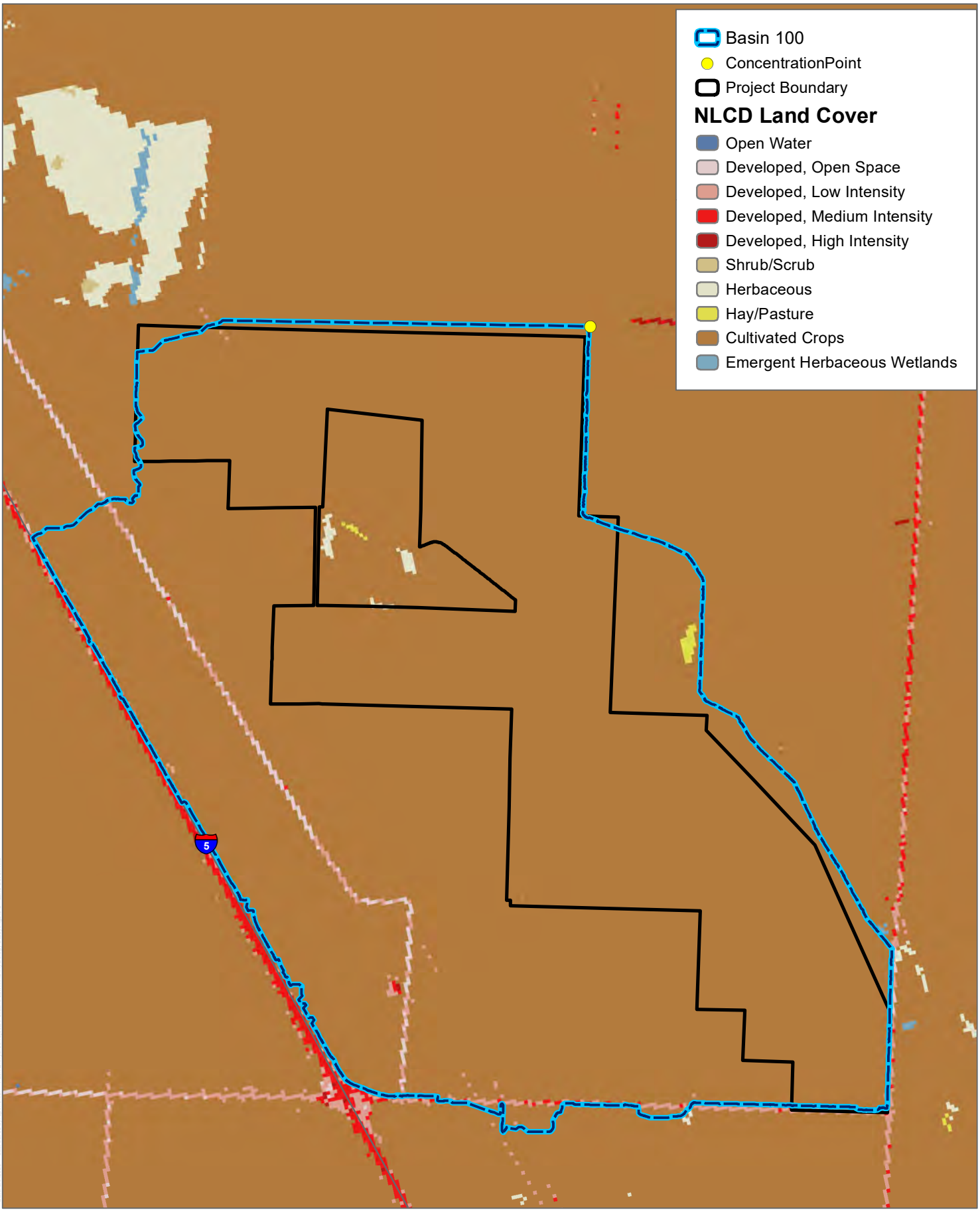

SOURCE: NLCD 2019

DUDEK

0 0.5 1 Miles

FIGURE 5

Land Cover Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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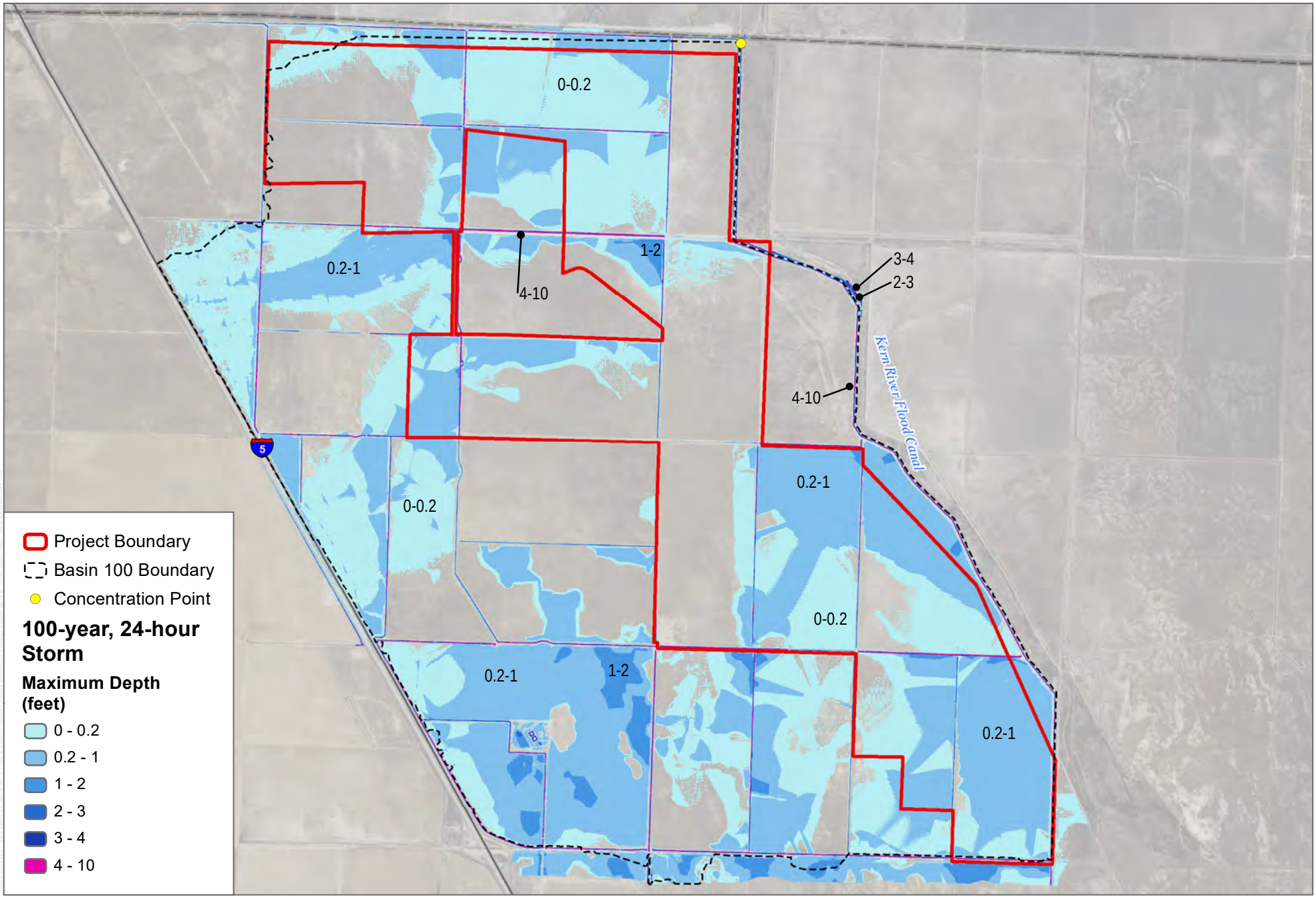

SOURCE: Bing

DUDEK

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Figure 6

Basin 100 Flood Depth Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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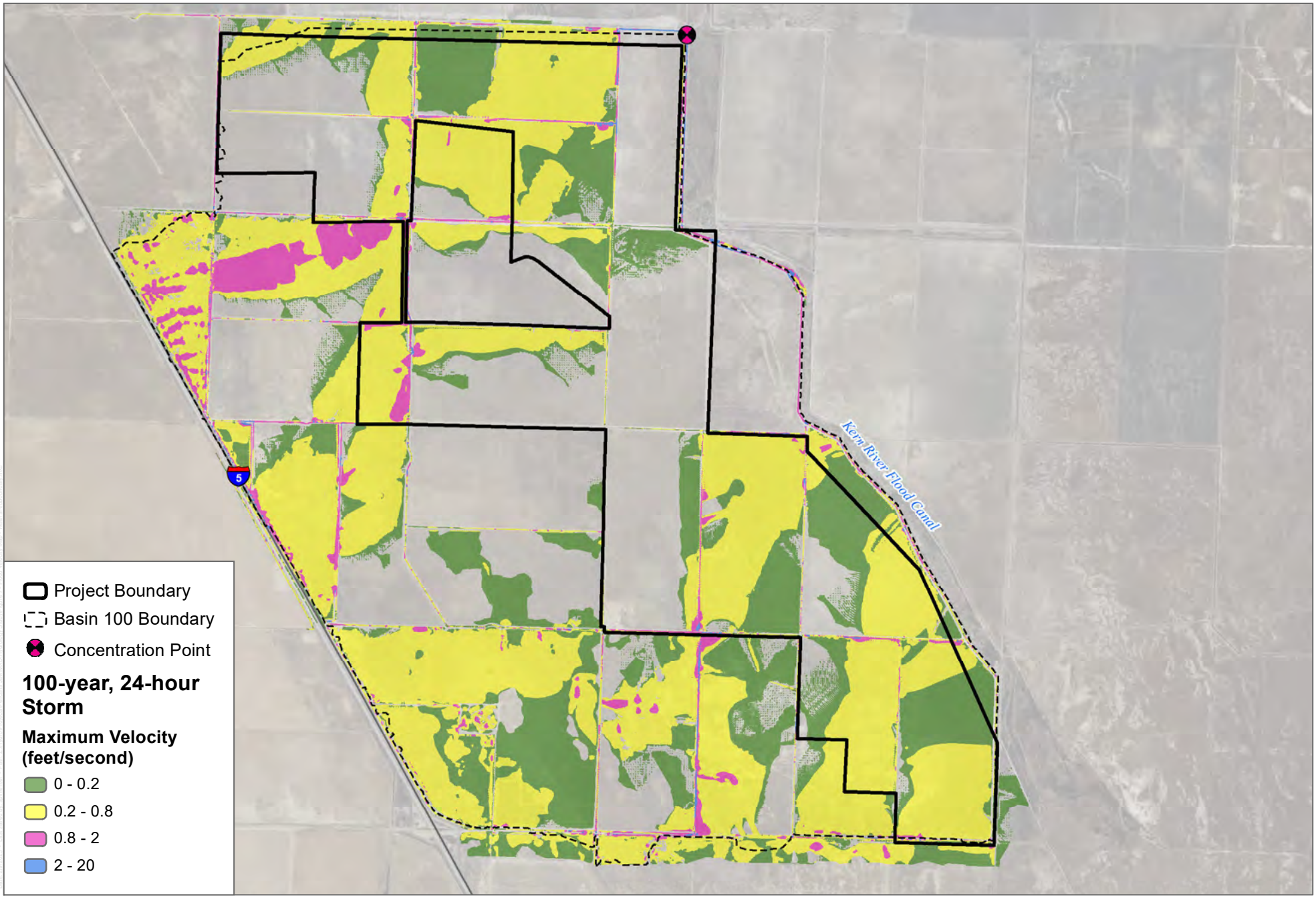

SOURCE: Bing

DUDEK

0 0.5 1 Miles

Figure 7

Basin 100 Flood Velocity Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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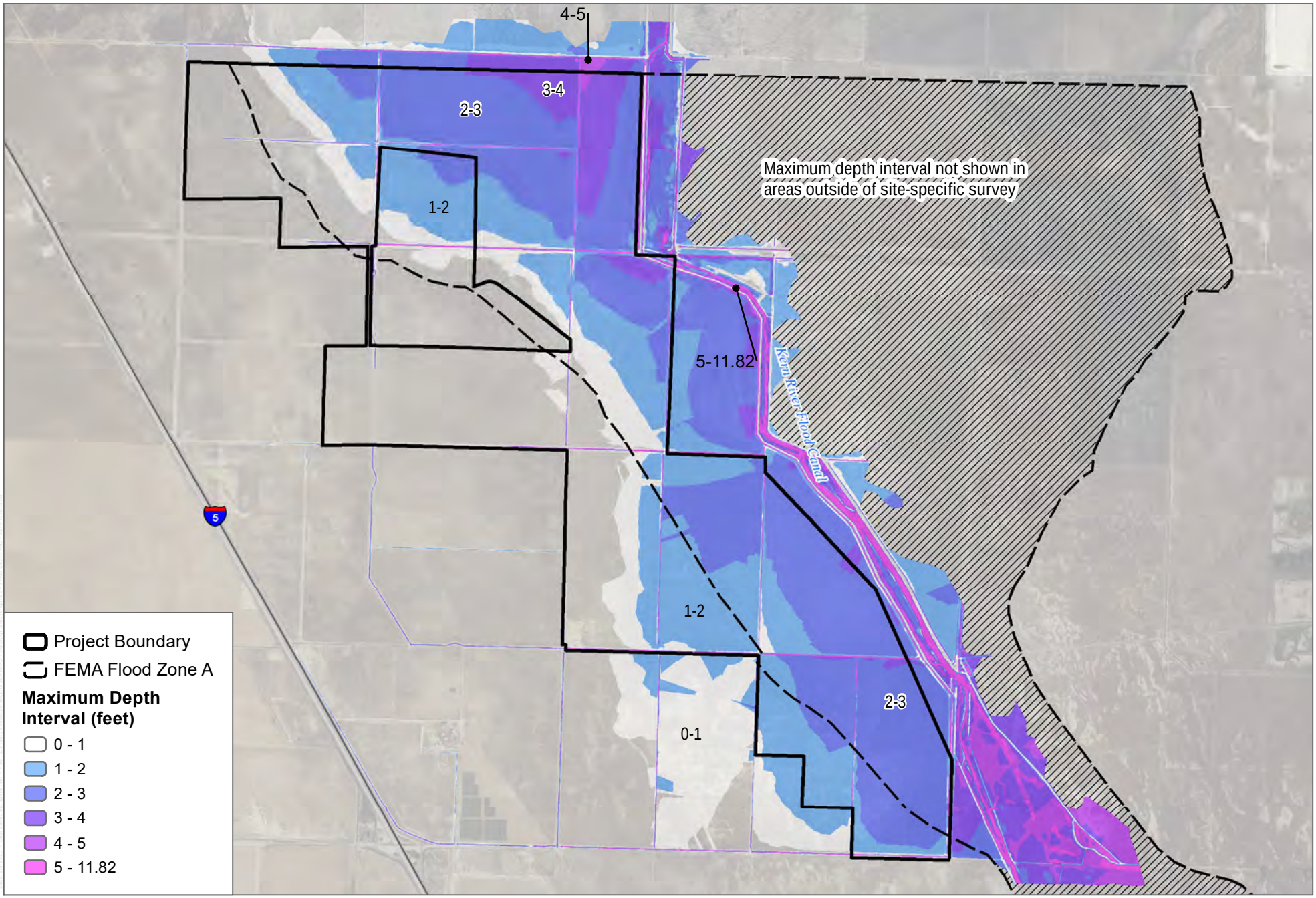

SOURCE: Bing

DUDEK

0 0.5 1 Miles

Figure 8

Kern River Flood Depth Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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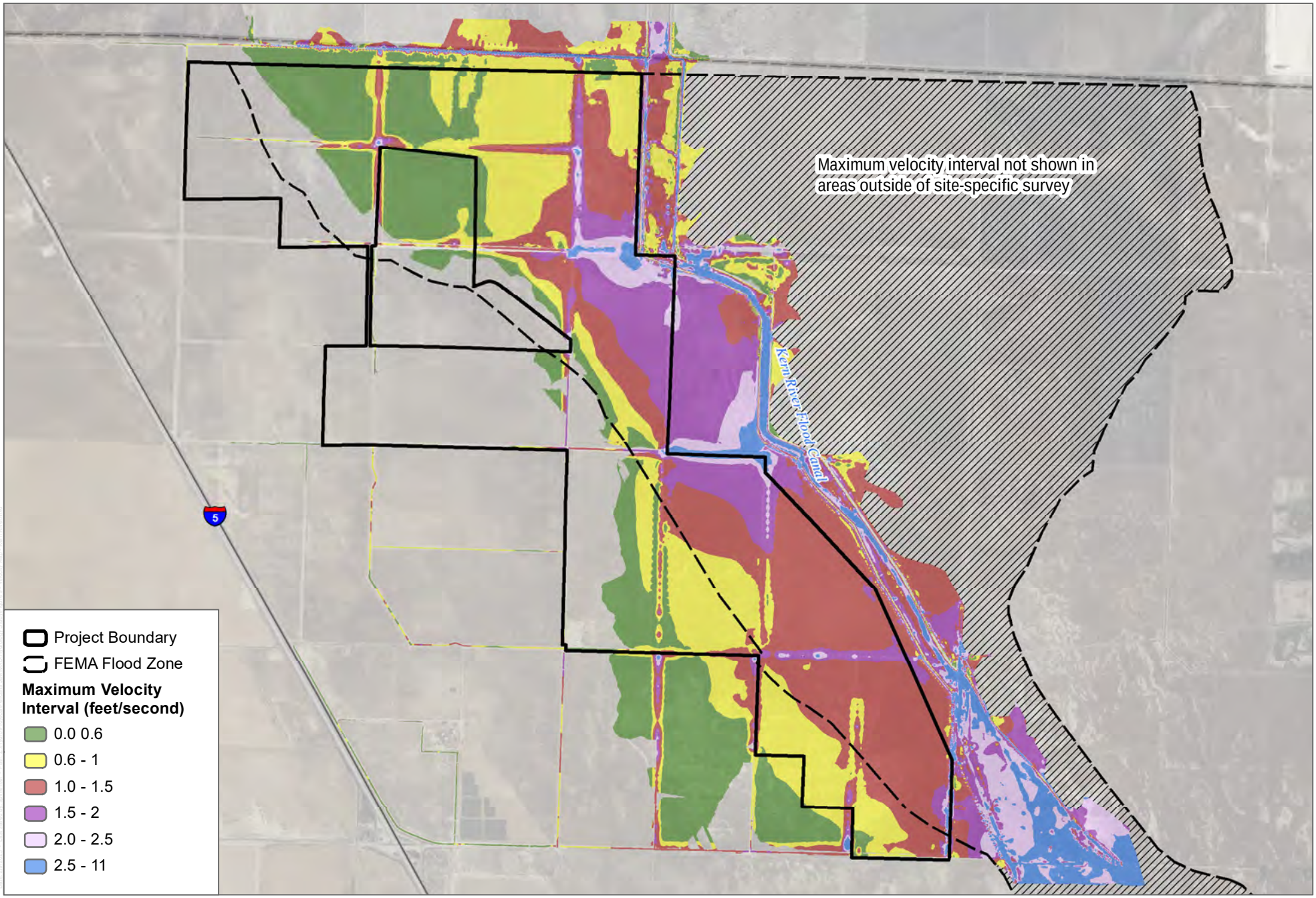

SOURCE: Bing

DUDEK

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Figure 9

Kern River Flood Velocity Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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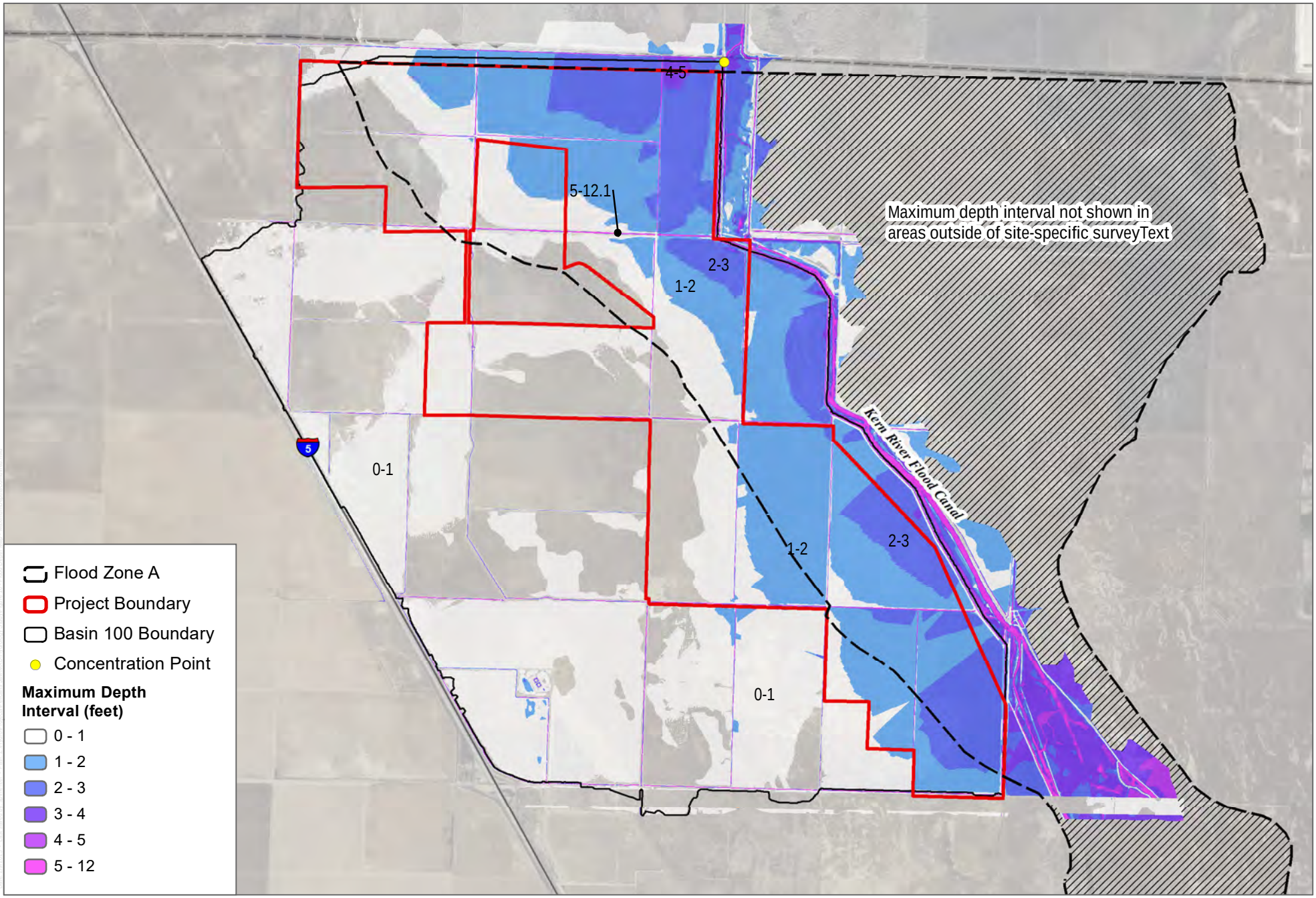

SOURCE: Bing

DUDEK

0 0.5 1 Miles

FIGURE 10

Maximum Flood Depth Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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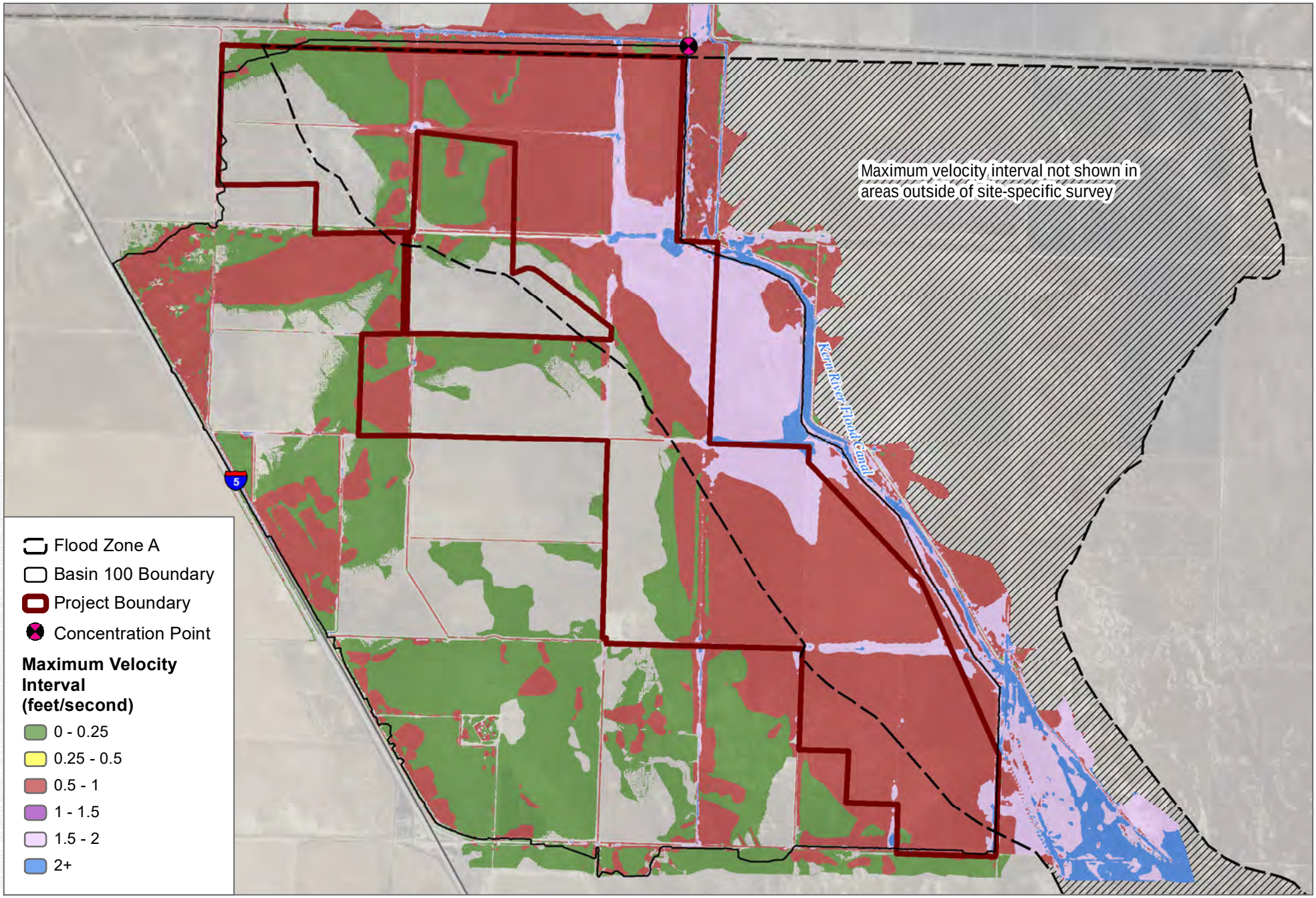

SOURCE: Bing

DUDEK

0 0.5 1 Miles

FIGURE 11

Maximum Flood Velocity Map

Hydrology and Hydraulic Study - Pelicans Jaw Hybrid Solar Project

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Appendix A
Preparer Resumes

Jonathan Martin

WATERSHED HYDROLOGIST

Jonathan Martin is a hydrologist and water quality specialist with 15 years' experience researching hydrological, ecological and meteorological dynamics from reach to watershed scale. Mr. Martin's strengths are surface and shallow-subsurface hydrology and water quality, ecohydrological analyses, and development and implentation of long-term monitoring programs assessing biological and hydrological interactions. He has experience conducting repeat and/or continuous observations of climate, streamflow, groundwater, water quality, evapotranspiration, and aquatic bioassessments (according to SWRCB SWAMP protocol).

Education

University of Arizona, Tucson
MS, Watershed Management and Ecohydrology, 2009

Northern Arizona University
BS, Physical Geography, 2000

Certifications

OSHA 40-Hour HAZWOPER

SWAMP Certified

Project Experience

City of Goleta Creek and Watershed Management Plan, Goleta, California. Served as Watershed Health and Resiliency Specialist in guiding the development of a creek and watershed management plan for twelve major drainages that bisect the City of Goleta. Coordinate materials for stakeholder meetings and discussions with the technical advisory committee (TAC) consisting of a mix of government and non-profit entities.

Habitat Assessment Protocol - Santa Ana Sucker Translocation Plan, San Bernardino Valley Municipal Water District, San Bernardino, California. Served as lead hydrologist for the team developing site evaluation protocol to estimate the feasibility of a reach to support the translocation of the sucker. Two phases for the site evaluation protocol were developed: Phase 1 consisted of a desktop review assessing feasibility and resiliency of the proposed relocation reach (e.g., topographic constraints, long-term provision of streamflow with anticipated shifts due to climate change, site access issues); Phase 2 included in-field measurements of channel geomorphology, water quality, and available food sources. Scoring matrices were developed to assist in prioritization of potential relocation reaches.

Hydrology Analysis for Habitat Restoration Project, Valley Springs, California. Developed hydrology model for a small watershed in the eastern Sierra foothills to characterize potential water budget for a proposed restoration pond for California red-legged frog. The model utilized the soil-moisture accounting method, which allowed for an hourly time step with a 20-year rainfall record to capture losses to evapotranspiration between rainfall events and establish a suitable lag in discharge based on soil properties (storage/tension/depth for different horizons).

McIver Dairy Aquatic Bioassessment, Truckee, California. Conducted aquatic bioassessment within High Sierra wetland to characterize pre-project conditions within a small intermittent stream.

Raw Water Intake Bypass Flow Study, San Jose Water Company, San Jose, California. Served as deputy project manager and lead hydrologist for a long-term study 1) identifying suitable habitat for five aquatic species, 2) developing an H&H model assessing potential flow through the seasonal streams across multiple water year scenarios, and 3) establishing interim bypass flows that will preserve habitat for the species of concern. Work includes continuous communication with CDFW and the RWQCB.

Watershed Budget, San Diego County, California. Developed/implemented long-term monitoring programs for measuring streamflow and evapotranspiration demands in a 25,000-acre watershed in San Diego County. Since 2010, sap-flow sensors have been deployed throughout the Quercus and Salix communities to assess plant functions in relationship to known hydrologic variables including: precipitation, soil moisture, groundwater elevation, and streamflow. The monitoring program captured the response of two Quercus engelmannii stands during the course of the recent 5-year drought that significantly depleted the plant-available moisture in the shallow soil horizons.

Riparian Restoration Geomorphology Study, Safford, Arizona. Managed a joint field study (The University of Arizona, Arizona Cooperative Extension, and the Bureau of Land Management) measuring channel degradation and/or aggradation along the Gila River. Conduct cross-section measurements, repeat photographs, and vegetation transect surveys at 13 monitoring stations located along a 25-mile reach of the Gila River in the Gila Box Riparian National Conservation Area. Work required locating and/or relocating permanent cross-section transects established in 1994 using photographs collected in 1994 and 2001.

Stormwater Pollution Prevention Plan (SWPPP) –California High Speed Rail. Developed initial SWPPP for the High Speed Rail Construction Package 2-3. Provide general SWPPP BMP Design Sheets for typical sections of the HSR to reduce erosion from the expansive construction site which crossed numerous water bodies.

Water Quality Monitoring Program Willow Lake, Sycuan Reservation, California. Developed/implemented water quality monitoring program for characterizing lake turbidity, suspended sediment concentrations, chlorophyll-*a* concentrations (to assess trophic state), and fecal coliform counts at fixed sampling stations and varying depths.

Preliminary Natural Treatment Wetland Assessment and Design for Hodges Reservoir Nutrient Reduction Program, San Diego, California. Conducted large-scale watershed modeling effort and hydrology study to identify drainages contributing greatest phosphorus loads to the reservoir. Develop cost-benefit analysis of multiple natural treatment wetland designs/locations for removal of nutrients from reservoir and urban discharge to the reservoir. Assess Preliminary Designs of Natural Treatment Wetland under varying loading rates and with different vegetation management programs to identify most suitable design parameters for removing nutrients.

Baseline Habitat Characterization for Rare Aquatic Snail Species, Santa Clarita, California. Designed/ implemented methods for monitoring baseline biotic and hydrologic conditions in a spring with a rare endemic snail. Monitoring program consisted of continuously measuring spring discharge, evapotranspiration (saturated-unsaturated flow assessment), and groundwater elevations/temperature. Quarterly water quality samples were collected from spring and ground waters, while bi-annual spring bioassessments characterized the BMI/periphyton communities and estimated the density of the endemic snail's population. Work included the development of a Habitat Management Program with monitoring frequency, objectives, and thresholds for triggering adaptive management.

Water Quality EIR for the City of San Diego's Pure Water Project, Miramar Reservoir, California. Provided technical support to City staff in identifying potential water quality shifts in Miramar Reservoir and associated impacts to aquatic ecosystem, including an in-depth analysis identifying external nutrient sources to the reservoir (e.g., runoff, avian feces, recreation).

Hydrology Study & Alternatives Analysis– Gypsum Quarry Reclamation Plan EIS, Borrego Desert, California. Coordinated development of an updated Drainage Study assessing impacts of proposed quarry expansion on hydrologic resources and developed four alternative stormwater conveyance berms across a 5-mile reach to better mimic natural topography and reduce potential for catastrophic failures. Produced a supplemental Hydrology Technical Study including assessment of impacts to water quality, groundwater, and on-site erosion/off-site deposition.

Publications

Arthun, D., Zaimes, G.Z., and Martin, J.R. 2013. Temporal River Channel Changes in the Gila Box Riparian National Conservation Area, Arizona, USA. Physical Geography. (publication accepted January 2013)

Hutmacher, A., Zaimes, G.Z., Martin, J.M., Green, D.M. 2013 Vegetation structure along urban ephemeral streams in southeastern Arizona. Urban Ecosystems. Published online - February 2013.

Martin, J.M., Kurc, S.A., Zaimes, G.Z., Crimmins, M., Hutmacher, A., Green, D. 2012 Elevated Air Temperatures in riparian ecosystems along ephemeral streams: The role of housing density. Journal of Arid Environments. 84 (9-18)

Osterkamp, W.R., Gray, J.R., Laronne J.B., and Martin, J.R. 2007. Structure and Composition of a Watershed-Scale Sediment Information Network. International Journal of Sediment Research. 22:3

Kipp Vilker, PE, QSD/QSP

CIVIL/ENVIRONMENTAL ENGINEER

Kipp Vilker is a California-registered professional civil engineer and Qualified Stormwater Pollution Prevention Plan Practitioner/Developer (QSD/QSP) with 9 years' experience as a civil and environmental engineer specializing in water resources, environmental remediation, and site/civil design. Mr. Vilker has assisted in all phases of design of site development projects, including site demolition, site planning, utility design, stormwater management and drainage, grading and earthwork, and erosion and sediment control. Mr. Vilker has performed hydrology and hydraulic analyses, developed stormwater Best Management Practices designs and recommendations, and has developed and managed Stormwater Pollution Prevention Plans (SWPPPs). His contributions to environmental remediation projects include assisting in all phases of investigation, design, construction implementation, and report writing. Mr. Vilker has experience with subconsultant oversight, soil logging, and soil/groundwater sampling and screening.

Education

University of Wisconsin, Madison
BS, Civil and Environmental Engineering

Certifications

Professional Civil Engineer (PE), CA No. 90011

Professional Civil Engineer (PE), VA No. 0402057970

Qualified Stormwater Pollution Prevention Plan Practitioner/Developer (QSD/QSP) No. 27048

Professional Affiliations

American Society of Civil Engineers

Project Experience

Development

Nitrate Mass Balance Studies, Multiple Developer Clients, San Diego County, California. Prepared studies for various residential development projects throughout San Diego County in accordance with the San Diego County Department of Environmental Health Local Agency Management Program. As a senior engineer, reviewed existing site-specific data, including geology, rainfall, and hydrology, and then used the gathered information to estimate resultant groundwater nitrate concentration and provide a recommended percent reduction in septic effluent nitrate if concentrations exceed water quality objectives. (2022)

Vapor Mitigation System Design, Peak Capital Investments LLC and Ryan Companies, Los Angeles County, California. Dudek designed passive vapor mitigation systems for multiple properties slated for development in accordance with Los Angeles County Public Works Gas Hazard Mitigation Policy and Standards. As a senior engineer, developed design plans and prepared operation and maintenance plan reports for the systems, which were designed to mitigate potential gas hazards, including methane and volatile organic compounds. (2022)

Phase I Environmental Site Assessments, Multiple Developer Clients, Santa Barbara, Ventura, and Los Angeles Counties, California. Dudek completed Phase I Environmental Site Assessments (ESAs) for multiple properties slated for development. As a senior engineer, performed tasks including site reconnaissance, inventory of chemicals on site, photoionization detector readings, utility clearance, owner and user interviews, file reviews, and report preparation. (2022)

Phase II ESA, Invest West/Pacifica Hotels and Ocean Meadows, LLC, Santa Barbara County, California. Dudek conducted Phase II ESAs to confirm or refute suspected impacts. As a senior engineer, performed tasks including preparation of work plans, health and safety plans, monitoring well installation, groundwater sampling, soil sampling, sub-slab vapor sampling, air sampling, data interpretation, and site investigation report preparation. (2020)

Energy

Hydrology and Hydraulic Analysis, Confidential Client, Riverside County, California. Prepared a report assessing the hydrological impacts to watersheds resulting from the development of a battery energy storage facility. Efforts included modeling storm events using HEC-HMS and HEC-RAS software and using peak flows and volumes to analyze maximum flow depths, velocities, and scour potential at the site. Efforts also included preparation of a hydrology and water quality memo, which addressed the California Environmental Quality Act Appendix G significance criteria. (2022)

Hydrology and Water Quality Analysis, Confidential Client, San Bernardino County, California. Prepared a technical study, which addressed the California Environmental Quality Act Appendix G significance criteria, to evaluate project impacts to hydrology and water quality resulting from the development of an energy storage facility. Efforts included calculating pre- and post-development peak flows using the San Bernardino County rational method and evaluating project impacts to water quality. (2022)

Hydrologic Analysis, Confidential Client, Stanislaus County, California. Performed a hydrology study assessing the impacts to watersheds resulting from the development of an access road for a proposed solar facility. Efforts included identifying peak discharge rates for both the existing and proposed conditions, assessing needs for Best Management Practices, and assessing the sufficiency of existing culverts. (2021)

Water Main Relocation, Confidential Client, Jacumba Hot Springs, California. Designed plans and specifications per San Diego County Water Agencies' Standards guidelines for a new potable water main as part of a solar project. (2021)

SWPPP Compliance Services, Confidential Client, Santa Barbara County, California. Served as a senior engineer to provide SWPPP compliance services, including SWPPP/Best Management Practice training, installation review, inspection report preparation and review, and weekly project management oversight. (2021)

Stormwater Compliance Services, Confidential Client, Riverside County, California. Prepared compliance documents to support the development of approximately 2,000 acres of land. Documents included a Surface Water Protection Plan and a Comprehensive Drainage, Stormwater, and Sediment Control Plan. (2022)

Water Supply Assessments, Stanislaus and Fresno Counties, California. Served as a senior engineer to prepare water supply assessments for several renewable energy projects to assess existing groundwater and surface water availability, evaluated projected project and non-project water demands, and determined sufficiency of supply over a 20-year forecast period. (2020)

Municipal

Municipal Separate Storm Sewer System Permit Compliance, City of Goleta Public Works, California. Served as project engineer responsible for implementing the City of Goleta's stormwater management program. This program protects water quality in accordance with the Central Coast Regional Water Quality Control Board, pursuant to National Pollution Discharge Elimination System requirements. Assisting the City in meeting Municipal Separate Storm Sewer System requirements, which involves water quality sampling, dry-weather sampling of outfalls, pollution prevention and facilities maintenance, illicit discharge detection and elimination, and annual reporting. (2021–2022)

Reservoir

San Gabriel Reservoir Post-Fire Emergency Restoration Project Hydrological and Hydraulic Study, Los Angeles County Public Works, Los Angeles County, California. Dudek was contracted by Los Angeles County Public Works to investigate the hydrologic and hydraulic impacts of the San Gabriel Reservoir Post-Fire Emergency Restoration Project. The project involved dewatering and diverting surface water from the San Gabriel Reservoir; excavating 4.9 million cubic yards of sediment from the Reservoir; and transporting, spreading, and compacting the sediment within a 50-acre fill site. Dudek completed a hydrological analysis of the watershed encompassing the fill site by using the Los Angeles County Modified Rational Method to compare pre- and post-project peak flow runoffs and volumes. Dudek also assessed the project's hydraulic impacts on downstream resources, including the Santa Ana Sucker (*Catostomus santaanae*). HEC-RAS software was used to evaluate the changes of several hydraulic parameters in three different stream reaches due to the dewatering operation. Parameters included water surface elevation, average velocity of flow in the channel, total area of cross section active flow, flow top width, and maximum channel depth. To support this modeling effort, Dudek staff performed field surveys to acquire high-resolution topographic data to develop a channel cross section simulated in the HEC-RAS model. (2021)

Restoration

Hydrologic and Hydraulic Modeling, United States Gypsum Company, San Diego County, California. Prepared a hydrologic and hydraulic model per San Diego County Hydrological methods, which informed jurisdictional delineations on a mitigation parcel. Efforts included delineating the contributing watersheds to the parcel using ArcGIS software; determining peak flows and hydrographs using HEC-HMS software; and analyzing floodplains and creating inundation, flow depth, and flow velocity maps using HEC-RAS two-dimensional software. (2022)

Water

Stormwater Design Support, Utility Company Client, California. Prepared technical memorandums outlining applicable stormwater permitting requirements and project-specific implementation of these requirements including Best Management Practices recommendations for various development projects throughout Southern California. (2021)

Water Resources Due Diligence, Santa Barbara County, California. Dudek performed an investigation of water resources to document existing conditions and determine the condition and viability of water supply at a property in anticipation of a property transfer. Serving as a senior engineer, performed tasks including coordination with water districts; inspection of on-site groundwater wells and water infrastructure; groundwater sampling; and examination of published geologic reports, well logs, data viewers, and other site-specific data. (2020)

Groundwater Monitoring Reports, Rams Hill Golf Course, Borrego Springs, California. Developed reports documenting biannual groundwater levels, production, and water quality. (2020)

Relevant Previous Experience

Development

New Consulate Compound, State Department, Nogales, Mexico. As a staff engineer with Langan Engineering & Environmental Services (Langan), designed site development construction plans using Civil 3D and AutoCAD software. Performed earthwork calculations and modeled utilities using WaterCAD and Hydraflow Storm Sewer software. Created a stormwater management plan to ensure post-development flows and volumes matched pre-development flows and volumes. Prepared site design reports summarizing calculations, models, and design criteria. (2016)

Energy

Site Remediation and Restoration, Major Petroleum Client, Santa Maria, California. While with Langan, served as a senior staff engineer and QSD for the remediation and restoration of approximately 14 acres of a former oilfield. Prepared and implemented the SWPPP and conducted SWPPP monitoring. Evaluated and procured subconsultants and provided technical and safety oversight for subconsultants. Also assisted in obtaining various permits, including U.S. Army Corps of Engineers Section 404, Regional Water Quality Control Board 401 permit, and California Department of Fish and Wildlife Streambed Alteration Agreement. (2019–2020)

Site Remediation and Restoration, Major Petroleum Client, Goleta, California. While with Langan, served as senior staff engineer for the repair of a slope failure on a former remediation and restoration site. Assisted in the development of construction plans for the grading, earthwork, and sediment and erosion control for an approximately 5-acre area within the restoration area, which was formerly a gas processing plant. After grading repairs were completed, oversaw the drilling and installation of four piezometers and two inclinometers along the repaired area to monitor future movement and pore-water pressure of the slope. (2019–2020)

Site Remediation and Restoration, Major Petroleum Client, Santa Maria, California. While with Langan, served as senior staff engineer for the investigation of soil contamination in former well pads and spill areas within a former oilfield. Procured drilling and remediation subconsultants and provided subconsultant oversight for the drilling, trenching, and analysis of soils. Analyzed laboratory data and developed investigation reports for submittal to Santa Barbara County Environmental Health Services, with the goal of acquiring No Further Action status for the sites or development of further remedial action to gain No Further Action status. (2019–2020)

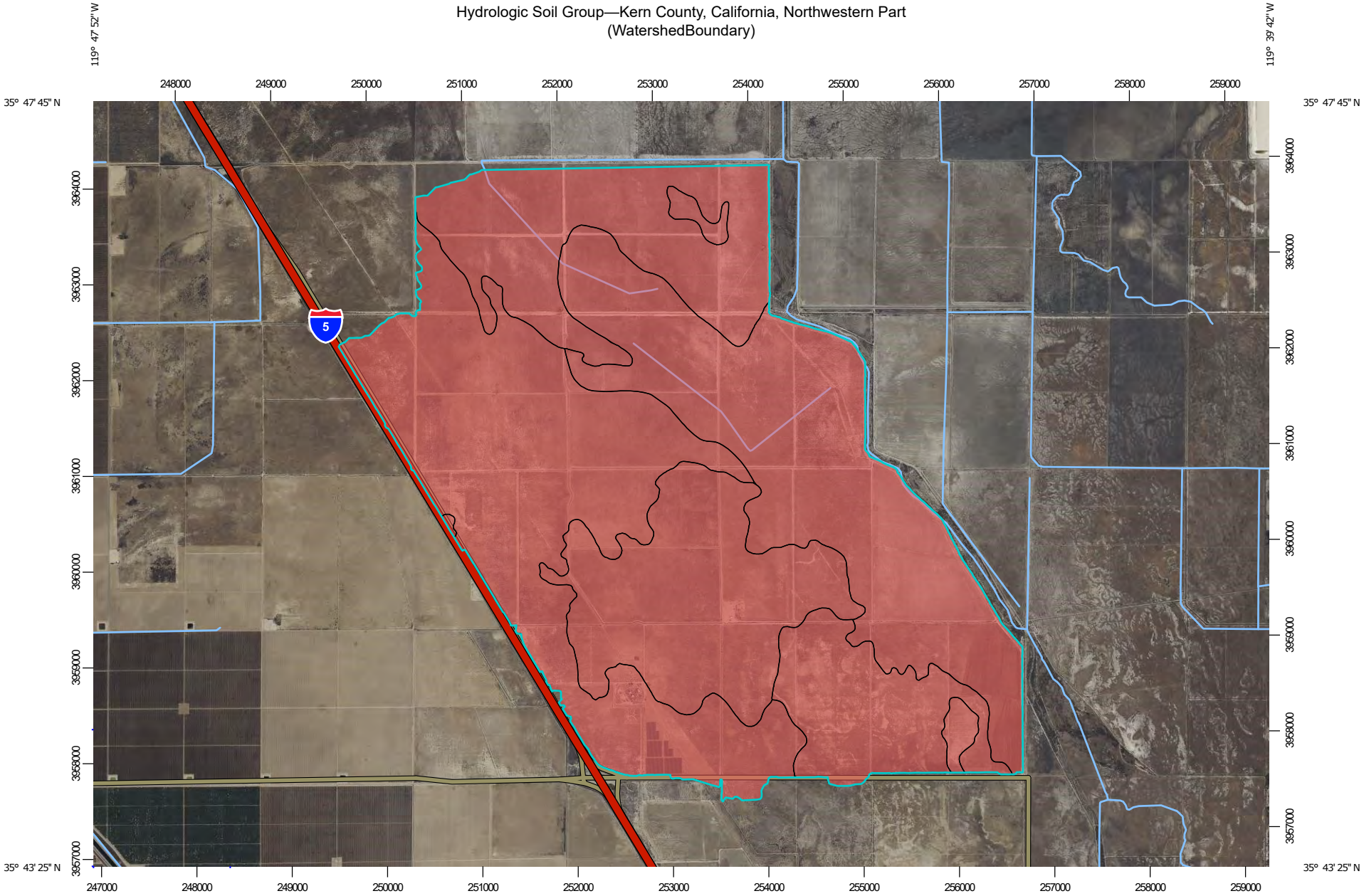
Site Remediation and Restoration, Major Petroleum Client, Goleta, California. While with Langan, served as senior staff engineer for remedial and restoration monitoring at the site of a former gas processing plant. Monitoring included surface water and sediment sampling, groundwater sampling, and vegetative cover monitoring. Analyzed the data and generated reports for the Department of Toxic Substances Control. (2018–2020)

Federal

Fort Necessity Battlefield Restoration, National Park Service, Farmington, Pennsylvania. While with Langan, served as staff engineer assisting with tasks that contributed to re-grading meadow topography. Work included obtaining a National Pollutant Discharge Elimination System permit, developing erosion and sediment control plans, and developing stormwater management plans. (2015)

Appendix B
USDA Soils Report

Hydrologic Soil Group—Kern County, California, Northwestern Part
(WatershedBoundary)



Map Scale: 1:56,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2500 5000 10000 15000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Kern County, California, Northwestern Part
Survey Area Data: Version 14, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 12, 2022—Mar 22, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
164	Houser fine sandy loam, partially drained	D	1,133.8	15.3%
208	Nahrub clay, partially drained	D	2,097.9	28.3%
210	Nahrub, partially drained-Lethent complex	D	632.0	8.5%
233	Twisselman sandy loam, saline-alkali, 0 to 2 percent sl opes	D	4.4	0.1%
234	Twisselman sandy loam, saline-alkali, moderately wet, 0 to 2 percent slopes	D	1,213.7	16.4%
238	Twisselman clay, saline-alkali, moderately wet, 0 to 2 percent slopes	D	2,327.0	31.4%
Totals for Area of Interest			**7,408.6**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C

Precipitation Point Frequency Estimate for Basin 100

NOAA Atlas 14, Volume 6, Version 2
Location name: Lost Hills, California, USA*
Latitude: 35.7594°, Longitude: -119.7296°
Elevation: 222.15 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.068** (0.059-0.080)	**0.089** (0.077-0.105)	**0.119** (0.102-0.141)	**0.146** (0.124-0.174)	**0.185** (0.151-0.230)	**0.219** (0.173-0.279)	**0.256** (0.197-0.336)	**0.297** (0.221-0.404)	**0.359** (0.254-0.514)	**0.414** (0.280-0.616)
10-min	**0.098** (0.084-0.115)	**0.128** (0.110-0.151)	**0.171** (0.146-0.202)	**0.209** (0.177-0.249)	**0.266** (0.216-0.330)	**0.314** (0.248-0.400)	**0.366** (0.282-0.481)	**0.426** (0.316-0.579)	**0.515** (0.364-0.737)	**0.593** (0.402-0.883)
15-min	**0.118** (0.102-0.139)	**0.155** (0.133-0.182)	**0.207** (0.177-0.244)	**0.253** (0.214-0.302)	**0.321** (0.261-0.399)	**0.379** (0.300-0.484)	**0.443** (0.341-0.582)	**0.515** (0.383-0.700)	**0.623** (0.440-0.891)	**0.717** (0.486-1.07)
30-min	**0.162** (0.140-0.191)	**0.213** (0.183-0.250)	**0.284** (0.243-0.335)	**0.347** (0.294-0.414)	**0.441** (0.359-0.548)	**0.521** (0.412-0.664)	**0.608** (0.468-0.799)	**0.707** (0.525-0.961)	**0.856** (0.605-1.22)	**0.984** (0.667-1.47)
60-min	**0.228** (0.196-0.268)	**0.299** (0.257-0.352)	**0.400** (0.342-0.472)	**0.488** (0.414-0.582)	**0.621** (0.505-0.771)	**0.732** (0.580-0.934)	**0.856** (0.658-1.13)	**0.995** (0.739-1.35)	**1.20** (0.850-1.72)	**1.39** (0.939-2.06)
2-hr	**0.336** (0.289-0.395)	**0.431** (0.370-0.507)	**0.567** (0.485-0.669)	**0.686** (0.581-0.818)	**0.864** (0.702-1.07)	**1.01** (0.802-1.29)	**1.18** (0.905-1.55)	**1.36** (1.01-1.85)	**1.64** (1.16-2.34)	**1.88** (1.27-2.79)
3-hr	**0.413** (0.355-0.485)	**0.528** (0.453-0.621)	**0.691** (0.591-0.816)	**0.835** (0.707-0.995)	**1.05** (0.851-1.30)	**1.23** (0.971-1.56)	**1.42** (1.09-1.87)	**1.64** (1.22-2.23)	**1.97** (1.39-2.81)	**2.25** (1.52-3.35)
6-hr	**0.553** (0.476-0.650)	**0.710** (0.609-0.835)	**0.930** (0.796-1.10)	**1.12** (0.951-1.34)	**1.41** (1.14-1.75)	**1.64** (1.30-2.09)	**1.90** (1.46-2.49)	**2.18** (1.62-2.96)	**2.60** (1.84-3.71)	**2.95** (2.00-4.40)
12-hr	**0.694** (0.597-0.815)	**0.906** (0.778-1.07)	**1.20** (1.03-1.42)	**1.45** (1.23-1.73)	**1.82** (1.48-2.26)	**2.12** (1.68-2.70)	**2.44** (1.87-3.20)	**2.79** (2.07-3.79)	**3.29** (2.33-4.71)	**3.71** (2.52-5.53)
24-hr	**0.868** (0.757-1.02)	**1.16** (1.01-1.36)	**1.56** (1.35-1.83)	**1.89** (1.63-2.24)	**2.38** (1.99-2.90)	**2.77** (2.27-3.44)	**3.18** (2.55-4.04)	**3.63** (2.84-4.73)	**4.27** (3.22-5.78)	**4.80** (3.50-6.70)
2-day	**1.01** (0.884-1.19)	**1.37** (1.19-1.61)	**1.87** (1.62-2.19)	**2.29** (1.97-2.71)	**2.91** (2.43-3.55)	**3.41** (2.80-4.24)	**3.95** (3.17-5.02)	**4.53** (3.55-5.91)	**5.38** (4.06-7.29)	**6.08** (4.44-8.50)
3-day	**1.10** (0.956-1.29)	**1.49** (1.30-1.75)	**2.04** (1.77-2.40)	**2.52** (2.17-2.99)	**3.23** (2.70-3.94)	**3.81** (3.12-4.73)	**4.44** (3.56-5.64)	**5.13** (4.01-6.68)	**6.13** (4.62-8.30)	**6.98** (5.10-9.75)
4-day	**1.19** (1.03-1.39)	**1.62** (1.41-1.89)	**2.22** (1.93-2.61)	**2.75** (2.37-3.25)	**3.52** (2.95-4.30)	**4.17** (3.42-5.19)	**4.88** (3.91-6.20)	**5.65** (4.42-7.37)	**6.79** (5.12-9.19)	**7.75** (5.66-10.8)
7-day	**1.39** (1.21-1.62)	**1.88** (1.63-2.20)	**2.58** (2.24-3.03)	**3.19** (2.75-3.77)	**4.09** (3.42-4.99)	**4.85** (3.98-6.03)	**5.68** (4.56-7.22)	**6.60** (5.16-8.60)	**7.96** (6.00-10.8)	**9.13** (6.67-12.7)
10-day	**1.49** (1.30-1.75)	**2.01** (1.75-2.36)	**2.75** (2.39-3.23)	**3.40** (2.93-4.02)	**4.35** (3.64-5.31)	**5.15** (4.23-6.41)	**6.03** (4.84-7.67)	**7.01** (5.49-9.14)	**8.46** (6.38-11.5)	**9.71** (7.09-13.6)
20-day	**1.83** (1.59-2.14)	**2.44** (2.13-2.87)	**3.31** (2.87-3.89)	**4.06** (3.50-4.81)	**5.17** (4.32-6.31)	**6.09** (5.00-7.57)	**7.09** (5.69-9.02)	**8.21** (6.42-10.7)	**9.85** (7.43-13.3)	**11.3** (8.22-15.7)
30-day	**2.18** (1.90-2.56)	**2.90** (2.52-3.40)	**3.90** (3.39-4.59)	**4.76** (4.11-5.64)	**6.02** (5.03-7.34)	**7.06** (5.79-8.77)	**8.18** (6.57-10.4)	**9.41** (7.37-12.3)	**11.2** (8.46-15.2)	**12.8** (9.32-17.8)
45-day	**2.64** (2.30-3.09)	**3.47** (3.02-4.07)	**4.62** (4.01-5.43)	**5.61** (4.83-6.64)	**7.02** (5.87-8.56)	**8.17** (6.70-10.2)	**9.40** (7.55-12.0)	**10.8** (8.42-14.0)	**12.7** (9.58-17.2)	**14.3** (10.5-20.0)
60-day	**3.07** (2.68-3.60)	**4.01** (3.49-4.71)	**5.29** (4.60-6.22)	**6.38** (5.50-7.55)	**7.92** (6.63-9.67)	**9.17** (7.53-11.4)	**10.5** (8.43-13.3)	**11.9** (9.35-15.6)	**14.0** (10.6-19.0)	**15.7** (11.5-22.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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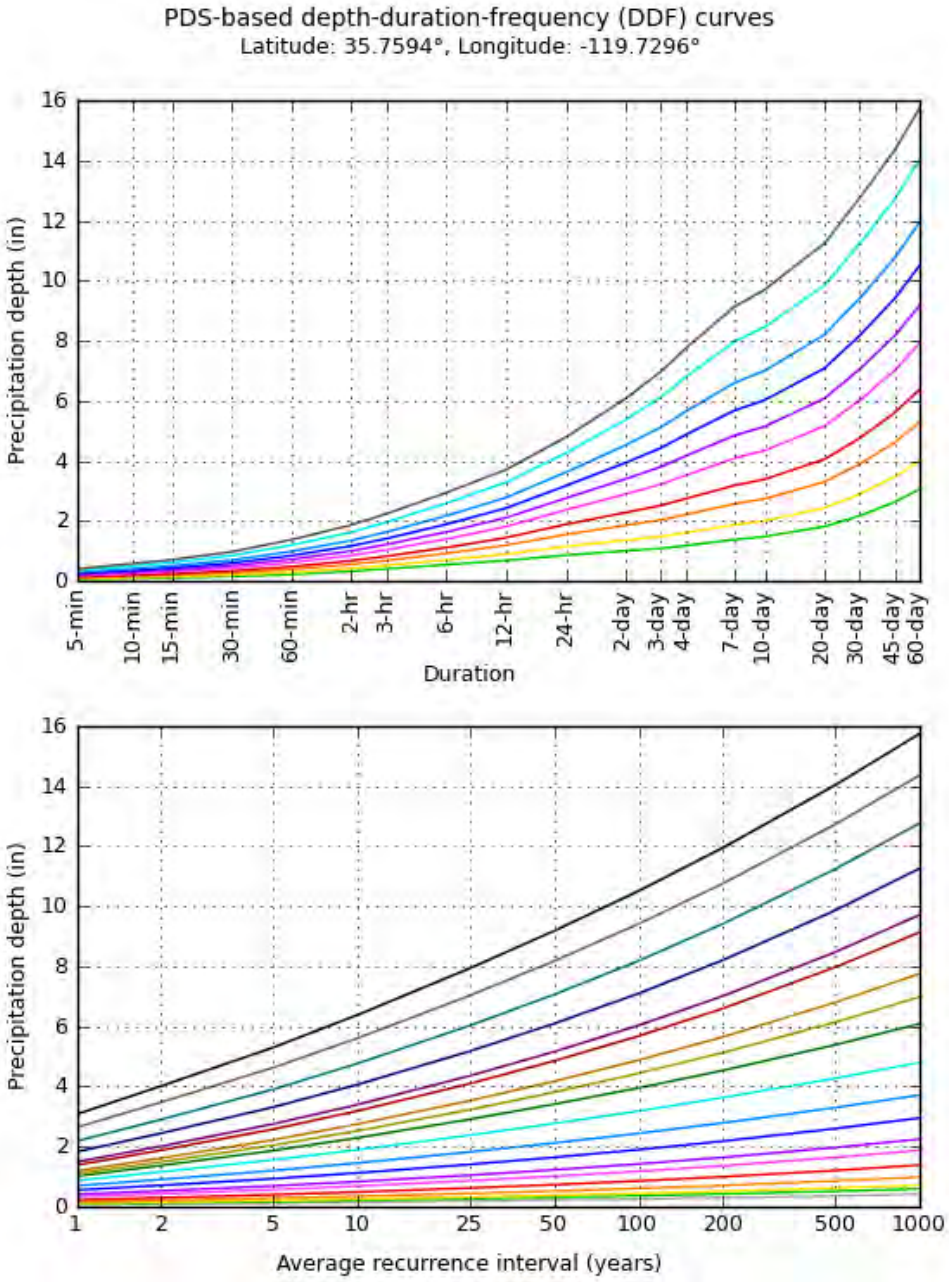
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Tue Jul 5 21:11:18 2022

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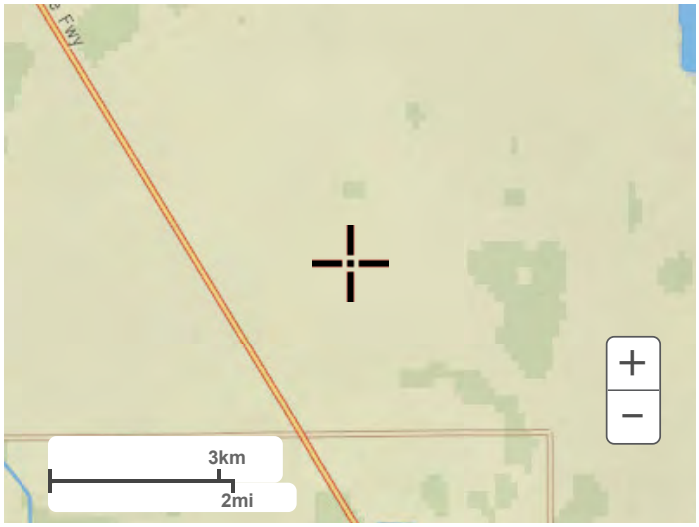
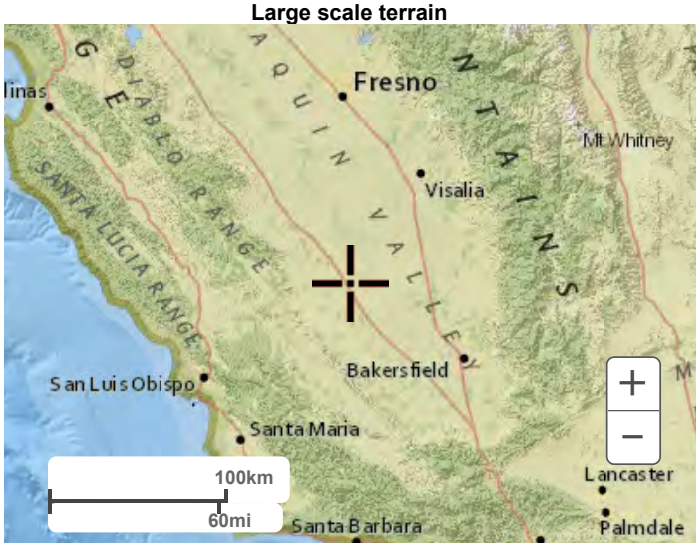
Maps & aerials

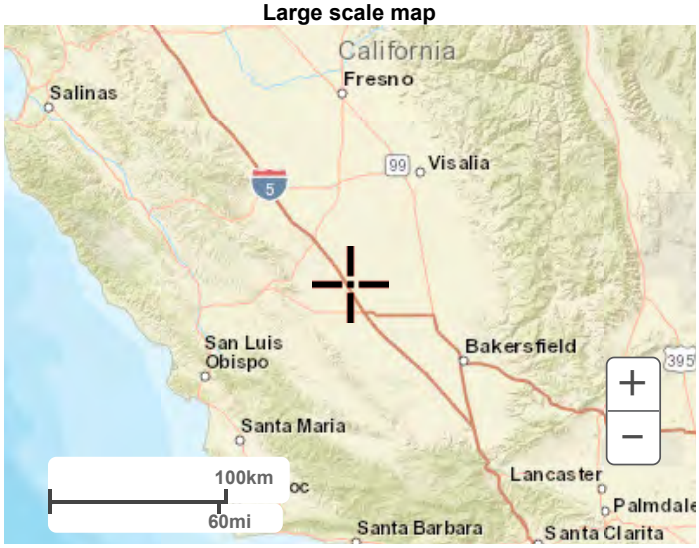
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix D
Lag Time Calculation

$$\text{lag (hours)} = C_t ((L \cdot L_{ca})/S^{0.5})^m \qquad \text{(E.2)}$$

where

C_t = a constant (determined by regional flood reconstitution studies)

L = length of longest watercourse (miles)

L_{ca} = length along longest watercourse, measured upstream to a point opposite center of area (miles)

S = overall slope of drainage area between the headwaters and the collection point (feet per mile)

m = a constant determined by regional flood reconstitution studies

It is then assumed that there exists a relationship between watershed lag and the quotient $((L \cdot L_{ca})/S^{0.5}))^m$. This relationship is given by the above empirical formula for lag when

C_t = $24\bar{n}$; ($\bar{n}$ is the visually estimated basin factor of all collection streams and watershed channels, see Figure E-2)

m = 0.38

Table B. Lag Calculations

	Basin 100
Ct	0.6
Basin Factor n	0.025
L (ft)	25,372
L (mi)	4.81
L_{ca} (ft)	12,311
L_{ca} (mi)	2.33
Elev Difference (ft)	20
S (ft/mi)	4.2
m	0.38
S^.5	2.04
$LxL_{ca}/S^{.5}$	5.5
Lag (hours)	**1.15**

Appendix E
HEC-HMS Hydrographs

Project: Pelicans_Jaw
Simulation Run: Run 1
Simulation Start: 31 December 1999, 24:00
Simulation End: 2 January 2000, 06:00

HMS Version: 4.9
Executed: 07 July 2022, 22:29

Global Parameter Summary - Subbasin

Area (MI^2)

Element Name	Area (MI^2)
Subbasin - 1	11.58

Transform: User - Specified S - Graph

Element Name	S - graph	Lag Method	Lag
Subbasin - 1	Undeveloped Valley S - Graph	Specified	1.15

Global Results Summary

Hydrologic Element	Drainage Area (MI2)	Peak Discharge (CFS)	Time of Peak	Volume (IN)
Subbasin - 1	11.58	2953.07	01Jan2000, 16:55	1.78

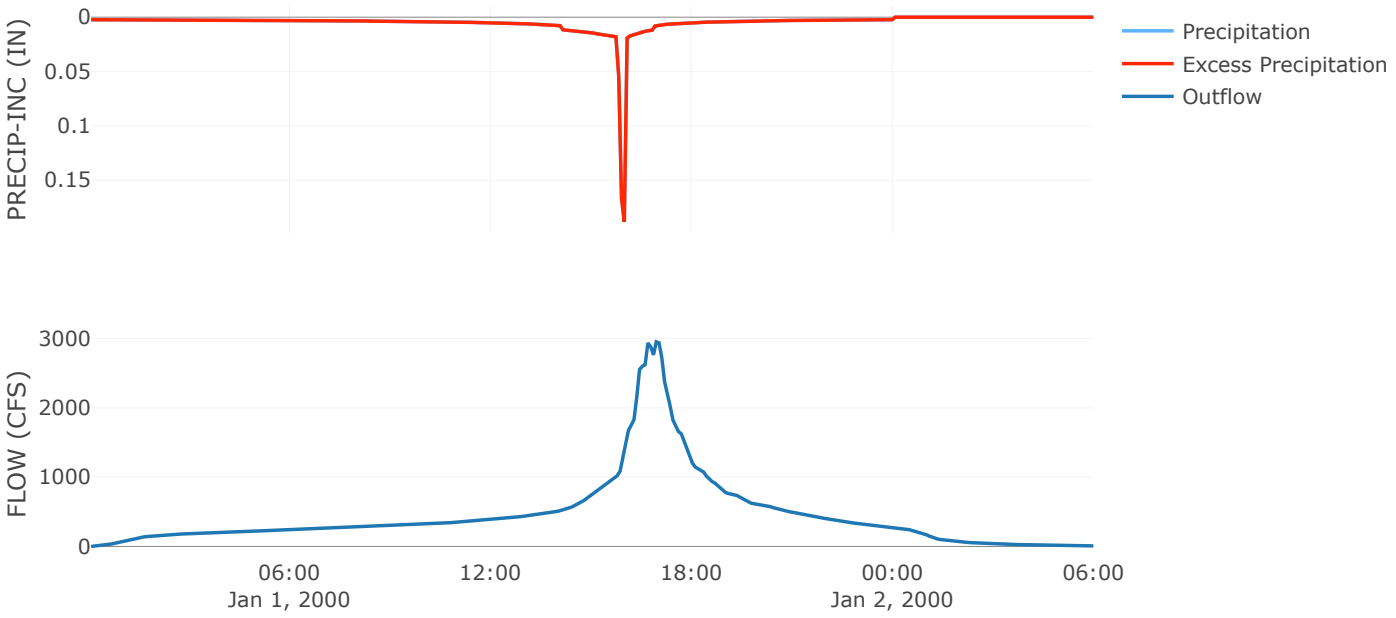
Subbasin: Subbasin-1

Area (MI^2) : 11.58

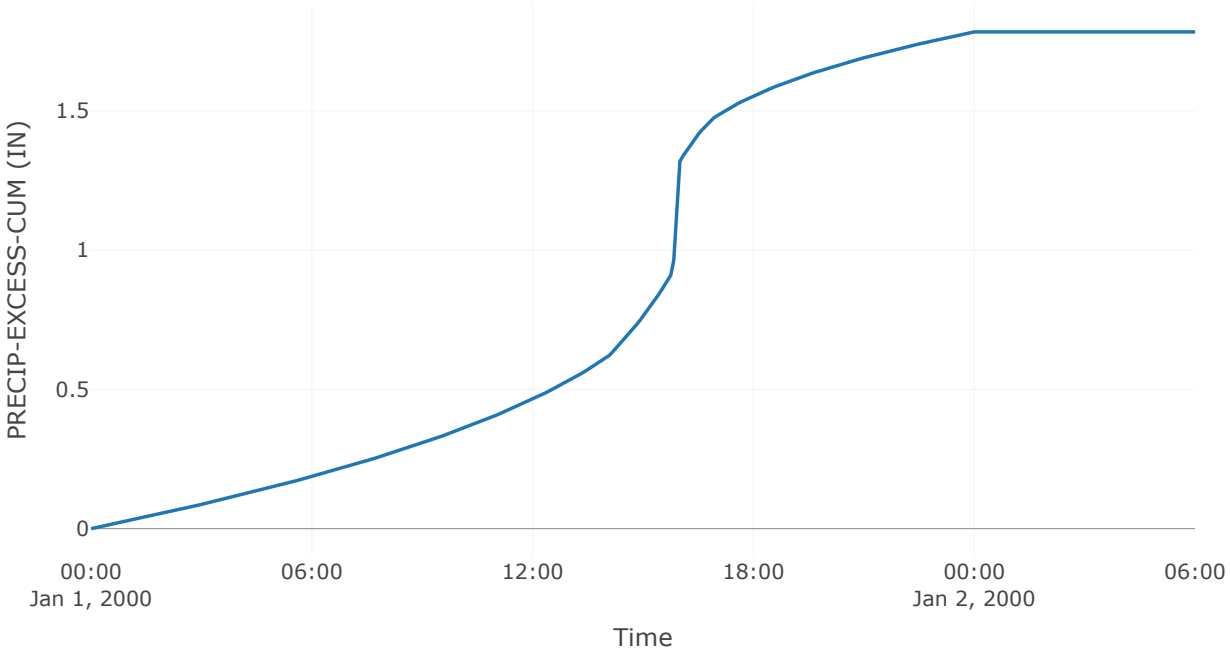
Transform: User - Specified S - Graph	
S - graph	Undeveloped Valley S - Graph
Lag Method	Specified
Lag	1.15

Results: Subbasin-1	
Peak Discharge (CFS)	2953.07
Time of Peak Discharge	01Jan2000, 16:55
Volume (IN)	1.78
Precipitation Volume (AC - FT)	1101.67
Loss Volume (AC - FT)	0
Excess Volume (AC - FT)	1101.67
Direct Runoff Volume (AC - FT)	1100.86
Baseflow Volume (AC - FT)	0

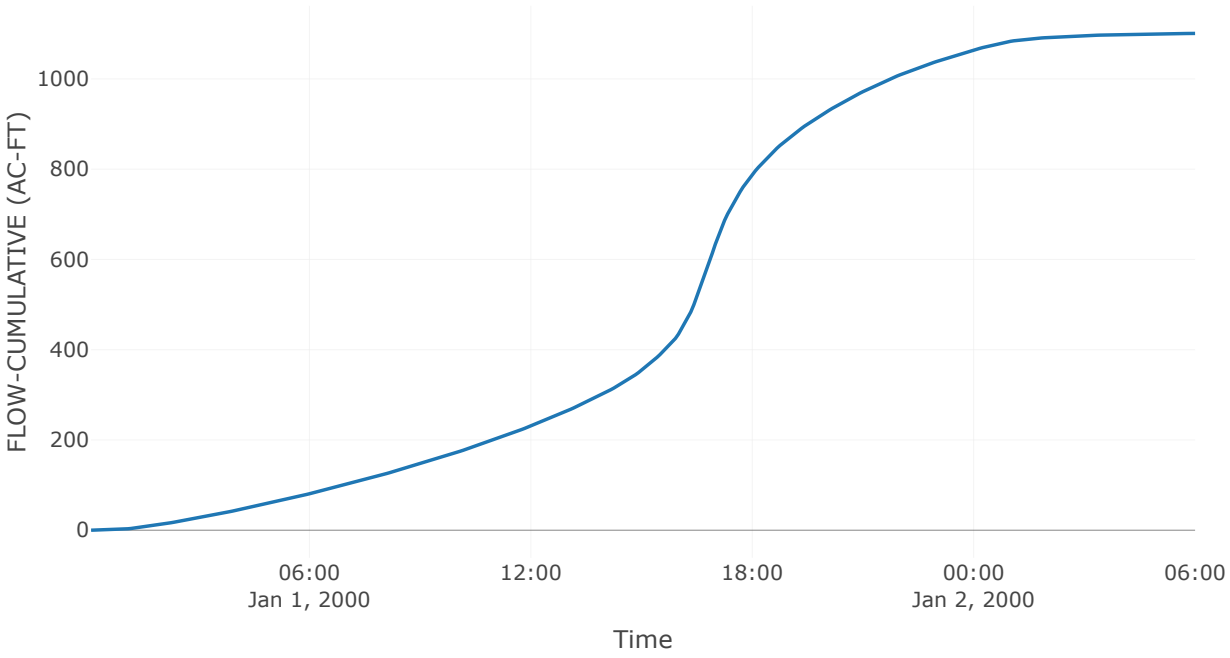
Precipitation and Outflow



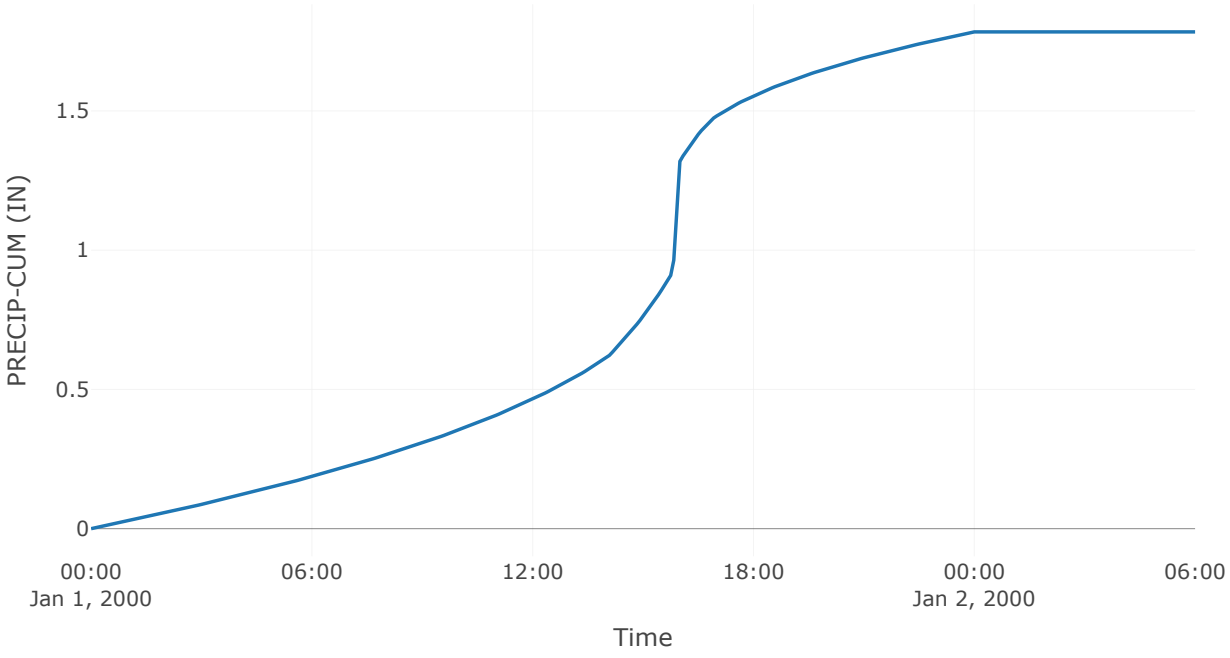
Cumulative Excess Precipitation

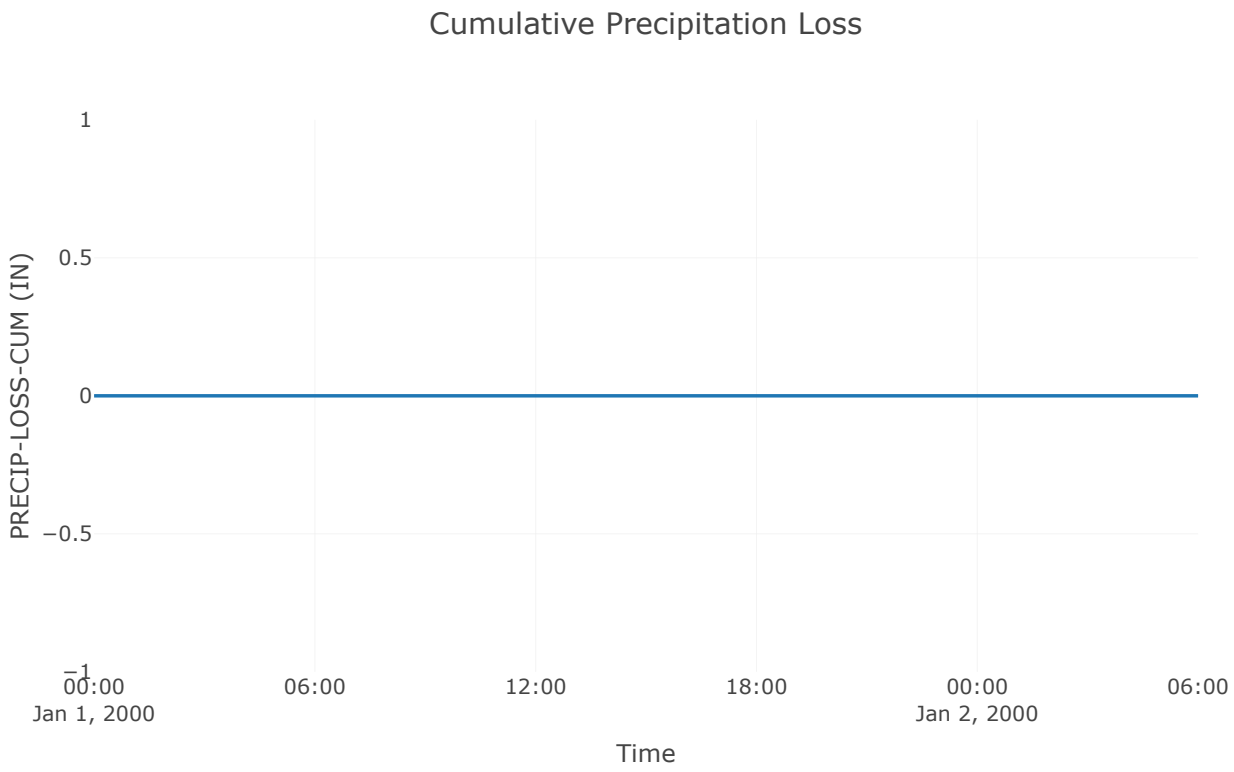


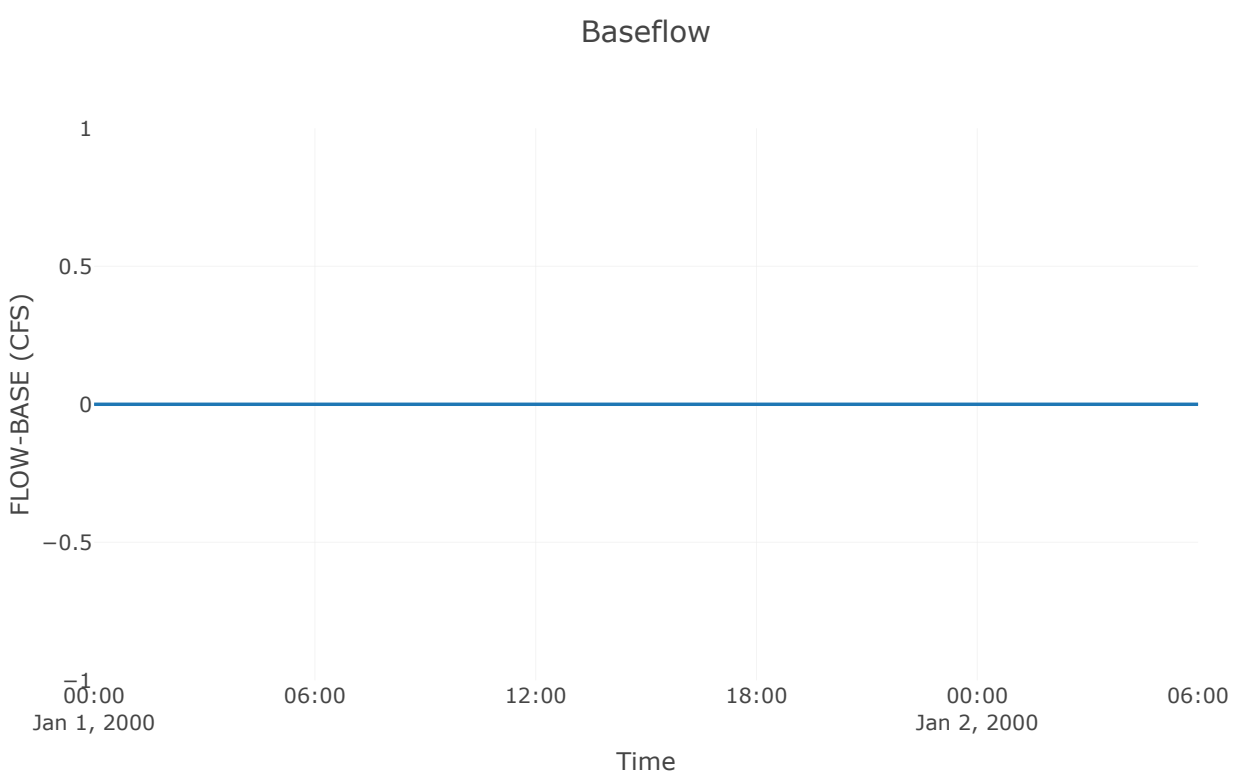
Cumulative Outflow

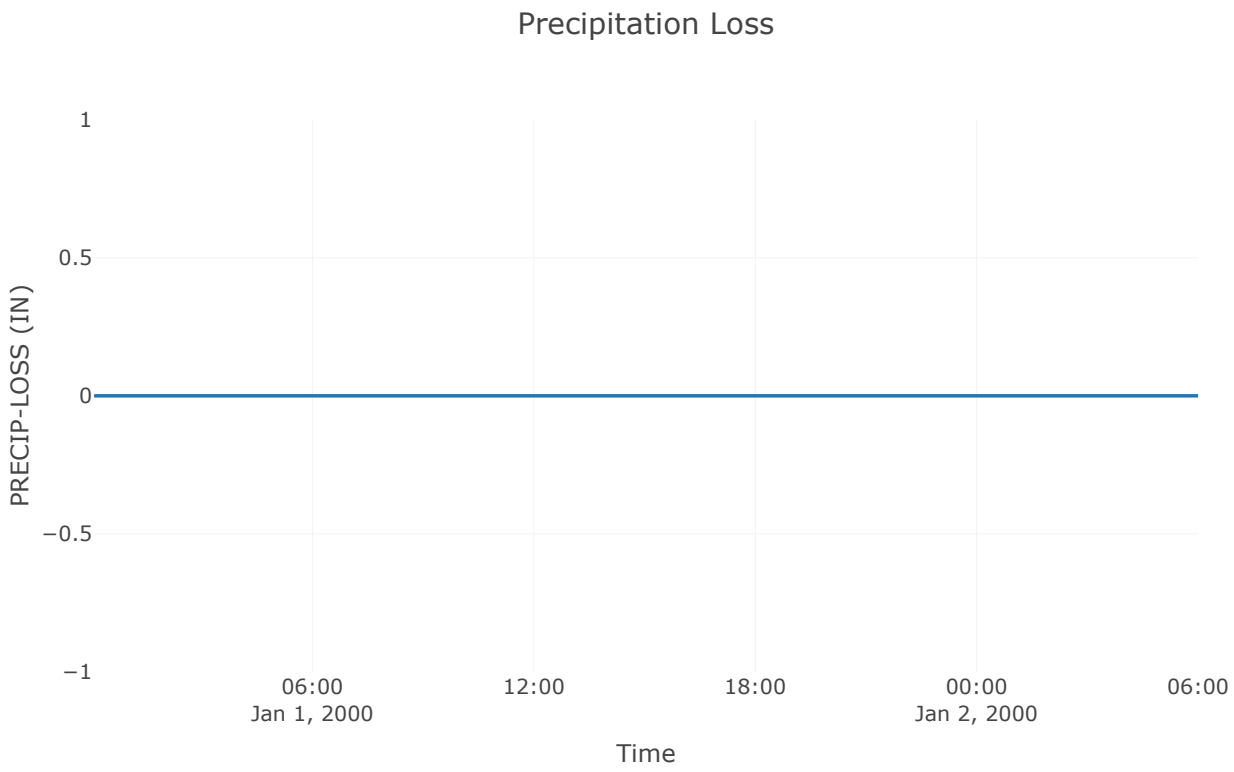


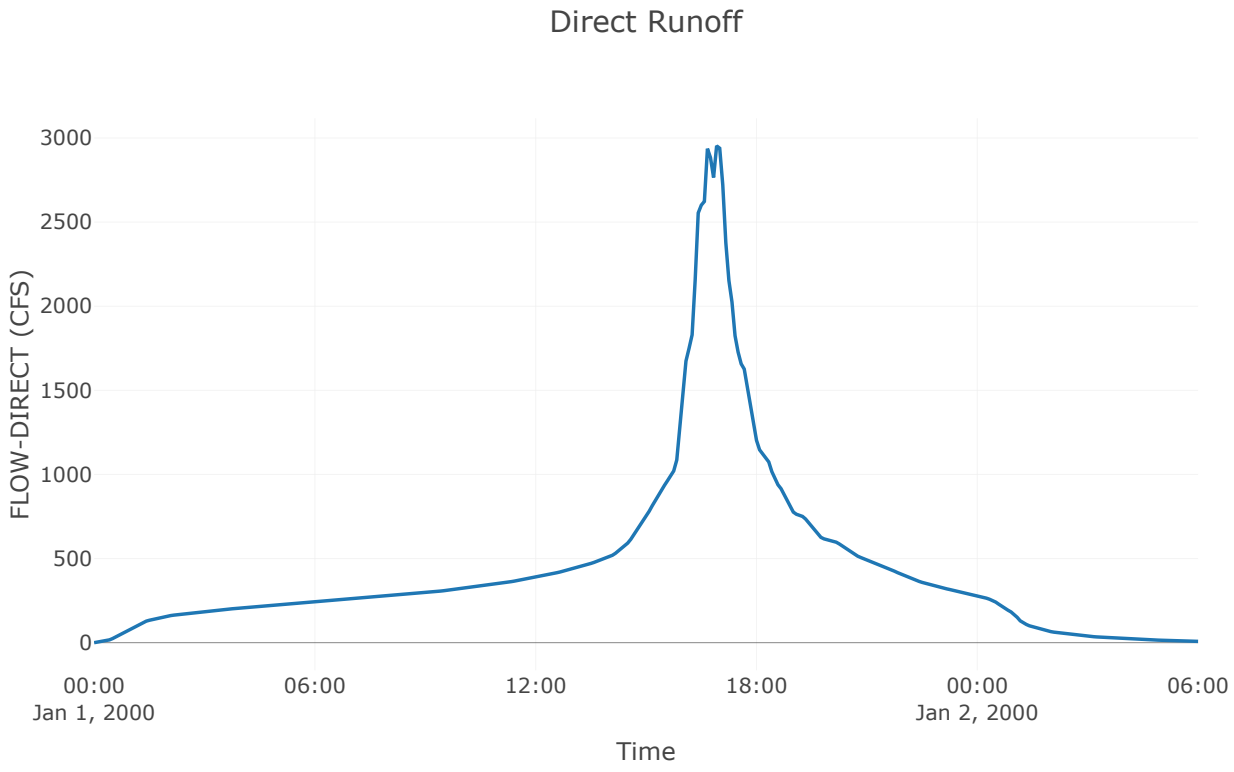
Cumulative Precipitation

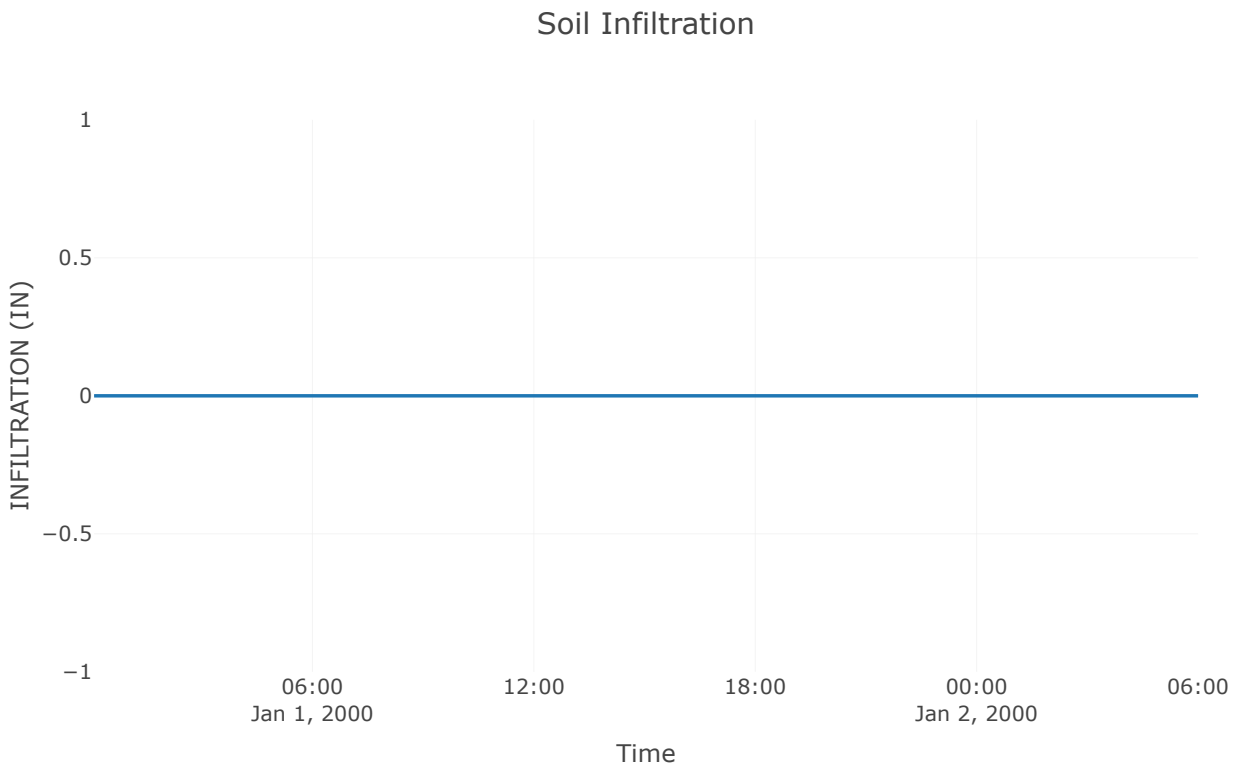



Cumulative Precipitation Loss
PRECIP-LOSS-CUM (IN)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
06:00
12:00
18:00
00:00
Jan 2, 2000
06:00
Time


Baseflow
FLOW-BASE (CFS)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
06:00
12:00
18:00
00:00
Jan 2, 2000
06:00
Time

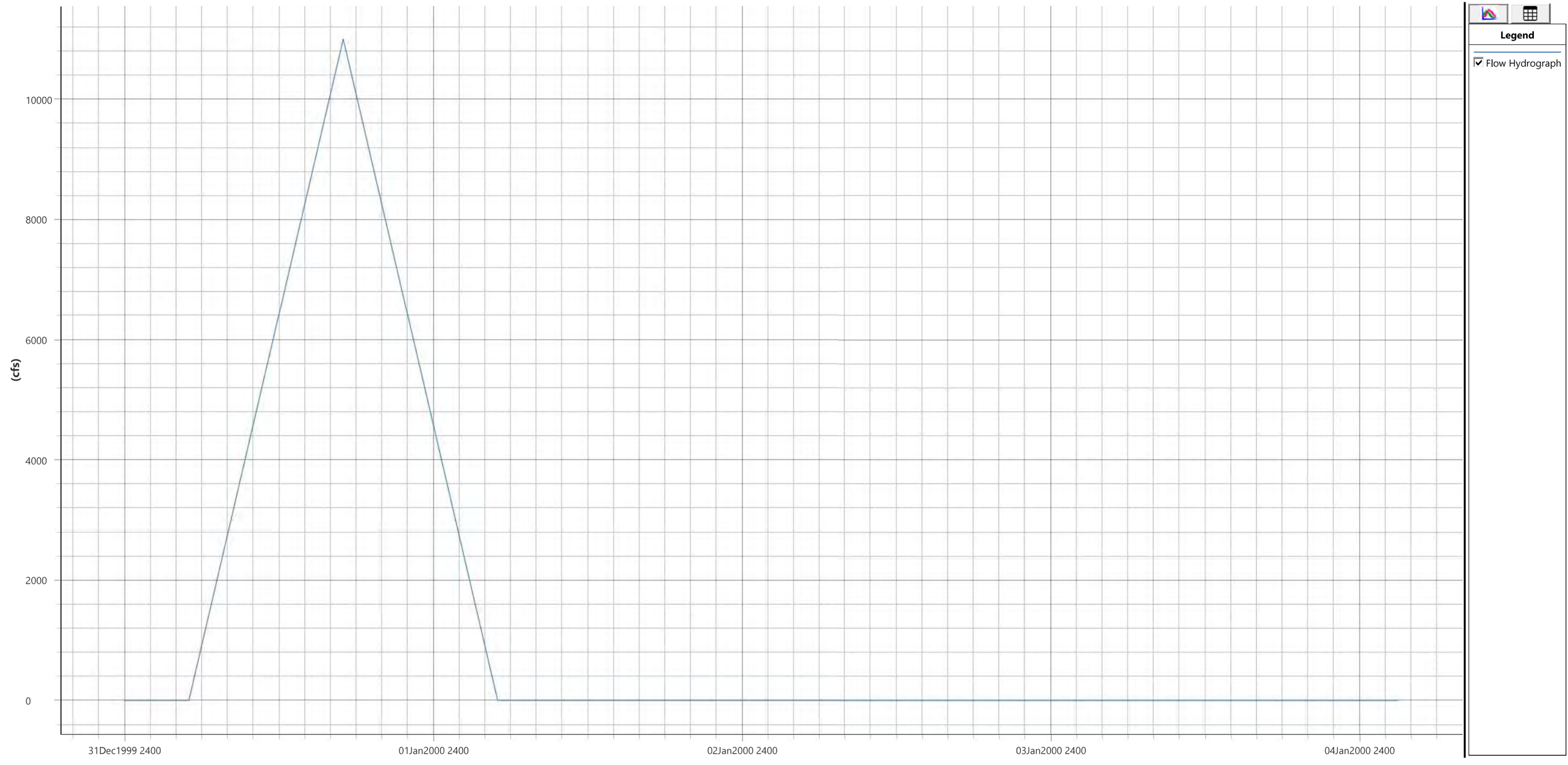

Precipitation Loss
PRECIP-LOSS (IN)
1
0.5
0
−0.5
−1
06:00
Jan 1, 2000
12:00
18:00
00:00
Jan 2, 2000
06:00
Time


Direct Runoff
FLOW-DIRECT (CFS)
3000
2500
2000
1500
1000
500
0
00:00
Jan 1, 2000
06:00
12:00
18:00
00:00
Jan 2, 2000
06:00
Time


Soil Infiltration
INFILTRATION (IN)
1
0.5
0
−0.5
−1
06:00
Jan 1, 2000
12:00
18:00
00:00
Jan 2, 2000
06:00
Time

Appendix F

Kern River Channel Hydrograph


Legend
Flow Hydrograph
(cfs)
10000
8000
6000
4000
2000
0
31Dec1999 2400
01Jan2000 2400
02Jan2000 2400
03Jan2000 2400
04Jan2000 2400

Appendix L
Noise Technical Report

Noise Technical Report (Revised)

Pelicans Jaw Hybrid Solar Project

FEBRUARY 2023

Prepared for:

PELICANS JAW SOLAR, LLC
3 Lagoon Drive, Suite 280
Redwood City, CA 94065
Contact: Tandy McMannes

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024
Contact: Jonathan V. Leech, INCE

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Acronyms and Abbreviations

Acronym/Abbreviation	Meaning
AUF	acoustical usage factor
ANSI	American National Standards Institute
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	community noise equivalent level
dB	decibel
dBA	A-weighted decibel
d_{ref}	The reference distance that helps define Leq (activity)
FAA	Federal Aviation Administration
FTA	Federal Transit Administration
HUD	U.S. Department of Housing and Urban Development
Hz	hertz
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
L_{min}	minimum sound level
L_v	vibration level
L_{xx}	percentile-exceeded sound levels
NSLU	noise-sensitive land use
OSHA	Occupational Safety and Health Act
PPV	peak particle velocity
RMS	root mean square
SPL	sound pressure level (or sound level) as measured by a sound level meter
USC	U. S. Code
VdB	vibration decibels
WHO	World Health Organization

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1 Introduction

1.1 Executive Summary

This Noise Technical Report was prepared in support of an application submitted by Pelicans Jaw Solar, LLC for the proposed development of the Pelicans Jaw Hybrid Solar Project (project), a solar energy facility on unincorporated lands in northwestern Kern County (County). The project site is located adjacent, and to the south of the border of Kern County with Kings County, approximately two miles each of the U.S. Interstate 5 (I-5).

The purpose of this noise technical report is to assess the potential noise impacts associated with implementation of the proposed project. This assessment uses the significance thresholds in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), as well as standards established in the local general plan and local noise ordinances, in determining the significance of project impacts related to noise.

This Noise Technical Report evaluated the potential for project-generated construction and operational noise emissions that could result in adverse impacts to sensitive receptors (i.e., structures and humans). This Noise Technical Report includes an assessment of ground-borne vibration impacts to sensitive receptors (i.e., structures and humans) based on vibration significance guidelines for project construction and operation. As described below, this Noise Technical Report concludes that construction and operational noise and vibration levels would not exceed CEQA thresholds.

This Noise Technical Report was prepared by Jonathan Leech, AICP, INCE. Mr. Leech's resume is provided in Appendix A.

1.2 Regional and Local Setting

The proposed project would be located on approximately 3,371 acres of private property in unincorporated Kern County, California, adjacent to the southern border of Kings County with direct access from I-5 located approximately 2 miles to the west. The project site is situated within portions of Sections 4, 5, 6, 8, 9, 15, 16, and 22 of Township 25 South, Range 21 East, San Bernardino Base and Meridian. The project site is generally bordered by Kern and Kings County line to the north, Lost Hills Road to the east, Twisselman Road to the south, and I-5 to the west. Please refer to Figure 1, Regional Map.

The project site is located entirely within Kern County, to the west of the Kern River Channel. The topography is characterized by an overall slope to the east/northeast. Elevations range from approximately 212 feet above mean sea level near the northeastern corner of the project site to approximately 223 feet above mean sea level at the central portion of the site. The project site and surrounding properties are currently vacant and have been used for cattle and sheep grazing since 2012. No crop cultivation has occurred on the project site within the last 10 years (between 2012 and 2022).

1.3 Project Description

The project would include up to 500-megawatt (MW) of photovoltaic solar generation and a battery energy storage system (BESS) with a capacity up to 4,000-megawatt hour (MWhr) located on approximately 3,371 acres of private property in Kern County, California. Construction of the project is anticipated to occur in three phases, with the first phase consisting of the installation of 300 MW of photovoltaic solar and the installation of up to 2,000 MWhr of battery energy storage beginning in the first quarter 2024 and becoming commercially operational in the fourth quarter of 2024 (up to 12 months). The second and third phases would consist of the installation of 200 MW of photovoltaic solar (phase two) and the installation of up to 2,000 MWhr of battery energy storage (phase three), with construction beginning in the first quarter of 2024 and commercial operation anticipated in the fourth quarter of 2024 (up to 12 months). The operational life of the proposed project is anticipated to be 35 years.

1.4 Noise Background and Terminology

1.4.1 Fundamentals of Environmental Noise

Vibrations, traveling as waves through air from a source, exert a force perceived by the human ear as sound. Sound pressure level (referred to as sound level) is measured on a logarithmic scale in decibel (dB) that represents the fluctuation of air pressure above and below atmospheric pressure. Frequency, or pitch, is a physical characteristic of sound and is expressed in units of cycles per second or hertz. The normal frequency range of hearing for most people extends from about 20 to 20,000 hertz. The human ear is more sensitive to middle and high frequencies, especially when the noise levels are quieter. As noise levels get louder, the human ear starts to hear the frequency spectrum more evenly. To accommodate for this phenomenon, a weighting system to evaluate how loud a noise level is to a human was developed. The frequency weighting, called “A” weighting, is typically used for quieter noise levels, which de-emphasizes the low-frequency components of the sound in a manner similar to the response of a human ear. This A-weighted sound level is called the “noise level” and is referenced in units of A-weighted decibel (dBA). Table 1 presents typical noise levels for common outdoor and indoor activities. Since sound is measured on a logarithmic scale, a doubling of sound energy results in a 3-dBA increase in the noise level. Changes in a community noise level of less than 3 dBA are not typically noticed by the human ear (Caltrans 2020a). Changes from 3 to 5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5-dBA increase is readily noticeable (EPA 1974). The human ear perceives a 10-dBA increase in sound level as a doubling of the sound level (i.e., 65 dBA sounds twice as loud as 55 dBA to a human ear).

An individual’s noise exposure occurs over time; however, noise level is a measure of noise at a given instant in time. Community noise sources vary continuously, being the product of many noise sources at various distances, all of which constitute a relatively stable background or ambient noise environment. The background, or ambient, noise level gradually changes throughout a typical day, corresponding to distant noise sources such as traffic volume and changes in atmospheric conditions. The time-varying character of environmental noise is often described with use of statistical or percentile noise descriptors including L_{10}, L_{50}, and L_{90}. These are the noise levels equaled or exceeded during 10, 50, and 90 percent of the measured time interval. Sound levels associated with L_{10} typically describe transient or short-term events, such as the noise from distinct passing cars and trucks. L_{50} represents the median sound level during the measurement. Levels will be above and below this value exactly one-half of the accumulated measurement time. L_{90} is the sound level exceeded 90 percent of the time, and often is used to describe background noise conditions or sources that are continuous or “steady-state” in character.

Table 1. Typical Noise Levels Associated with Common Activities

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, 50 miles per hour		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher (in next room)
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing (Healthy)	0	Lowest Threshold of Human Hearing (Healthy)

Source: Caltrans 2020a.
Notes: dBA = A-weighted decibel; mph = miles per hour.

Noise levels are generally higher during the daytime and early evening when traffic (including airplanes), commercial, and industrial activity is the greatest. However, noise sources experienced during nighttime hours when background levels are generally lower can be potentially more conspicuous and irritating to the receiver. To evaluate noise in a way that considers periodic fluctuations experienced throughout the day and night, a concept termed "community noise equivalent level" (CNEL) was developed, wherein noise measurements are weighted, added, and averaged over a 24-hour period to reflect magnitude, duration, frequency, and time of occurrence.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}, respectively), percentile-exceeded sound level (L_{xx}), the day-night sound level (L_{dn}), and the CNEL. The following list provides brief definitions of noise terminology used in this report.

- Decibel (dB) is a unitless measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micropascals.

- **A-weighted decibel** (dBA) is an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent sound level** (L_{eq}) is the constant level that, over a given time period, transmits the same amount of acoustic energy as the actual time-varying sound. Equivalent sound levels are the basis for both the L_{dn} and CNEL scales.
- **Maximum sound level** (L_{max}) is the maximum sound level measured during the measurement period.
- **Minimum sound level** (L_{min}) is the minimum sound level measured during the measurement period.
- **Percentile-exceeded sound level** (L_{xx}) is the sound level exceeded X% of a specific time period. L_{10} is the sound level exceeded 10% of the time.
- **Day-Night Average Sound Level** (L_{dn}) is a 24-hour average A-weighted sound level with a 10 dB penalty added each of the hourly average noise levels occurring in the nighttime hours from 10:00 p.m. to 7:00 a.m. The 10 dB penalty is applied to account for increased noise sensitivity during the nighttime hours.
- **Community Noise Equivalent Level** (CNEL) is the average equivalent A-weighted sound level during a 24-hour day. CNEL accounts for the increased noise sensitivity during the evening hours (7:00 p.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.) by adding 5 dB to the recorded hourly average sound levels in the evening and 10 dB to the hourly average sound levels at night.

1.4.1.1 Exterior Noise Distance Attenuation

Noise sources are classified in two forms: (1) point sources, such as stationary equipment or a group of construction vehicles and equipment working within a spatially limited area at a given time; and (2) line sources, such as a roadway with a large number of pass-by sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dBA for each doubling of distance from the source to the receptor at acoustically "hard" sites and at a rate of 7.5 dBA for each doubling of distance from source to receptor at acoustically "soft" sites (Caltrans 2020a). Sound generated by a line source (i.e., a roadway) typically attenuates at a rate of 3 dBA and 4.5 dBA per doubling distance, for hard and soft sites, respectively (Caltrans 2020a). Sound levels can also be attenuated by human-made or natural barriers. For the purpose of a sound attenuation discussion, a hard or reflective site does not provide any excess ground-effect attenuation and is characteristic of asphalt or concrete ground surfaces, as well as very hard-packed soils. An acoustically soft or absorptive site is characteristic of unpaved loose soil or vegetated ground.

With respect to examples of this distance-attenuation relationship for exterior noise, a 60-dBA noise level measured at 50 feet from a tractor installing fenceposts within a packed earth feedlot site would diminish to 54 dBA at 100 feet from the source, and to 48 dBA at 200 feet from the source. This scenario is addressed by the point source attenuation for a hard site (6 dBA with each doubling of the distance). For the scenario where soft-site conditions exist between the point source and receptor, represented by natural vegetation, planted row crop, or plowed furrows adjacent to the work area, an attenuation rate of 7.5 dBA per doubling of distance would apply; the tractor noise measured as 60 dBA at 50 feet would diminish to 52.5 dBA at 100 feet from the source and to 45 dBA at 200 feet from the source, where soft ground exists between the sound source and the receptor location.

1.4.1.2 Structural Noise Attenuation

Sound levels can also be attenuated by human-made or natural barriers. Solid walls, berms, or elevation differences typically reduce noise levels in the range of approximately 5 to 15 dBA (Caltrans 2020a). Structures can also provide

noise reduction by insulating interior spaces from outdoor noise. The outside-to-inside noise attenuation provided by typical structures in California ranges between 17 to 30 dBA with open and closed windows, respectively, as shown in Table 2.

Table 2. Outside-to-Inside Noise Attenuation (dBA)

Building Type	Open Windows	Closed Windows
Residences	17	25
Schools	17	25
Churches	20	30
Hospitals/offices/hotels	17	25
Theaters	17	25

Source: Transportation Research Board, National Research Council 1971.
Notes: dBA = A-weighted decibel.
As shown, structures with closed windows can attenuate exterior noise by a minimum of 25 to 30 dBA

1.4.2 Fundamentals of Vibration

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Heavy equipment operation, including stationary equipment that produces substantial oscillation or construction equipment that causes percussive action against the ground surface, may be experienced by building occupants as perceptible vibration. It is also common for groundborne vibration to cause windows, pictures on walls, or items on shelves to rattle. Although the perceived vibration from such equipment operation can be intrusive to building occupants, the vibration is seldom of sufficient magnitude to cause even minor cosmetic damage to buildings.

Peak particle velocity (PPV) that describes particle movement over time (in terms of physical displacement of mass, expressed as inches/second or in/sec) is generally employed for the discussion of vibration impacts on people and structures. Groundborne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities. Next to pile driving and soil compacting, grading activity has the greatest potential for vibration impacts when earthwork involves large bulldozers, large trucks, or other heavy equipment.

1.4.3 Health Effects of Noise

Excessively noisy conditions can affect an individual's quality of life, health, and well-being. The effects of noise can be organized into six broad categories: sleep disturbance, permanent hearing loss, human performance and behavior, social interaction or communication, extra-auditory health effects, and general annoyance. An individual's reaction to noise and its level of disturbance depends on many factors such as the source of the noise, its loudness relative to the background noise level, time of day, whether the noise is temporary or permanent, and subjective sensitivity.

1.5 Noise Regulation and Management

1.5.1 Federal

1.5.1.1 Federal Aviation Administration Standards

Enforced by the Federal Aviation Administration, Code of Federal Regulations Title 14, Part 150, prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving those programs. Title 14 also identifies those land uses that are normally compatible with various levels of exposure to noise by individuals. The Federal Aviation Administration has determined that interior sound levels up to 45 dBA L_{dn} (or CNEL) are acceptable within residential buildings. The Federal Aviation Administration also considers residential land uses to be compatible with exterior noise levels at or less than 65 dBA L_{dn} (or CNEL).

1.5.1.2 Federal Transit Administration (FTA)

In its Transit Noise and Vibration Impact Assessment guidance manual, the FTA recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an eight-hour period when detailed construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project (FTA 2006). Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such limits at the state and local jurisdictional levels.

1.5.2 State

1.5.2.1 California Department of Transportation Vibration Standards

The California Department of Transportation (Caltrans) conducted extensive research on human annoyance and damage to structures caused by vibration from short term construction activities and from long term highway operations and has published criteria for vibration management (Transportation and Construction Vibration Guidance Manual 2020). These criteria established by Caltrans are commonly used to assess vibration impacts from all types of projects and activities. Caltrans uses a threshold of 0.2 in/sec PPV for annoyance to persons, where a continuous vibration source is involved; for transient sources (represented by construction activities), Caltrans uses a threshold of 0.24 in/sec PPV (which equates to a distinctly perceptible level). For commercial buildings constructed of concrete and steel, Caltrans identifies a damage threshold of 0.5 in/sec PPV. For residential structures employing concrete foundation and wood frame construction, Caltrans identifies a conservative damage threshold vibration level standard of 0.3 in/sec PPV (Caltrans 2020b).

1.5.2.2 California Noise Control Act of 1973

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, declares that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also identifies a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare

1.5.2.3 California Department of Health Services

DHS has developed guidelines of community noise acceptability for use by local agencies, which have been published by the Governor's Office of Planning and Research (2003) as the Land Use Compatibility for Community Noise Environments Matrix. Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

1.5.3 Local

1.5.3.1 Kern County General Plan

The Noise Element of the Kern County General Plan identifies noise-sensitive land uses and noise sources, defines areas of noise impact, and establishes goals, policies, and programs to ensure that County residents are protected from excessive noise, and to develop an implementation program which could effectively mitigate potential noise problems. The implementation measures have been designed so that they will not subject residential or other sensitive noise land uses to exterior noise levels in excess of 65 dBA Ldn, and interior noise levels in excess of 45 dBA Ldn.

In accordance with the Energy Element of the Kern County General Plan, Policy 10, the County may also require the preparation of an acoustical analysis for energy project proposals that might impact sensitive and highly sensitive uses.

Applicable goals, policies, and implementation measures from the Noise and Energy Elements of the County's General Plan, relevant to the proposed project, are summarized below (County of Kern 2009).

Chapter 3. Noise Element

Goals

Goal 1: Ensure that residents of Kern County are protected from excessive noise and that moderate levels of noise are maintained.

Goal 2: Protect the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise producing roadways, industries, railroads, airports, oil and gas extraction, and other sources.

Policies

Policy 1: Review discretionary industrial, commercial, or other noise-generating land use projects for compatibility with nearby noise-sensitive land uses,

Policy 3: Encourage vegetation and landscaping along roadways and adjacent to other noise sources in order to increase absorption of noise,

Policy 4: Utilize good land use planning principles to reduce conflicts related to noise emissions.

Policy 7: Employ the best available methods of noise control.

Implementation Measures

Measure A: Utilize zoning regulations to assist in achieving noise-compatible land use patterns.

Measure C: Review discretionary development plans, programs and proposals, including those initiated by both the public and private sectors, to ascertain and ensure their conformance to the policies outlined in this element.

Measure F: Require proposed commercial and industrial uses or operations to be designed or arranged so that they will not subject residential or other noise-sensitive land uses to exterior noise levels in excess of 65 dB Ldn and interior noise levels in excess of 45 dB Ldn.

Measure G: At the time of any discretionary approval, such as a request for a General Plan Amendment, zone change or subdivision, the developer may be required to submit an acoustical report indicating the means by which the developer proposes to comply with the noise standards. The acoustical report shall:

a) Be the responsibility of the applicant.
b) Be prepared by a qualified acoustical consultant experienced in the fields of environmental noise assessment and architectural acoustics.
c) Be subject to the review and approval of the Kern County Planning Department and the Environmental Health Services Department. All recommendations therein shall be complied with prior to final approval of the project.

Measure I: Noise analyses shall include recommended mitigation, if required, and shall:

a) Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
b) Include estimated noise levels, in terms of CNEL, for existing and projected future (10–20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element.
c) Include recommendations for appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element.
d) Include estimates of noise exposure after the prescribed mitigation measures have been implemented. If compliance with the adopted standards and policies of the Noise Element will not be achieved, a rationale for acceptance of the project must be provided.

Measure J: Develop implementation procedures to ensure that requirements imposed pursuant to the findings of an acoustical analysis are conducted as part of the project permitting process.

Chapter 5. Energy Element

Policies

Policy 10: The County should require acoustical analysis for energy project proposals that might impact sensitive and highly-sensitive uses in accordance with the Noise Element of the General Plan.

1.5.3.2 Kern County Zoning Ordinance

Section 19.80.030.S(1) of the Kern County Zoning Ordinance restricts noise generated by commercial or industrial uses within 500 feet of a residential use or residential zone district. The commercial or industrial use shall not generate noise that exceeds an average 65 dB Ldn between the hours of 7:00 a.m. and 10:00 p.m. and shall not generate noise that exceeds 65 dB L_{eq}, or which would result in an increase of 5 dB L_{eq} or more from ambient sound levels, whichever is greater, between the hours of 10:00 p.m. and 7:00 a.m. Commercial or industrial facilities that are located in the M-3 zone district are exempt from these noise-generation restrictions.

1.5.3.3 Kern County Code of Ordinances

The Kern County Code of Ordinances, Chapter 8.36 (Noise Control), includes acceptable hours of construction, and limitations on construction related noise impacts on adjacent sensitive receptors.

Section 8.36.020 – Prohibited sounds

It is unlawful for any person to do, or cause to be done, any of the following acts within the unincorporated areas of the county:

H. To create noise from construction, between the hours of nine (9:00) p.m. and six (6:00) a.m. on weekdays and nine (9:00) p.m. and eight (8:00) a.m. on weekends, which is audible to a person with average hearing faculties or capacity at a distance of one hundred fifty (150) feet from the construction site, if the construction site is within one thousand (1,000) feet of an occupied residential dwelling except as provided below:

1. The resource management director or a designated representative may for good cause exempt some construction work for a limited time.
2. Emergency work is exempt from this section.

1.5.3.4 Local Vibration Standards

Vibration standards have not been adopted by Kern County. For this study, the vibration criteria adopted by Caltrans are employed for assessment of vibration impacts. For transient sources (represented by construction activities), Caltrans uses a human annoyance threshold of 0.24 in/sec PPV (which equates to a distinctly perceptible level). For fragile historic structures, Caltrans identifies a threshold of 0.3 in/sec PPV for a single event source (e.g., blasting) and 0.12 in/sec PPV for a continued source (e.g., traffic, vibratory pile drives, vibratory compaction equipment, etc.). (Caltrans 2020b). For typical residential structures employing concrete foundation and wood frame construction, Caltrans identifies a conservative damage threshold vibration level standard of 0.3 in/sec PPV (continued source) to avoid potential damage to older residential structures (Caltrans 2020b).

1.6 Significance Criteria

Appendix G of the CEQA Guidelines contains analysis guidelines related to noise and vibration impacts. These guidelines have been used as thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Criteria Not Applicable to the Proposed Project

The project site is not located within an area covered by the Kern County Airport Land Use Compatibility Plan. The nearest public airport to the project site is the Wasco-Kern County Airport, located approximately 20 miles southeast of the project site. The closest private airport facility to the project site is Creekside Airport, located approximately 10 miles southwest of the project site. Given the project is not located within two miles of an airport, future residents would not be exposed to elevated noise levels from aircraft operations. Airport noise impacts are not addressed further in the analysis.

2 Environmental Setting

2.1 Sensitive Receptors

Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound or vibration could adversely affect the use of the land. Residences, hospitals, nursing care or assisted living facilities, guest lodging, and churches would be considered noise- and vibration-sensitive. In addition, vibration-sensitive land uses also include institutional uses such as laboratories where the activities within the building are particularly sensitive to vibration. The closest off-site sensitive receptor to the project site includes a residence located 3.8 miles west of the project site, which is represented as location ST1 on Figure 3.

2.2 Ambient Noise Survey

Sound-pressure level measurements of short duration (i.e., less than an hour apiece) were conducted in the vicinity of the project site on April 22, 2022, to quantify and characterize the existing outdoor noise levels. Table 3, Measured Short-Term Baseline Outdoor Noise Levels, provides the location, date, and time at which these baseline noise level measurements were taken. The sound-pressure level measurements were performed by an attending Dudek field investigator using a SoftdB Piccolo model sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute standard for a Type 2 (general purpose) sound level meter. The accuracy of the sound level meter was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately five feet above the ground.

As detailed in Table 3, four short-term noise level measurement locations were selected (ST1-ST4) that represent either existing sensitive receivers and/or roadway facilities to which the project would principally contribute trips, or where on-site noise sources are expected to be concentrated and thus could represent an area of maximum sound level generation for the project. These noise measurement locations are depicted on Figure 3, Ambient Noise Monitoring Locations.

The L_{eq} and L_{max} noise levels measured at these locations are provided in Table 3. The primary noise sources at the sites identified in Table 3 consisted of traffic along roadways in the vicinity. As shown in Table 3, the measured existing ambient sound levels at ST1–ST4 ranged from approximately 47.9 dBA L_{eq} at ST3 to 64.1 dBA L_{eq} at ST4. The higher noise levels recorded at ST4 appear to be the result of the unobstructed exposure of this measurement location to traffic noise associated with I-5. Noise measurement data summarized in Table 3 is also included in Appendix B, along with field data sheets that provide additional information about field conditions and noise contributors to each measured sound level.

Table 3. Measured Short-Term Ambient Outdoor Noise Levels

Receptor	Location/Address	Date	Time	L_{eq} (dBA)	L_{max} (dBA)
ST1	Closest residence to project site, south side of Twisselman Road on east side of aqueduct	April 22, 2022	2:00 PM to 2:15 PM	51.3	77.1
ST2	Twisselman Road east of I-5		12:10 PM to 12:25 PM	59.7	73.9

Table 3. Measured Short-Term Ambient Outdoor Noise Levels

Receptor	Location/Address	Date	Time	L_{eq} (dBA)	L_{max} (dBA)
ST3	Lost Hills Road at eastern project site boundary		12:35 PM to 12:50 PM	47.9	62.3
ST4	Western project site boundary adjacent to the alternate locations of the Pacific Gas & Electric (PG&E) switching station, project substation, BESS, and operations and maintenance building		1:15 PM to 1:30 PM	64.1	82.2

Source: Appendix B
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels; ST = short-term noise measurement locations.

2.3 Existing Traffic Noise Levels

Dudek's transportation team identified the existing average daily trips (ADT) on roadways in the project vicinity including I-5, Twisselman Road, and Lost Hills Road (Traffic Generation Assessment for the Pelicans Jaw Hybrid Solar Project, Dudek, September 9, 2022). Based upon the identified existing ADTs for these roadways, Dudek calculated the traffic noise level along each roadway using equations adapted from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). The traffic noise levels in Table 4 are based upon reported existing ADTs, and not on the manual traffic counts conducted during the short-term ambient noise measurements.

Table 4. Modeled Existing Traffic Noise Levels (dBA)

Road	Associated Short-term Noise Measure Location	Daytime Hourly L_{eq}	Nighttime Hourly L_{eq}	CNEL
Twisselman Road West of I-5	ST1	55.8	47.1	56.4
Twisselman Road East of I-5	ST2	45.0	36.3	45.6
Lost Hills Road	ST3	44.6	36.0	45.2
Interstate 5 (I-5)	N/A	76.5	68.0	77.2

3 Impacts and Mitigations

3.1 Methodology

3.1.1 Construction Noise

One of the most extensive and widely used databases for sound levels from motorized or powered equipment is the FHWA RCNM. While the focus of data compilation was for equipment that would typically be employed for the construction of transportation facilities, the list is comprehensive enough to be useful in assessing sound levels for nearly every activity for which powered equipment is used. Table 5 provides an excerpt from RCNM of the sound levels generated by various powered equipment that could be associated with construction of the project. Note that the equipment noise levels presented in Table 5 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 5. Selected Powered Equipment Noise Emission Levels from RCNM

Equipment	Maximum Sound Level (dBA L_{max}) – 50 feet from Source
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Loader	85
Paver	89
Pneumatic Tool	85
Pump	76
Roller	74
Saw	76
Scraper	89
Truck	88

Source: FHWA 2006a, 2006b.
Notes: dBA = decibel (A-weighted).

Noise emissions from the construction phase of the project were estimated based upon construction scenario information provided by the project applicant, including phasing, equipment mix, and vehicle trips, and CalEEMod default values when project specifics were not known. The construction equipment mixes, and vehicle trips used for estimating the project-generated construction noise emissions are included in Appendix C.

A Microsoft Excel–based noise prediction model emulating and using reference data from the FHWA RCNM was used to estimate construction noise levels at the nearest noise-sensitive land use (i.e., residence), based upon the distance between the closest project construction boundary and this residence. Aggregate noise emission from project construction activities, broken down by sequential phase and sub-phase of construction activity, was predicted for the worst-case construction activity occurring along the closest construction boundary to the off-site closest residence. Dudek compared predicted construction noise levels to the recommended FTA construction noise exposure standard and to measured ambient noise levels.

3.1.2 Traffic Noise

Dudek's transportation team evaluated project-related traffic levels along roadways to which the project would principally contribute vehicle trips, including I-5, Twisselman Road, and Lost Hills Road (Traffic Generation Assessment for the Pelicans Jaw Hybrid Solar Project, Dudek, September 9, 2022). Project-related traffic noise levels were examined along these same roadways using the results of the traffic analysis. Acoustical calculations using standard noise modeling equations adapted from the FHWA noise prediction model were performed for the following scenarios: Existing, Existing Plus Project Construction Traffic, and Existing Plus Project Operational Traffic.

The modeling calculations take into account the posted vehicle speed, average daily traffic volumes for each scenario, and the estimated vehicle mix (i.e., automobiles, medium and heavy trucks). The model assumed soft-site propagation conditions, as the roadways are surrounded by undeveloped agriculture lands. Noise levels were modeled at 50 feet from the centerline of each road. Noise levels at greater distances from the roadway centerline would be lower due to attenuation provided by increased distance from the noise source. Generally, noise from heavily traveled roadways would experience a decrease of approximately 3 dBA for every doubling of distance from the roadway. The noise model does not take into account the sound-attenuating effect of intervening structures, barriers, vegetation, or topography. Therefore, the noise levels predicted by the model are conservative with respect to traffic noise exposure levels along these roadways.

3.1.3 Operational Noise Level Quantification

Stationary Source Reference Sound Levels

Long-term operational project noise was assessed based upon the site layout plans indicating locations for each of the major noise-generating components, identified sound level for each piece of equipment, and the location of the closest noise-sensitive receivers (i.e., residences) to the project site. Typical noise-producing equipment associated with the proposed project includes PV trackers, string inverters for PV panel arrays, integrated BESS consisting of batteries, controllers, and inverters, mid-level transformers, emergency electrical power generators, and substations/switching stations with step-up transformers. The exact equipment types, models, locations and associated noise levels were not available for all potential project noise sources at the time this analysis was conducted; however, where project-specific information was not available, Dudek identified an appropriate representative sound level reference for each type of major equipment to be used at the facility. A description of major project equipment and the employed sound level reference for each are provided below. Refer to Figure 3 for the site layout indicating the location of the project components described below. The operational noise analysis in this report is based upon the updated locations as noted on Figure 2 for the BESS, Proposed Substation, and PG&E Switching Station.

PV Inverters & Mid-Level Transformers

Specifications provided for the string inverters indicate the project intends to employ SMA Model SC4200UP. Manufacturer sound data is not yet available for this model, but for a similar model (SC 2500-EV), the manufacturer reports a sound pressure level of 64 dBA at 10 meters (32.8 feet). The reported sound level for this similar string inverter would be reasonable to employ in the assessment of sound levels generated by the project string inverters. According to the site layout, 140 SMA inverters would be distributed throughout the solar array areas. Each inverter would be paired with a mid-level transformer. According to National Electric Manufacturers Association (NEMA) Standards Publication No. TR 20- 2014 – Dry Type Transformers for General Applications (NEMA 2014), noise level limits are specified for equivalent winding kilovolt-amps ranges and cooling systems. 67 dBA is the highest acceptable noise level at 1 foot from transformers for the capacity expected to be necessary for the field transformers; at 32.8 feet the sound level for the field transformers would be 37 dBA apiece. Because the transformers would generate sound levels 31 dBA lower than the inverters, the combined sound level of each inverter/transformer pair would be no greater than the inverter by itself (when two sound levels differ by more than 10 dBA, the sum of the two is equal to the higher sound level). A sound pressure level reference of 64 dBA at 32.8 feet was thus used to model each string inverter/transformer pair.

Substation and Switching Station Transformers

According to the project site plan, there would be up a project substation and a PG&E switching station. Substations and switching stations typically include step-up transformers. Dudek reviewed noise level data associated with various capacity transformers previously analyzed for other projects. Based upon this review, Dudek identified that noise levels associated with substation and switching station transformers that are expected to be employed at the project typically range from approximately 75 to 89 dB at a distance of 3 feet from the source. A reference sound level of 89 dBA at 1 meter (3.28 feet) from the source is used in this analysis to represent substation and switching station transformers. One step-up transformer was modeled at the substation and at the switching station.

Battery Energy Storage System

According to the project description, BESS units could be distributed throughout the site, could be consolidated in one area of the site and employ individual BESS containers or units, or could be housed in a centralized structure. Worst-case noise levels would be associated with a configuration that places all the BESS units in a dedicated portion of the project site, as this would represent a concentrated noise source that could have an effective distance to the closest sensitive receiver much shorter than individual units in a distributed BESS configuration.

Dudek modeled the BESS component as if implemented in a dedicated area of the site (as indicated in the site layout), employing individual BESS units (not within a single centralized structure). Dudek used the sound level reference for a Tesla MegaPack to model BESS operational noise. Based upon the quantity of Tesla MegaPacks used on another project to achieve 600 MWhr of storage, Dudek estimated 1,492 MegaPacks would be included in the project to achieve the target 4,000 MWhr of storage capacity. Based upon use histograms for six separate sites across the US, the most common fan speed power setting for the MegaPack is 40% throughout day and night periods, which yields a sound pressure level of 79 dBA at 1 meter (3.28 feet).

Typically, one mid-level transformer is provided for each 4 MegaPacks. Assuming 1,492 MegaPacks, 372 mid-level transformers would be anticipated, placed on ground-level pads throughout the dedicated BESS portion of the site. According to National Electric Manufacturers Association (NEMA) Standards Publication No. TR 20- 2014 – Dry Type

Transformers for General Applications (NEMA 2014), noise level limits are specified for equivalent winding kilovolt-amps ranges and cooling systems. 64 dBA is the highest acceptable noise level at 1 foot from transformers for the capacity expected to be necessary for the BESS transformers; at 3.28 feet the sound level for the field transformers would be 54 dBA apiece.

Up to two (2) emergency electrical generators may be included in the BESS component, to ensure that cooling equipment for the systems would continue to function in the event of an electrical service interruption. Dudek used the sound reference level for a Generac SG250 generator (250 kW capacity) with a factory supplied level 1 acoustic enclosure. The reported sound level is 77.8 dBA at 23 feet.

Trackers

The project's photovoltaic (PV) panels would utilize axis trackers to periodically adjust the angle of the PV panels in relation to the sun. This would occur intermittently throughout the daytime hours. Noise levels associated with trackers are very low in nature, approximately 37 dB at a distance of 10 feet from the source (AECOM 2012). Such noise levels are essentially negligible and inaudible beyond a few feet from the source. Noise contributions from the trackers were therefore not combined with the noise contributions from the major equipment in the noise analysis.

Electrical Transmission Lines (Gen-Tie Lines)

The project would include overhead electrical transmission lines, generally referred to as gen-tie lines. The exact gen-tie line routes are not known at this time, and a few options are being considered. Gen-tie lines are used to facilitate the transmission of generated electricity to off-site stations. Noise associated with gen-tie lines are considered negligible and are generally limited to noise associated with corona discharge. The noise is often described as a crackling or humming sound, and associated noise levels could be expected to be approximately 25 dBA at a distance of 25 feet from the source (AECOM 2012). Such noise levels are negligible and inaudible beyond a few feet from the source, and this noise contribution was therefore not combined with other sources in the analysis.

Stationary Source Operational Sound Level Modeling

Prediction of operation noise attributed to the project involved creation of a sound propagation model using a Dudek proprietary Excel-based software tool. Dudek NoisePro is used for calculation, presentation, assessment, and prediction of environmental noise. Estimated sound emission from the Megapacks (i.e., the top-mounted cooling fan units), PV string inverters, medium-voltage transformers, and step-up transformers were entered into the Dudek NoisePro model. The outdoor noise propagation formulas in NoisePro follow the International Organization of Standardization (ISO) Standard 9613-2, "Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation" (ISO 1996).

Calculation parameters that establish how the NoisePro model predicts combined noise level from the above-listed project sources include as follows:

- Sound propagation per International Organization of Standardization (ISO) 9613-2 (ISO 1996);
- Default ground acoustical absorption coefficient = 0.5 (on a scale of 0 = reflective, 1 = absorptive); and;
- Zero order of reflection.

3.1.4 Methodology – Vibration Assessment

California Department of Transportation (Caltrans) has been assembling data for vibration levels generated by heavy construction equipment operation during the building of transportation projects for many years. The vibration levels from use of such equipment are representative for other types of construction efforts, not just transportation projects, and are therefore widely employed to assess vibration levels from heavy equipment use for any effort. According to Caltrans (2020b) the most important equipment relative to generation of vibration, and the vibration levels produced by such equipment, is illustrated in Table 6.

Table 6. Vibration Velocities for Typical Construction Equipment

Equipment	PPV at 25 Feet (Inches Per Second)
Vibratory Roller	0.210
Large Bulldozer	0.089
Loaded Trucks	0.076
Drill Rig / Auger	0.089
Jackhammer	0.035
Small Bulldozer	0.003
Vibratory Pile Driver	0.65

Source: Caltrans 2020b.

Caltrans uses a threshold of 0.2 in/sec PPV for annoyance to persons to address construction, or 0.24 in/sec PPV for long-term vibration sources; given the construction threshold is more stringent, it will be used in the analysis. Caltrans identifies a conservative damage threshold vibration level standard of 0.12 in/sec PPV (continuous vibration) for historic structures (Caltrans 2020b). Using the fragile historic structure threshold of 0.12 in/sec PPV to assess any potential vibration impacts of the project is therefore also conservative to avoid human annoyance or damage to any classification of structures.

Using the vibration level value for each of the equipment listed in Table 5, the distance to the target vibration level of 0.12 in/sec PPV was determined, using the following formula:

Peak particle velocity at distance (d) = peak particle velocity(d_{ref}) * (d_{ref}/d)$^{1.5}$

In the above equation, "d" is the distance between the receiver and a vibration source, "d_{ref}" is the reference distance that applies for the indicated vibration magnitude. The calculated distance to a vibration level of 0.12 in/sec PPV represents the radius from each equipment type within which potentially significant vibration impacts from project construction could occur. Table 7 presents the results of applying the above equation to the equipment in Table 6.

As illustrated in Table 7, ground borne vibration levels for most construction equipment would attenuate to less than 0.12 in/sec PPV within 37 feet from the equipment. For a vibratory pile driver, the distance at which ground borne vibration levels would attenuate to 0.12 in/sec PPV would be approximately 350feet.

Table 7. Distance Radius From Construction Equipment to Vibration Level of 0.2 in/sec PPV

Equipment	Distance From Equipment Where Vibration Level is Reduced to 0.2 in/sec PPV (Feet)
Vibratory Roller	37
Large Bulldozer	20
Loaded Trucks	18
Drill Rig / Auger	15
Jackhammer	11
Small Bulldozer	3
Vibratory Pile Driver	350

Source: Caltrans 2020b

3.2 Impacts Analysis

3.2.1 Project Impacts – Increases in Ambient Noise Levels

Significance Criteria 1: Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

3.2.1.1 Project Construction

As described under Section 3.1.1 (Construction Noise Methodology), construction noise modeling was performed to predict construction noise levels at the closest noise-sensitive use to the site, a residence approximately 3.8 miles west of the Project site. Table 8 provides a summary of the construction noise modeling; detailed information is provided in Appendix C.

Table 8. Construction Noise Levels at Nearest Residence by Phase and Activity (dBA)

Task/Activity	Phase I		Phase II		Phase III		PG&E Switching Station	
	L_{max}	$L_{eq\ 8\text{-}hr}$	L_{max}	$L_{eq\ 8\text{-}hr}$	L_{max}	$L_{eq\ 8\text{-}hr}$	L_{max}	$L_{eq\ 8\text{-}hr}$
Fencing Install	27	23	27	23	N/A	N/A	N/A	N/A
Grading/Compaction	38	36	38	36	N/A	N/A	35	34
Trenching/Cabling	37	34	37	34	37	34	N/A	N/A
Steel Pile Install	36	40	36	40	N/A	N/A	N/A	N/A
BESS Construction/ Facility Construction	36	32	N/A	N/A	36	32	34	33
Gen-Tie Install	29	21	29	21	N/A	N/A	34	33
Site Clean-up	34	30	34	30	34	30	34	30
Highest Noise Level Per Phase	38	40	38	40	37	34	35	34

Kern County Code of Ordinances, Section 8.36.020 prohibits the creation of noise from construction, between the hours of nine (9:00) p.m. and six (6:00) a.m. on weekdays and nine (9:00) p.m. and eight (8:00) a.m. on weekends, which is audible to a person with average hearing faculties or capacity at a distance of one hundred fifty (150) feet from the construction site, if the construction site is within one thousand (1,000) feet of an occupied residential dwelling. The closest residence to the project site is approximately 3.8 miles west, and therefore construction schedule restrictions are not applicable under Section 8.36.020. However, based upon the intent of Section 8.36.020, nighttime construction noise (between 9 PM and 8 AM) should be managed such that it is not audible at residences in the general vicinity of the project construction site, which would imply that construction noise should not be greater than 3 dBA over ambient for any night-time construction activities. Comparing the predicted maximum construction noise level from Table 7 at the closest residence (38 dBA L_{Max})) to the recorded ambient noise level (51.3 dBA L_{eq}), we see the construction noise level would remain at least 13 dBA L_{eq} lower than the recorded daytime ambient noise level, and therefore would not be audible at the closest residence. During construction, activity may overlap between phases, increasing the number of equipment being used and the resulting composite noise levels. The most intense phases (Phase I and Phase 2) each have an individual L_{max} of 38; even if these phases occurred simultaneously, the composite construction noise level would increase to only 41 dBA L_{max}. The overlapping of other sequential phases would in each case produce composite sound levels less than 41 dBA L_{max}. This level would remain 10 dBA L_{eq} lower than the daytime ambient level at the closest residence, and therefore inaudible.

Based upon the modeled existing traffic noise at this closest residence, night-time existing traffic noise levels are approximately 47 dBA L_{eq} and therefore, even if night-time construction activities were to occasionally occur, they would be approximately 9 dBA L_{eq} lower than existing nighttime traffic noise, and therefore also inaudible at the residence. Even with the potential overlap of construction phases, the maximum anticipated construction noise level of 41 dBA L_{max} would remain at least 6 dBA L_{eq} lower than the nighttime traffic noise at the closest residence, which would also be inaudible.

With respect to the FTA recommended daytime 8-hour average of 80 dBA at vicinity residences, construction noise levels are predicted to be no greater than an 8-hour average of 40 dBA L_{eq} at the closest residence to the project and would therefore not begin to approach the FTA recommended limit. With the potential for overlap of adjacent construction phase timing, the noise level from combined phases would not be anticipated to exceed an 8-hour average of 43 dBA L_{eq} at the closest residence to the project. Consequently, construction noise impacts of the Project would be less than significant.

3.2.1.2 Project Traffic Noise

The Dudek transportation team quantified average daily trips on roadways to which the project would contribute trips, including scenarios for existing and existing plus project traffic (Traffic Generation Assessment for the Pelicans Jaw Hybrid Solar Project, Dudek, September 9, 2022). Based on 2020 daily traffic counts from Caltrans, at Twisselman Road, I-5 carries approximately 32,500 average daily traffic (ADT). Based on 2020 traffic volumes from the Kern Council of Governments (COG), east of I-5, Twisselman Road carries approximately 50 ADT, and west of I- 5, Twisselman Road carries approximately 600 ADT. Based on 2020 traffic volumes from the Kern COG, south of Twisselman Road, Lost Hills Road carries approximately 40 ADT. Dudek used these ADT values to model existing traffic noise levels.

The peak day of construction for the project would generate approximately 1,002 daily trips. The permanent operations and maintenance phase, of the project is expected to generate 10 daily trips. Dudek assumed all construction and operation trips would travel along I-5, to Twisselman Road east of I-5, to Lost Hills Road in order to access the site.

As described in Section 3.12 (Traffic Noise Methodology), acoustical calculations using standard noise modeling equations adapted from the FHWA noise prediction model were performed using the above ADT values for Existing Plus Project Construction Traffic and Existing Plus Project Operational Traffic. Tables 9 and 10 present the results of the traffic noise modeling, detailed information is provided in Appendix D.

Table 9. Project Construction Traffic Noise Levels Compared to Existing

Roadway	Existing dBA CNEL	Existing + Construction dBA CNEL	Increase From Construction Traffic	Noticeable Increase?	Sensitive Receivers Along roadway
I-5	77.2	77.4	0.2	No	No
Twisselman Road East of I-5	45.6	58.8	13.2	**Yes**	No
Lost Hills Road North of Twisselman	45.2	58.8	13.6	**Yes**	No

Source: Appendix D

As indicated in Table 9, construction traffic noise level increases on I-5 attributable to the project would be negligible (well below 1 dBA). Along Twisselman Road east of I-5 and along Lost Hills Road north of Twisselman, the project would increase existing traffic noise levels during construction by 13.2 and 13.6 dBA CNEL, respectively. This increase would be above the threshold of a noticeable change to existing noise levels. However, there are no existing sensitive receptors adjacent to these roadway segments, or within one mile of these roadway segments. Therefore, no existing residences or noise-sensitive land uses would be exposed to construction-related increased traffic noise levels as a result of the project. For example, the 58.8 dBA CNEL noise level from existing plus construction traffic would attenuate to 45.4 dBA CNEL within 1,100 feet of each of these roadways, which would be essentially equivalent to the lowest existing traffic noise exposure levels calculated for selected receivers in the vicinity of the project (i.e., ST1 – ST3). At the closest existing residence (ST1) the construction traffic noise levels from either Twisselman Road east of I-5 or Lost Hills Road would attenuate to approximately 33 dBA CNEL compared to the existing traffic noise level exposure of 56 dBA CNEL. In addition, noise levels along these roadway segments, even including construction traffic, would fall within the acceptable exterior noise level exposure for residential land uses (i.e., 65 dBA CNEL). Consequently, project construction traffic noise impacts would be less than significant.

Table 10. Project Operational Traffic Noise Levels Compared to Existing

Roadway	Existing dBA CNEL	Existing + Operations dBA CNEL	Increase From Operations Traffic	Noticeable Increase?	Sensitive Receivers Along roadway
I-5	77.2	77.2	0	No	No
Twisselman Road East of I-5	45.6	46.4	0.8	No	No
Lost Hills Road North of Twisselman	45.2	45.6	0.4	No	No

Source: Appendix D

As indicated in Table 10, long-term operation of the project would involve trip generation that would result in traffic noise level increases on each roadway segment of no more than 0.8 dBA CNEL, which would not be readily noticeable. In addition, noise levels along these segments of Twisselman Road and Lost Hills Road, even including project operational traffic, would fall within the acceptable exterior noise level exposure for residential land uses (i.e., 65 dBA CNEL). Furthermore, as noted above, there are no existing sensitive receptors within 1 mile of these roadway segments; because sound diminishes at a rate of 3-4.5 dBA for each doubling of distance from the source to receptor, there would be no audible increase in operational traffic more than 25 feet from these segments. Consequently, operational traffic noise impacts would be less than significant.

3.2.1.3 Project Operational Noise

As described under Section 3.1.3 (Operational Noise Methodology), operational noise was modeled in the NoisePro model space, with a receiver at the closest existing residence to the proposed facility (ST1), as well as receivers at each of the other three locations where ambient noise measurements were performed (ST2-ST4), for comparison of project operational noise levels against ambient noise levels. Table 11 and 12 present the results of the operational noise modeling at ST1- ST4, and compare these modeled operational noise levels to recorded ambient noise levels and to limits contained in the Kern County Zoning Ordinance. Detailed information for the operational noise modeling is provided in Appendix E.

Table 11. Project Operational Noise Levels Compared to Ambient

Receiver ID	Measured Existing Ambient (dBA L_{eq})	Predicted Operational Noise Level (dBA L_{eq})	Existing + Project (dBA L_{eq})	Increase (dBA L_{eq})
ST1	51.3	6.1	51.3	0
ST2	59.7	20.0	59.7	0
ST3	47.9	35.7	47.9	0
ST4	64.1	50.7	64.1	0

Source: Appendix E.

As indicated in Table 11, the project would not result in an increase in the ambient noise level at any of the locations where ambient noise monitoring was performed.

Table 12. Project Operational Noise Levels Compared to Zoning Ordinance Limits

Receiver ID	Predicted Operational Noise Level (dBA L_{eq})	Predicted Operational Noise Level (dBA CNEL)	Noise Ordinance Limit (dBA CNEL)	Limit Exceeded?
ST1	6.1	12.8	65	No
ST2	20.0	26.7		No
ST3	35.7	42.4		No
ST4	50.7	57.4		No

Source: Appendix E.

As indicated in Table 12, even if all of the facility equipment operated continuously over a 24-hour period, the predicted operational sound level at each of the ambient noise monitoring locations would fall well below the zoning ordinance limit of 65 dBA CNEL. Consequently, operational noise impacts of the project would be less than significant.

NoisePro calculates the noise level across the entire grid that encompasses the project site and adjacent areas. Figure 4 graphically represents the noise model results, providing noise contours extending outward from the proposed project to illustrate the hourly noise level from operation of the project. As illustrated on Figure 4, the 40-45 dBA L_{eq} contour is essentially contained within the project site.

3.2.1.4 Mitigation

The proposed project would not result in a significant temporary or permanent increase in ambient noise levels; therefore, no mitigation is required.

Significance After Mitigation

Mitigation is not required, because impacts would be less than significant without mitigation.

3.2.2 Project Impacts – Vibration Generation

Significance Criteria 2: Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

3.2.2.1 Construction Vibration

As discussed in Section 3.1.3 (Vibration Methodology) groundborne vibration generated from construction equipment would be attenuated to 0.12 in/sec PPV at a distance of no greater than 350 feet from construction activity. Caltrans uses a human annoyance significance threshold for transient vibration (applicable to construction) of 0.2 in/sec PPV. Caltrans uses a building damage significance threshold of 0.12 in/ sec PPV for fragile buildings. Consequently, for construction activities that are no closer than 350 feet from vibration sensitive uses, including residences, construction-related vibration levels would remain below the significance threshold. The closest existing vibration-sensitive use (a residence) is located approximately 3.8 miles (20.080 feet) from the project construction boundary. The vibration level from a vibratory pile driver at a distance of 20,080 feet would be 0.00003 in/sec PPV. Therefore, project construction-related vibration levels would be less than significant

3.2.2.2 Operation Phase Vibration

Vibration impacts associated with industrial and commercial facility operations are limited to large scale equipment with rotational components or involving repeated impact or “striking” movements (e.g., industrial grade compressors, stamping machines, printing presses), or with the maneuvering of heavy trucks or similar large-scale materials-transport equipment. The ongoing operation of the proposed solar facility would not involve rotational equipment, or impact equipment. One water truck delivery per week is anticipated for long term operation of the project; as discussed under construction vibration, potentially significant vibration impacts from a loaded truck operation would be limited to a distance of 18 feet, which would not extend beyond the road right-of-way for roads used by the water truck to access the site. Consequently, long-term operation of the project would not be anticipated to generated perceptible vibration levels; operational vibration levels are therefore considered less than significant.

3.2.2.3 Mitigation Measures

The proposed Project would not result in a significant vibration impact; therefore, no mitigation is required.

Significance After Mitigation

Mitigation is not required, because impacts would be less than significant without mitigation.

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4 References Cited

AECOM 2012. Solar Panel Tracker and Gen-Tie Noise Measurements. February 1, 2012.

Caltrans. 2020a. *Technical Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* California Department of Transportation Division of Environmental Analysis. April 2020.

Caltrans. 2020b. *Transportation- and Construction Vibration Guidance Manual*. California Department of Transportation Division of Environmental Analysis. April 2020.

Federal Highway Administration (FHWA). 2006a. *Construction Noise Handbook.* August 2006.

FHWA. 2006b. *Roadway Construction Noise Model*, Version 1.1. February 2006.

State of California, Governor's Office of Planning and Research (OPR). 2003. General Plan Guidelines. October 2003.

Transportation Research Board, National Research Council. 1971. *Highway Noise: A Design Guide for Highway Engineers (1971), National Cooperative Highway Research Program Report 117*.

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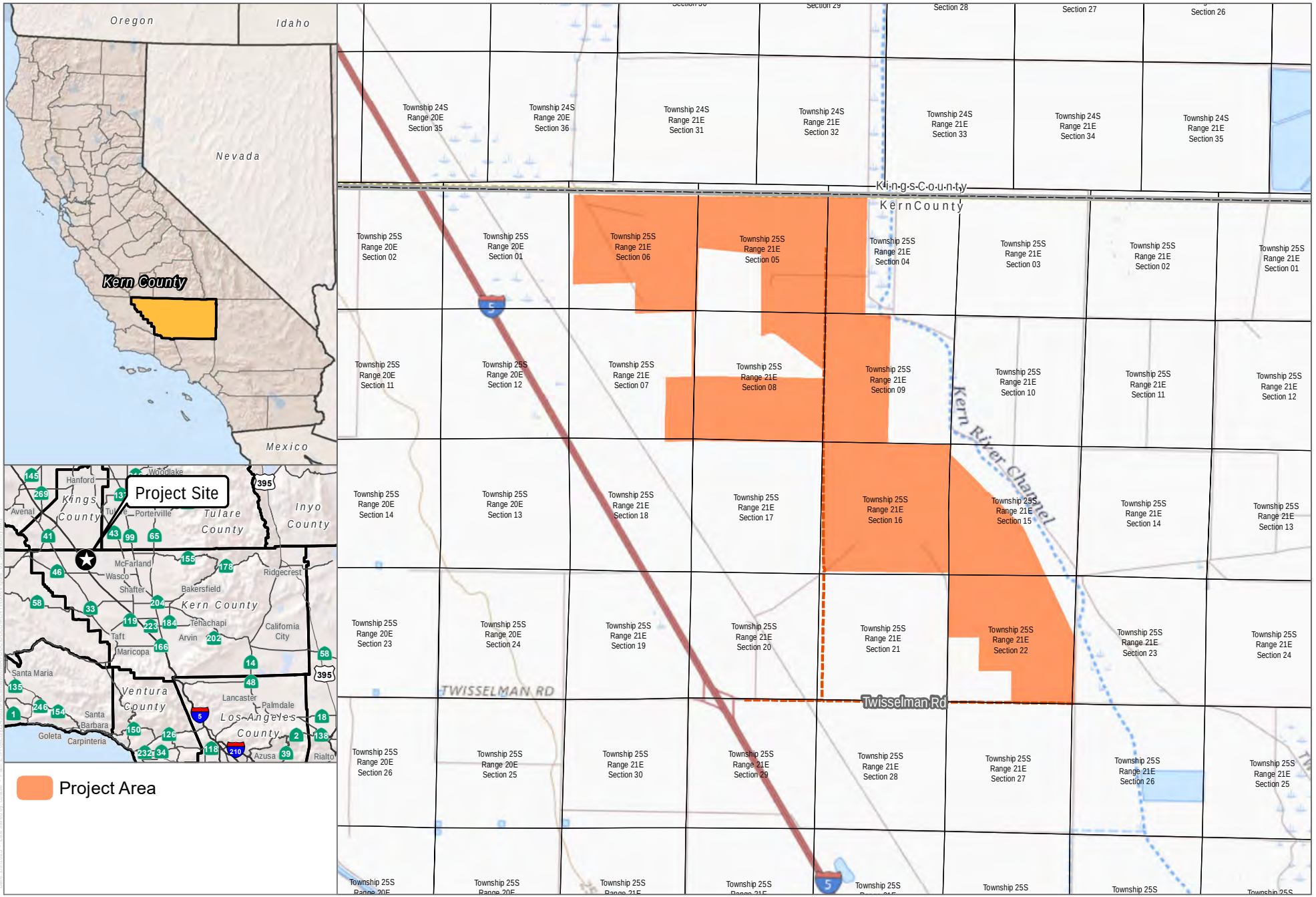

SOURCE: USGS National Map 2021
West Camp, Lone Tree Well and Lost Hills NW Quadrangles

DUDEK

0 0.5 1 Miles

FIGURE 1
Site Vicinity

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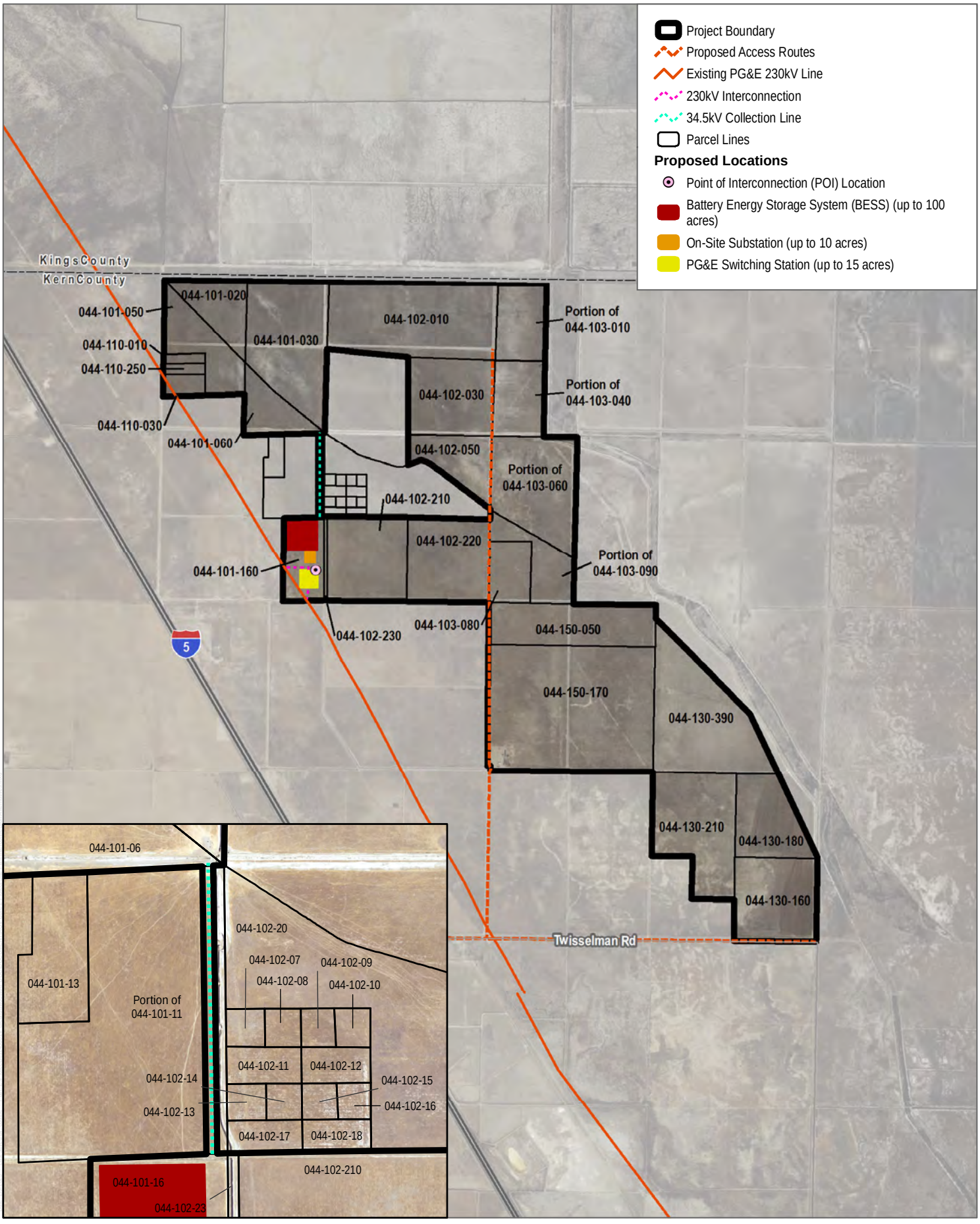

SOURCE: Bing 2022, Samsung 2022, County of Kern 2020

FIGURE 2
Project Site Plan and Interconnection

DUDEK

0 2,000 4,000 Feet

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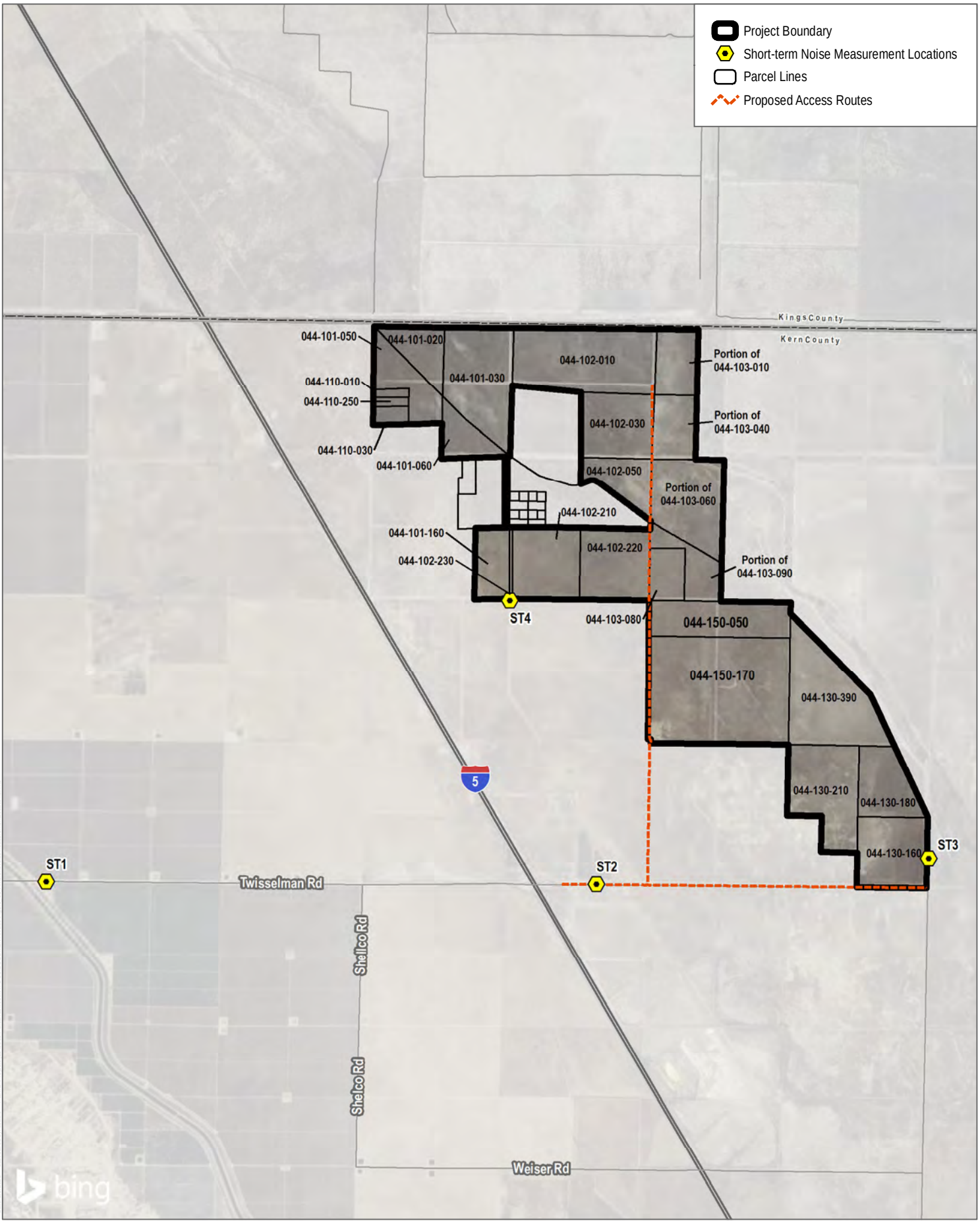

SOURCE: Bing 2022, Samsung 2022, County of Kern 2020

FIGURE 3
Ambient Noise Measurement Locations

DUDEK

0 2,000 4,000 Feet

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SOURCE: Dudek 2023

DUDEK

0 3480 6960 Feet

FIGURE 4

Composite Operational Noise Levels

Pelicans Jaw Hybrid Solar Project Noise Technical Report

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Appendix A
Resume

Jonathan Leech, AICP, INCE, PG

SENIOR PROJECT MANAGER, ENVIRONMENTAL SPECIALIST

Jonathan Leech is a senior project manager and environmental specialist with 35 years' environmental planning experience, including environmental research, hazardous materials and environmental impact assessment, condition compliance and mitigation monitoring, and land use analysis. Mr. Leech has contributed to more than 200 CEQA and NEPA environmental documents including: environmental assessments (EAs); environmental impact reports (EIRs); mitigated negative declarations (MNDs); specific plans; and policy documents for numerous local agencies within the State of California..

Mr. Leech also has more than 19 years of focused experience in noise assessments, including evaluation of noise generation from commercial, municipal, and industrial facilities, as well as large-scale evaluations of proposed subdivisions and specific plan projects, for inclusion in environmental impact reports (EIRs) or negative declarations (NDs). He has performed noise evaluation of construction and operational impacts including traffic-related noise, as well as provided noise monitoring during construction for compliance with project conditions and noise ordinance restrictions.

Education

University of California, Santa Barbara
BA, Environmental Studies/ Geology, 1984

Pennsylvania State University
Coursework in Graduate Acoustics Program, 2012

Certifications

American Institute of Certified Planners (AICP)

Professional Geologist (PG), CA

Professional Affiliations

American Planning Association

Association of Environmental Professionals

Institute of Noise Control Engineers (INCE)

Project Experience

Grapevine Specific Plan, Kern County, California. Prepared the noise technical report and noise and vibration EIR section for the Grapevine Specific Plan which includes approximately 8,010 acres, of which approximately 3,232 acres (or about 40%) would be designated for ongoing open space uses (with grazing and open space as the predominant land uses), while approximately 4,778 acres (60%) would be developed as a residential community and employment center. The overall development for the entire Specific Plan is restricted to a maximum of 12,000 residential units and 5.1 million square feet of commercial and industrial floor area. The land use plan is designed as a series of conveniently located village centers, each composed of a mix of housing, neighborhood-serving retail and office uses, schools, parks, and community services.

The Creek at Dominguez Hills, Carson, California. Prepared noise technical report and completed the noise and vibration section of the EIR . The proposed project includes a new sports, recreation, fitness, and wellness destination on a portion of the approximately 171-acre Victoria Golf Course, located at 340 Martin Luther King Jr. Street (formerly E. 192nd Street) in the City of Carson. The project site would be developed with approximately 532,500 square feet of buildings, including a multi-use indoor sports complex, youth learning experience facility, indoor skydiving facility, marketplace, clubhouse, recreation and dining center, restaurants (alternatively, a specialty grocery store may be developed in place of some of the restaurant uses), and a sports wellness center. The proposed project would also provide ziplining facilities, a community park, open space areas, a putting green, and a jogging path.

Yosemite Avenue-Gardner Avenue to Hatch Road Annexation, City of Merced, California. Performed noise and vibration assessment of this mixed-use development proposal and prepared the noise and vibration section of the EIR for the project. The approximately 70-acre annexation site was proposed to be developed with 20 multi-family structures containing a total of 540 units, a 13,700 square foot clubhouse, and a mixed use building with 66,00 square feet of ground floor retail and 30 residential units on the second floor.

Angleton Energy Storage Facility, Confidential Client, Angleton, Texas. Completed an ambient noise survey and prepared a noise technical study to quantify operational noise from transformer and inverter equipment at adjacent residential receivers. The technical memorandum compared the operational noise levels against allowable limits prescribed in the special use permit for the facility and demonstrated the facility would be in compliance with such standards.

Southern California Gas Company, Goleta Storage Field Expansion Proposal, Santa Barbara County, California. Under contract to the Energy & Minerals Division of Santa Barbara County, conducted independent verification sound level measurements, completed third party technical review of applicant submitted noise reports, and prepared the noise section for the Re-circulated Draft EIR addressing a proposal for development of new wells to access deeper natural gas storage basins.

Copper Energy Storage Facility, Confidential Client, Butte, Montana. Completed an ambient noise survey and prepared a noise technical study to quantify operational noise from transformer and inverter equipment at adjacent residential receivers. The technical memorandum compared the operational noise levels against standards prescribed in the Butte-Silver Bow County Zoning Ordinance and demonstrated the facility would be in compliance with such standards.

Central Valley Gas Storage Project, Colusa County, California. Prepared the noise assessment for the Central Valley Gas Storage Project proposed by Central Valley Gas Storage LLC (Central Valley), involving the development of a depleted underground reservoir at the Princeton Gas Field located in Colusa County, 60 miles northwest of Sacramento, California. The project involves constructing a 10-acre compressor station site, a 4-acre remote well pad site with nine injection/withdrawal wells, up to five observation wells, a 1-acre metering station site, and a 14.7-mile, 24-inch diameter pipeline to connect to PG&E's transmission system. The noise assessment was conducted pursuant to the provisions of CEQA and CPUC procedures.

North Street Energy Storage Facility, Confidential Client, Brookhaven, New York. Completed an ambient noise survey and prepared a noise technical study to quantify operational noise from transformer and inverter equipment at adjacent residential receivers. The technical memorandum compared the operational noise levels against standards prescribed in the Brookhaven municipal code and demonstrated the facility would be in compliance with such standards.

Rugged Solar Farm, Boulevard Community, San Diego County, California. Prepared a noise technical study for incorporation into an EIR addressing a proposed 80 MW solar generation facility on 765 acres. Analysis included assessment of facility equipment noise at adjacent residential property lines, calculation of construction noise levels at nearby sensitive receptors, and cumulative construction noise analysis.

Tierra Del Sol Solar Farm, Boulevard Community, San Diego County, California. Prepared a noise technical study for incorporation into an EIR addressing a proposed 60 MW solar generation facility on 420 acres. Analysis included assessment of facility equipment noise at adjacent residential property lines, calculation of construction noise levels at nearby sensitive receptors, and cumulative construction noise analysis.

Westside and Whitney Point Solar Farm, Westside Community, Fresno County, California. Project manager for permitting of two separate 20 MW solar generating facilities on two adjacent 160 acre project sites. As a condition of allowing a connection to electrical distribution infrastructure, Pacific Gas & Electric required 5 acres within the property to construct an electrical substation to serve the project and other solar electrical generating facilities.

Little Bear Solar Farm, Fresno County, California. Prepared a noise technical study for incorporation into an EIR addressing a proposed 180 MW solar generation facility on 1,288 acres. Analysis included assessment of facility equipment noise at adjacent residential property lines and calculation of construction noise levels at nearby sensitive receptors.

San Joaquin Valley Solar Farm, Confidential Client, Fresno County, California. Prepared a noise technical study for incorporation into an EIR addressing a proposed 200 MW solar generation facility on 1,700 acres. Analysis included assessment of facility equipment noise at adjacent residential property lines and calculation of construction noise levels at nearby sensitive receptors.

Sandrini Valley Solar Farm, County of Kern, Mettler, California. Under contract to Kern County, completed peer review of an applicant provided acoustic report and prepared the noise and vibration section of the EIR. The proposed facility consists of a 300 megawatt (MW) solar photovoltaic facility including a 100 MW battery energy storage system. Analysis included construction noise and assessment of facility equipment noise at adjacent residential property lines and nearby sensitive receptors.

Cascade Energy Storage Facility, Confidential Client, Stockton, California. Completed an ambient noise survey and prepared a noise technical study to quantify construction-related noise levels and operational noise from transformer and inverter equipment at adjacent residential receivers. The noise study compared the operational noise levels against standards prescribed in the San Joaquin County code of ordinances and demonstrated the facility would be in compliance with such standards.

Ceres Energy Storage Facility, Confidential Client, Stockton, California. Prepared a noise technical study to quantify operational noise from transformer and inverter equipment at adjacent residential receivers. The noise study compared the operational noise levels against standards prescribed in the City of Stockton noise ordinance and demonstrated the facility would be in compliance with such standards.

Solar Farm, Confidential Client, Champagne County, Illinois. Prepared a noise technical study for satisfaction of permit requirements and to demonstrate compliance with Illinois noise regulations addressing a proposed 150 MW solar generation facility on 1,275 acres. Analysis included measurements to characterize the ambient noise level from farming and transportation sources in the area, and assessment of facility equipment operational noise at nearby sensitive receptors (i.e., adjacent rural residences).

Avondale Energy Storage Facility, Confidential Client, Avondale, Arizona. Completed an ambient noise survey and prepared a noise technical study to quantify operational noise from transformer and inverter equipment at adjacent residential receivers. The noise study compared the operational noise levels against standards prescribed in the Avondale zoning ordinance and demonstrated the facility would be in compliance with such standards and would not generate noise levels at area residences substantially higher than ambient noise levels.

Solar Farm, Confidential Client, Culpeper County, Virginia. Prepared a noise technical study for satisfaction of permit requirements and to demonstrate compliance with Culpeper County noise regulations addressing a proposed 80 MW solar generation facility. Analysis included assessment of facility equipment noise at adjacent residential property lines and calculation of construction noise levels at nearby sensitive receptors.

Appendix B
Ambient Noise Measurement Data

ID	Start Date	Start Time	End Time	Mins	SPL Time Weight	LN% Freq \	LAeq	LAmax	LAmin	L1%	L5%	L10%	L50%	L90%	L95%	L99%
ST2	4/22/2022	12:09 PM	12:24 PM	15	Slow	dBA	59.7	73.9	48.8	67.2	64.9	63.4	57.2	51.9	51	50
ST3	4/22/2022	12:35 PM	12:50 PM	15	Slow	dBA	47.9	62.3	31.8	56.3	53.3	51.5	45.1	38.8	36.9	34.7
ST4	4/22/2022	1:15 PM	1:30 PM	15	Slow	dBA	64.1	82.2	43	75.4	70.4	67.5	56.6	47	46.1	44.9
ST1	4/22/2022	2:00 PM	2:15 PM	15	Slow	dBA	51.3	77.1	38	59.2	53.5	51.2	44.4	41	40.5	39.8

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT Pelican's Jaw — PROJECT # 11438
SITE ID ST01
SITE ADDRESS — OBSERVER(S) Pedro Garcia
START DATE 4/22/22 — END DATE 4/22/22
START TIME 1400 — END TIME 1415

METEOROLOGICAL CONDITIONS

TEMP 70.5 F — HUMIDITY 40.1 % R.H. — WIND CALM (LIGHT) MODERATE
WINDSPD 7.5 MPH — DIR. N NE S SE ~~S~~ SW W NW (E) — VARIABLE STEADY (GUSTY)
SKY SUNNY CLEAR OVRCAST (PRTLY CLDY) FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT Piccolo II — TYPE 1 (2) — SERIAL # PØ218Ø212ØØ
CALIBRATOR REED R8Ø9Ø — SERIAL # 13ØØ85ØØUR2
CALIBRATION CHECK — PRE-MEASUREMENT 94 dBA SPL — POST-MEASUREMENT ____ dBA SPL — WINDSCRN Y

SETTINGS (A-WTD) SLOW (FAST) (FRONTAL) RANDOM ANSI OTHER: ____

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
06	1:59:59	2:15:02	51.3	77.1	38	41	44.4	51.2	

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER: ____
ROADWAY TYPE: Arterial — DIST. TO RDWY C/L OR EOP: (20 ft.)
TRAFFIC COUNT DURATION: 15 MIN — SPEED 55 — ___ MIN — SPEED

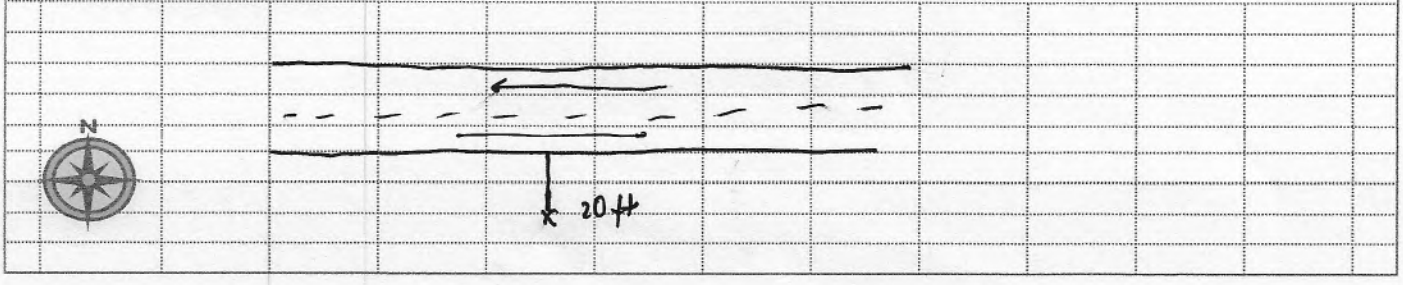
COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB	IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ✗	COUNT 2 (OR RDWY 2) NB/EB	SB/WB	NB/EB	SB/WB
AUTOS	0								
MED TRKS	0								
HVY TRKS	0								
BUSES	0								
MOTRCLS	0								

SPEEDS ESTIMATED BY: RADAR / (DRIVING THE PACE)
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: ____

DESCRIPTION / SKETCH

TERRAIN (HARD) SOFT MIXED (FLAT) OTHER: ____
PHOTOS ____
OTHER COMMENTS / SKETCH



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: PELICAN'S JAW — PROJECT #: 11438
SITE ID: ST#2
SITE ADDRESS — OBSERVER(S): PEDRO GARCIA
START DATE: 4/22/22 — END DATE: 4/22/22
START TIME: 1210 — END TIME: 1225

METEOROLOGICAL CONDITIONS

TEMP: 63 F — HUMIDITY: 46.1 % R.H. — WIND: CALM / (VARIABLE) / LIGHT / STEADY / MODERATE / (GUSTY)
WINDSPD: 5.5 MPH — DIR. N NE S SE S SW (W) NW
SKY: SUNNY / CLEAR / (OVRCAST) / PRTLY CLDY / FOG / (RAIN)

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 (2) — SERIAL # P0218021200
CALIBRATOR: REED R8090 — SERIAL # B0085OVR2
CALIBRATION CHECK — PRE-MEASUREMENT: 94 dBA SPL — POST-MEASUREMENT: ____ dBA SPL — WINDSCRN: Y

SETTINGS: (A-WTD) / SLOW / (FAST) / (FRONTAL) / RANDOM / ANSI / OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
03	12:09:59	12:24:59	59.7	73.9	48.8	51.9	57.2	63.4	

COMMENTS
BEGAN RAINING @ 1219-1222. GUSTS UP TO 8 mpH.

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: TRAFFIC / AIRCRAFT / RAIL / INDUSTRIAL / OTHER:
ROADWAY TYPE: — DIST. TO RDWY C/L OR EOP:

TRAFFIC COUNT DURATION: ___ MIN — SPEED

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS				
MED TRKS				
HVY TRKS				
BUSES				
MOTRCLS				

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ____

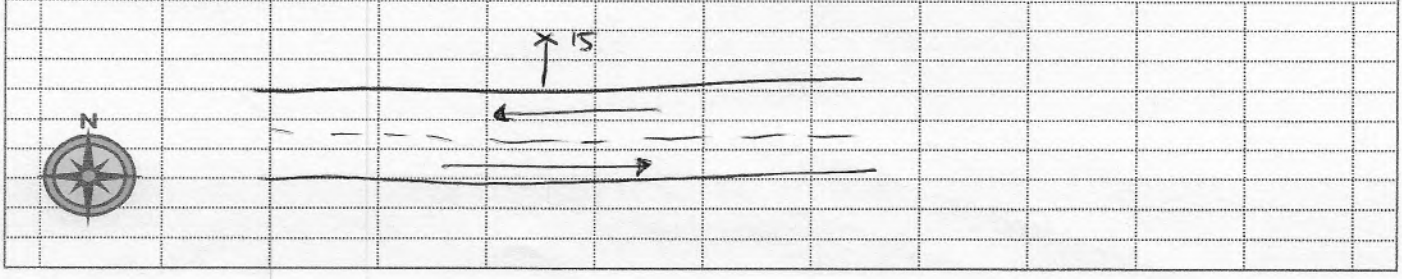
COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
___ MIN				

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING (DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: HWY 5 TO THE WEST.

DESCRIPTION / SKETCH

TERRAIN (HARD) SOFT MIXED (FLAT) OTHER:
PHOTOS
OTHER COMMENTS / SKETCH



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT Pelican's Jaw — PROJECT # 11438
SITE ID ST03
SITE ADDRESS — OBSERVER(S) Pedro García
START DATE 4/22/22 — END DATE 4/22/22
START TIME 12:35 — END TIME 1250

METEOROLOGICAL CONDITIONS

TEMP 69.5 F — HUMIDITY 65 % R.H. — WIND (CALM) LIGHT MODERATE (VARIABLE) STEADY (GUSTY)
WINDSPD 8 MPH — DIR N NE S SE S SW (W) NW
SKY SUNNY CLEAR (OVRCAST) PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT Piccolo II — TYPE 1 (2) — SERIAL # PQ2180212005
CALIBRATOR REED R8090 — SERIAL # B088500VR2
CALIBRATION CHECK — PRE-MEASUREMENT 94 dBA SPL — POST-MEASUREMENT ____ dBA SPL — WINDSCRN Y

SETTINGS (A-WTD) SLOW (FAST) (FRONTAL) RANDOM ANSI OTHER: ____

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
04	12:35:05	12:50:02	47.9	62.3	31.8	38.3	45.1	51.5	

COMMENTS
Gusts up to 10 mph

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER: ____
ROADWAY TYPE: — DIST. TO RDWY C/L OR EOP: ____
TRAFFIC COUNT DURATION: ____ MIN — SPEED ____ — ____ MIN — SPEED

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB	COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	NB/EB	SB/WB
AUTOS									
MED TRKS									
HVY TRKS									
BUSES									
MOTRCLS									

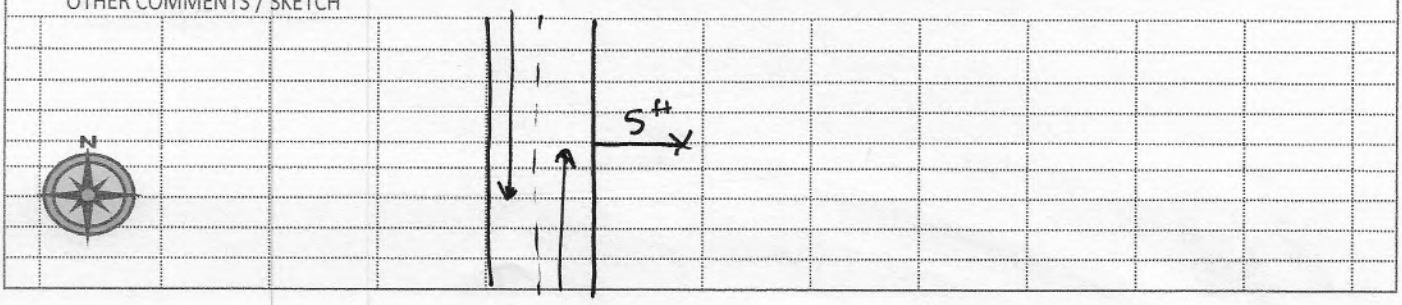
IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ____

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: ____

DESCRIPTION / SKETCH

TERRAIN HARD (SOFT) MIXED (FLAT) OTHER: ____
PHOTOS ____
OTHER COMMENTS / SKETCH



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT Pelican's Jaw | PROJECT # 11438
SITE ID ST04
SITE ADDRESS | OBSERVER(S) Pedro Garcia
START DATE 4/22/22 | END DATE 4/22/22
START TIME 1315 | END TIME 1330

METEOROLOGICAL CONDITIONS

TEMP 64.5 F | HUMIDITY 50 % R.H. | WIND (CALM) LIGHT MODERATE
WINDSPD 1.5 MPH | DIR. N NE S SE S (SW) W NW | VARIABLE (STEADY) GUSTY
SKY SUNNY CLEAR | OVRCAST (PRTLY CLDY) FOG | RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT Piccolo II | TYPE 1 (2) | SERIAL # P0218021200
CALIBRATOR REED R8090 | SERIAL # B008500VR2
CALIBRATION CHECK PRE-MEASUREMENT 94 dBA SPL | POST-MEASUREMENT ____ dBA SPL | WINDSCRN Y

SETTINGS (A-WTD) SLOW (FAST) (FRONTAL) RANDOM ANSI OTHER: ____

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
05	1:14:59	1:30:00	64.1	82.2	43	47	56.6	67.5	

COMMENTS

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE TRAFFIC AIRCRAFT RAIL INDUSTRIAL OTHER: ____
ROADWAY TYPE: | DIST. TO RDWY C/L OR EOP:

TRAFFIC COUNT DURATION: ____ MIN SPEED ____ | ____ MIN SPEED

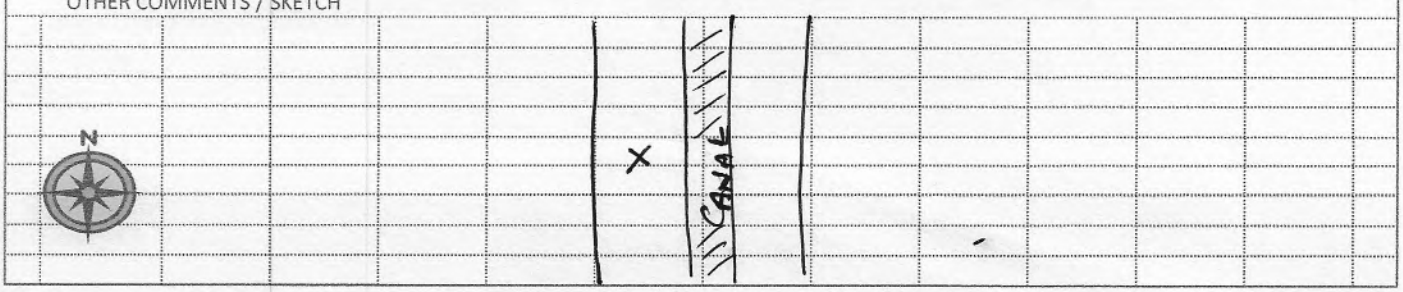
COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB	IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ____	COUNT 2 (OR RDWY 2) NB/EB	SB/WB	NB/EB	SB/WB
AUTOS									
MED TRKS									
HVY TRKS									
BUSES									
MOTRCLS									

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): (DIST. AIRCRAFT) RUSTLING LEAVES DIST. BARKING DOGS BIRDS DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: @ ~1318-1321, 1327-1330
AIRCRAF

DESCRIPTION / SKETCH

TERRAIN HARD (SOFT) MIXED (FLAT) OTHER: ____
PHOTOS ____
OTHER COMMENTS / SKETCH



Appendix C

Construction Noise Modeling Data and Results

The construction equipment mixes and vehicle trips used for estimating the project-generated construction emissions are shown in Table A.

Table A. Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
Perimeter Fence Excavation and Installation - Phase I	80	2	0	Skid Steer Loaders	1	8
Perimeter Fence Excavation and Installation - Phase II	80	2	0	Skid Steer Loaders	1	8
Site and Access Road Grading/ Grubbing/ Compacting - Phase II	100	6	0	Graders	2	8
				Off-Highway Trucks	4	8
				Rollers	2	8
				Rubber Tired Dozers	2	8
				Rubber Tired Loaders	1	8
				Scrapers	1	8
				Tractors/Loaders/ Backhoes	2	8
Aboveground and Underground Low-Voltage Cable Installation - Phase III	80	2	0	Excavators	2	8
				Generator Sets	1	8
				Other Construction Equipment	1	8
				Rollers	1	8
				Rough Terrain Forklifts	1	8
Site and Access Road Grading/ Grubbing/ Compacting - Phase I	100	6	0	Graders	2	8
				Off-Highway Trucks	4	8
				Rollers	2	8
				Rubber Tired Dozers	2	8
				Rubber Tired Loaders	1	8
				Scrapers	1	8
				Tractors/Loaders/ Backhoes	2	8
Battery Energy Storage System - Phase III	100	4	864	Cranes	1	8
				Graders	1	8
				Rough Terrain Forklifts	1	8

Table A. Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
Aboveground and Underground Low-Voltage Cable Installation - Phase I	80	2	0	Excavators	2	8
				Generator Sets	1	8
				Other Construction Equipment	1	8
				Rollers	1	8
				Rough Terrain Forklifts	1	8
Aboveground and Underground Low-Voltage Cable Installation - Phase II	80	2	0	Excavators	2	8
				Generator Sets	1	10
				Other Construction Equipment	1	8
				Rollers	1	8
				Rough Terrain Forklifts	1	8
Steel Pile Installation - Phase II	160	4	1,090	Cranes	1	8
				Generator Sets	2	10
				Off-Highway Trucks	20	8
				Other Construction Equipment	4	8
				Rough Terrain Forklifts	8	8
Steel Pile Installation - Phase I	160	4	1,634	Cranes	1	8
				Generator Sets	2	8
				Off-Highway Trucks	20	8
				Other Construction Equipment	4	8
				Rough Terrain Forklifts	8	8
Battery Energy Storage System – Phase I	100	4	864	Crane	1	8
				Graders	1	8
				Rough Terrain Forklifts	1	8
Gen-Tie Installation - Phase I	80	4	0	Cranes	1	8
Gen-Tie Installation - Phase II	80	4	0	Cranes	1	8
Testing & Commissioning - Phase I	8	0	0	NA	NA	NA

Table A. Construction Scenario Assumptions

Construction Phase	One-Way Vehicle Trips			Equipment		
	Average Daily Worker Trips	*Average Daily Vendor Truck Trips*	*Total Haul Truck Trips*	*Equipment Type*	*Quantity*	*Usage Hours*
Testing & Commissioning - Phase II	8	0	0	NA	NA	NA
Testing & Commissioning - Phase III	8	0	0	NA	NA	NA
Site Cleanup & Restoration - Phase I	10	2	0	Graders	1	8
				Skid Steer Loaders	1	8
Site Cleanup & Restoration - Phase II	4	2	0	Graders	1	8
				Skid Steer Loaders	1	8
Site Cleanup & Restoration - Phase III	4	2	0	Graders	1	8
				Skid Steer Loaders	1	8
PG&E Switching Station Site Preparation	18	4	0	Rollers	1	8
				Rubber Tired Dozers	3	8
				Scrapers	1	8
				Tractors/Loaders/ Backhoes	4	8
PG&E Switching Station Construction	20	8	0	Aerial Lifts	2	8
				Cranes	1	7
				Forklifts	3	8
				Tractors/Loaders/ Backhoes	3	7
				Welders	1	8
PG&E Switching Station Gen-Tie	20	8	0	Aerial Lifts	2	8
				Cranes	1	7
				Forklifts	3	8
				Tractors/Loaders/ Backhoes	3	7
PG&E Switching Station Cleanup	10	4	0	Graders	1	8
				Skid Steer Loaders	1	8

PHASE I CONSTRUCTION

Noise level limit for construction phase at residential land use, per FTA guidance = 80

Averaging Period (in hours): 8

Construction Sub-Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Predicted 8-hour Leq
Fencing Excavation & Installation	Front End Loader	1	40	79		20000	27.0	23
					Total for Fencing Excavation & Installation Phase:		**27.0**	**23.0**
Site Grubbing / Grading / Compaction	Grader	2	40	85		20000	33.0	32
	Dump Truck	4	40	76		20000	24.0	26
	Roller	2	20	80		20000	28.0	24
	Dozer	2	40	82		20000	30.0	29
	Front End Loader	1	40	79		20000	27.0	23
	Scraper	1	40	84		20000	32.0	28
	Backhoe	2	40	78		20000	26.0	25
					Total for Site Grubbing / Grading / Compaction Phase:		**38.0**	**36.2**
Trenching & Cable Installation	Excavator	2	40	81		20000	29.0	28
	Generator	1	50	72		20000	20.0	17
	All Other Equipment > 5 HP	1	50	85		20000	33.0	30
	Roller	1	20	80		20000	28.0	21
	Gradall	1	40	83		20000	31.0	27
					Total for Trenching & Cable Installation Phase:		**36.8**	**33.6**
Steel Pile Installation	Crane	1	16	81		20000	29.0	21
	Generator	2	50	72		20000	20.0	20
	Dump Truck	20	40	76		20000	24.0	33
	All Other Equipment > 5 HP	4	50	85		20000	33.0	36
	Gradall	8	40	83		20000	31.0	36
					Total for Steel Pile Installation Phase:		**36.4**	**40.1**
BESS Installation	Crane	1	16	81		20000	29.0	21
	Grader	1	40	85		20000	33.0	29
	Gradall	1	40	83		20000	31.0	27
					Total for BESS Installation Phase:		**36.0**	**31.5**
Gen-Tie Installation	Crane	1	16	81		20000	29.0	21
					Total for Gen-Tie Installation Phase:		**29.0**	**21.0**
Site Clean-up & Restoration	Grader	1	40	85		20000	33.0	29
	Front End Loader	1	40	79		20000	27.0	23
					Total for Site Clean-up & Restoration Phase:		**33.9**	**30.0**

PHASE II CONSTRUCTION

Noise level limit for construction phase at residential land use, per FTA guidance = 80

Averaging Period (in hours): 8

Construction Sub-Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Predicted 8-hour Leq
Fencing Excavation & Installation	Front End Loader	1	40	79		20000	27.0	23
					Total for Fencing Excavation & Installation Phase:		**27.0**	**23.0**
Site Grubbing / Grading / Compaction	Grader	2	40	85		20000	33.0	32
	Dump Truck	4	40	76		20000	24.0	26
	Roller	2	20	80		20000	28.0	24
	Dozer	2	40	82		20000	30.0	29
	Front End Loader	1	40	79		20000	27.0	23
	Scraper	1	40	84		20000	32.0	28
	Backhoe	2	40	78		20000	26.0	25
					Total for Site Grubbing / Grading / Compaction Phase:		**38.0**	**36.2**
Trenching & Cable Installation	Excavator	2	40	81		20000	29.0	28
	Generator	1	50	72		20000	20.0	17
	All Other Equipment > 5 HP	1	50	85		20000	33.0	30
	Roller	1	20	80		20000	28.0	21
	Gradall	1	40	83		20000	31.0	27
					Total for Trenching & Cable Installation Phase:		**36.8**	**33.6**
Steel Pile Installation	Crane	1	16	81		20000	29.0	21
	Generator	2	50	72		20000	20.0	20
	Dump Truck	20	40	76		20000	24.0	33
	All Other Equipment > 5 HP	4	50	85		20000	33.0	36
	Gradall	8	40	83		20000	31.0	36
					Total for Steel Pile Installation Phase:		**36.4**	**40.1**
Gen-Tie Installation	Crane	1	16	81		20000	29.0	21
					Total for Gen-Tie Installation Phase:		**29.0**	**21.0**
Site Clean-up & Restoration	Grader	1	40	85		20000	33.0	29
	Front End Loader	1	40	79		20000	27.0	23
					Total for Site Clean-up & Restoration Phase:		**33.9**	**30.0**

PHASE III CONSTRUCTION

Noise level limit for construction phase at residential land use, per FTA guidance = 80
Averaging Period (in hours): 8

Construction Sub-Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Predicted 8-hour Leq
Trenching & Cable Installation	Excavator	2	40	81		20000	29.0	28
	Generator	1	50	72		20000	20.0	17
	All Other Equipment > 5 HP	1	50	85		20000	33.0	30
	Roller	1	20	80		20000	28.0	21
	Gradall	1	40	83		20000	31.0	27
					Total for Trenching & Cable Installation Phase:		**36.8**	**33.6**
BESS Installation	Crane	1	16	81		20000	29.0	21
	Grader	1	40	85		20000	33.0	29
	Gradall	1	40	83		20000	31.0	27
					Total for BESS Installation Phase:		**36.0**	**31.5**
Site Clean-up & Restoration	Grader	1	40	85		20000	33.0	29
	Front End Loader	1	40	79		20000	27.0	23
					Total for Site Clean-up & Restoration Phase:		**33.9**	**30.0**

PGE SUBSTATION CONSTRUCTION

Noise level limit for construction phase at residential land use, per FTA guidance = 80
Averaging Period (in hours): 8

Construction Sub-Phase	Equipment	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Client Equipment Description, Data Source and/or Notes	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Predicted 8-hour Leq
Site Grubbing / Grading / Compaction	Roller	1	20	80		20000	28.0	21
	Dozer	3	40	82		20000	30.0	31
	Scraper	1	40	84		20000	32.0	28
	Backhoe	4	40	78		20000	26.0	28
					Total for Site Grubbing / Grading / Compaction Phase:		**35.5**	**34.1**
Facilities Construction	Man Lift	2	20	75		20000	23.0	19
	Crane	1	16	81		20000	29.0	21
	Gradall	3	40	83		20000	31.0	32
	Backhoe	3	40	78		20000	26.0	27
	Welder / Torch	1	40	73		20000	21.0	17
					Total for Facilities Construction Phase:		**34.4**	**33.5**
Gen-Tie Construction	Man Lift	2	20	75		20000	23.0	19
	Crane	1	16	81		20000	29.0	21
	Gradall	3	40	83		20000	31.0	32
	Backhoe	3	40	78		20000	26.0	27
					Total for Gen-Tie Construction Phase:		**34.2**	**33.4**
Site Clean-up & Restoration	Grader	1	40	85		20000	33.0	29
	Front End Loader	1	40	79		20000	27.0	23
					Total for Site Clean-up & Restoration Phase:		**33.9**	**30.0**

Appendix D

Traffic Noise Level Modeling Data and Results

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Twisselman Road West of I-5	DATE:	9/1/2022
Scenario:	**Existing**	BY:	J. Leech

ADT	600			PK HR VOL	60
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	53.0	51.0	49.5	43.2	52.5
MEDIUM TRUCKS	48.2	46.8	40.7	37.4	46.9
HEAVY TRUCKS	54.5	53.2	44.5	44.0	53.2
VEHICULAR NOISE	57.4	55.8	51.1	47.1	**56.4**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Twisselman Road East of I-5	DATE:	9/1/2022
Scenario:	**Existing**	BY:	J. Leech

ADT	50			PK HR VOL	5
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	42.2	40.2	38.7	32.4	41.7
MEDIUM TRUCKS	37.4	36.0	29.9	26.6	36.2
HEAVY TRUCKS	43.7	42.4	33.7	33.2	42.4
VEHICULAR NOISE	46.6	45.0	40.3	36.3	**45.6**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Twisselman Road East of I-5	DATE:	9/1/2022
Scenario:	**Existing + Construction**	BY:	J. Leech

ADT	1,050			PK HR VOL	105
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	55.4	53.5	51.9	45.7	54.9
MEDIUM TRUCKS	50.6	49.3	43.1	39.9	49.4
HEAVY TRUCKS	56.9	55.6	46.9	46.4	55.6
VEHICULAR NOISE	59.8	58.3	53.5	49.6	**58.8**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Twisselman Road East of I-5	DATE:	9/1/2022
Scenario:	**Existing + Project Operation**	BY:	J. Leech

ADT	60			PK HR VOL	10
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS: (15=HARD SITE, 10=SOFT SITE)

AUTOM	10.0			
MED TR	10.0			
HVY TR	10.0			
BARRIER	0	(0=WALL,1=BERM)		
ELEVATIONS:				
PAD	0.0	AUTOMOBILES =	0.00	
ROAD	0.0	MEDIUM TRUCKS=	2.30	
		HEAVY TRUCKS =	8.01	
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	45.2	41.0	39.5	33.2	42.5
MEDIUM TRUCKS	40.4	36.8	30.7	27.4	36.9
HEAVY TRUCKS	46.7	43.2	34.5	34.0	43.2
VEHICULAR NOISE	49.6	45.8	41.1	37.1	**46.4**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Lost Hills Road	DATE:	9/1/2022
Scenario:	**Existing**	BY:	J. Leech

ADT	40			PK HR VOL	4
SPEED	48				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	42.0	40.1	38.5	32.3	41.5
MEDIUM TRUCKS	37.1	35.7	29.6	26.3	35.9
HEAVY TRUCKS	43.1	41.8	33.1	32.7	41.9
VEHICULAR NOISE	46.2	44.6	40.0	36.0	**45.2**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Twisselman Road	DATE:	9/1/2022
Scenario:	**Existing + Construction**	BY:	J. Leech

ADT	1,040			PK HR VOL	104
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	55.3	53.4	51.8	45.6	54.9
MEDIUM TRUCKS	50.6	49.2	43.1	39.8	49.3
HEAVY TRUCKS	56.9	55.6	46.9	46.4	55.6
VEHICULAR NOISE	59.8	58.2	53.5	49.5	**58.8**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	Lost Hills Road	DATE:	9/1/2022
Scenario:	**Existing + Project Operation**	BY:	J. Leech

ADT	50			PK HR VOL	9
SPEED	45				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	44.7	40.2	38.7	32.4	41.7
MEDIUM TRUCKS	40.0	36.0	29.9	26.6	36.2
HEAVY TRUCKS	46.2	42.4	33.7	33.2	42.4
VEHICULAR NOISE	49.1	45.0	40.3	36.3	**45.6**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	I-5	DATE:	9/1/2022
Scenario:	**Existing**	BY:	J. Leech

ADT	32,500			PK HR VOL	3,250
SPEED	65				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	74.8	72.9	71.3	65.1	74.3
MEDIUM TRUCKS	69.4	68.0	61.8	58.6	68.1
HEAVY TRUCKS	74.1	72.8	64.1	63.7	72.9
VEHICULAR NOISE	78.1	76.5	72.4	68.0	**77.2**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	I-5	DATE:	9/1/2022
Scenario:	**Existing + Construction**	BY:	J. Leech

ADT	33,500			PK HR VOL	3,350
SPEED	65				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	74.9	73.0	71.4	65.2	74.4
MEDIUM TRUCKS	69.5	68.1	62.0	58.7	68.2
HEAVY TRUCKS	74.3	73.0	64.3	63.8	73.0
VEHICULAR NOISE	78.2	76.7	72.6	68.1	**77.4**

FHWA - HIGHWAY TRAFFIC NOISE PREDICTION MODEL

(modified for CNEL)

DUDEK

PROJECT:	Pelican Jaw Solar	JN:	11438.64
ROADWAY:	I-5	DATE:	9/1/2022
Scenario:	**Existing + Operations**	BY:	J. Leech

ADT	32,510			PK HR VOL	3,255
SPEED	65				
PK HR %	10				
DIST CTL	50				
DIST N/F	52	(M=76,P=52,S=36,C=12)	AUTO SLE DISTANCE		43.0
DIST WALL	0		MED TRUCK SLE DIST		42.8
DIST W/OB	50		HVY TRUCK SLE DIST		42.8
HTH WALL	0.0	********			
HTH OBS	5.0				
AMBIENT	40.0				
ROADWAY VIEW:					
LF ANGLE	-60				
RT ANGLE	60				
DF ANGLE	120				

SITE CONDITIONS:		(15=HARD SITE, 10=SOFT SITE)			
AUTOM	10.0				
MED TR	10.0				
HVY TR	10.0				
BARRIER	0	(0=WALL,1=BERM)			
ELEVATIONS:					
PAD	0.0	AUTOMOBILES =	0.00		
ROAD	0.0	MEDIUM TRUCKS=	2.30		
		HEAVY TRUCKS =	8.01		
GRADE:	0.0 %	GRADE ADJUSTM=	0.0	(TO HEAVY TRUCKS)	

VEHICLE DISTRIBUTION:

	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.770	0.134	0.096	0.9400
MEDIUM TRUCKS	0.872	0.053	0.075	0.0250
HEAVY TRUCKS	0.889	0.030	0.081	0.0350

NOISE IMPACTS WITHOUT TOPO OR BARRIER SHIELDING:

	LEQ PK HR	LEQ DAY	LEQ EVE	LEQ NIGHT	CNEL
AUTOMOBILES	74.8	72.9	71.3	65.1	74.3
MEDIUM TRUCKS	69.4	68.0	61.8	58.6	68.1
HEAVY TRUCKS	74.2	72.8	64.2	63.7	72.9
VEHICULAR NOISE	78.1	76.5	72.4	68.0	**77.2**

Appendix E

Operational Noise Level Modeling Data and Results

Technical Basis of Dudek's "NoisePro" Excel-based Outdoor Sound Propagation Prediction Model

In summary, the Microsoft Excel-based **NoisePro** outdoor sound propagation model developed by Dudek calculates the aggregate sound pressure level (SPL) received by each and every cell within a two-dimensional (2D) array (a product of X columns of cells by Y rows of cells). The quantity of this received SPL, in A-weighted decibels (dBA), is the logarithmic sum of acoustical contribution from each of "n" user-input sound emitting point sources located on the same 2D array, which may be written as follows:

$$SPL_{X,Y} = 10 * \log \sum_{i=1}^{n} 10^{0.1[L_i - A_i]}$$

where each individual source sound level (L_i) is attenuated by an algebraic sum of three attenuation factors ($A_i = A_{div} + A_{atm} + A_{gr}$) that are each dependent on the distance between the sound source position on the X by Y array and the receiving $SPL_{X,Y}$ position on a different position in the same 2D array of worksheet cells, where each cell is defined by the user as representing the center of a square area having equal sides of user-defined length in feet. The above expression is based on Equation 5 from the International Organization for Standardization (ISO) 9613-2 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation", and the individual attenuation factors used by **NoisePro** emulate those in Equation 4 and may be summarized as follows:

- $\boldsymbol{A_{div}}$ = attenuation due to *geometrical divergence* (i.e., pure distance), equating to 20*LOG(d/d_{ref}); and where $\boldsymbol{d}$ is the horizontal distance between a source and a receiver position, while $\boldsymbol{d_{ref}}$ is the reference distance at which the sound source L_i is defined.
- $\boldsymbol{A_{atm}}$ = attenuation due to *atmospheric absorption*, which for 1,000 Hz (1 kHz) = 4.16*$\boldsymbol{d}$/3280 and is derived from Equation 5.7 in Noise & Vibration Control Engineering (Beranek and Ver, 1992).
- $\boldsymbol{A_{gr}}$ = attenuation due to *ground effects*, appearing as Equation 10 in ISO 9613-2 and can be expressed with the following Excel formula:

  $$\boldsymbol{A_{gr}} = \text{MAX}(0,4.8-[\boldsymbol{h_s}+\boldsymbol{h_r}]/\boldsymbol{d}*[17+984/\boldsymbol{d}])$$

  where $\boldsymbol{h_s}$ and $\boldsymbol{h_r}$ are the heights (in feet) of the sound source and receiver positions above grade, respectively. This means that for small distances, attenuation from ground effects will be small or essentially zero; and, even at great distances, the attenuation from ground effects is effectively capped at 4.8 dB.

The Excel workbook comprising **NoisePro** calculates $SPL_{X,Y}$ by using a coding loop to evaluate the acoustic contribution from each attenuated sound source ($\boldsymbol{L_i}$ - $\boldsymbol{A_i}$) in sequence, and logarithmically adding the new evaluation to the previous total in a cumulative manner. When all sources have been evaluated, the loop terminates and yields an aggregate or log-summed total $SPL_{X,Y}$ value that is thus unique to a position in the 2D array of cells represented by X and Y, and can thus be "mapped". If the user has defined a particular cell in the X by Y array as a uniquely tagged Receiver, then the corresponding $SPL_{X,Y}$ value can be indexed and displayed accordingly.

The resulting output array of cells, each having an individually calculated $SPL_{X,Y}$ numerical value, is then filled with a color (from a user-defined palette) by application of a Conditional Formatting rules set (an Excel formatting feature) that compares the dB quantity with user-defined "high" and "low" dB ranges for each available color. Each colored cell can thus be likened to a "pixel" within a 2D array that forms a composite image representing—visually—the sound propagation from all modeled sound sources.

GRID CALCULATION WORKSHEET

Example Portion of Concluded Calculations Loop

		Source	163
	grid size (ft)	Source Tag	**GEN02**
x	348	Source X-coordinate	19836
y	348	Source Y-coordinate	16008
	rcvr plane height (ft)	Source Z-coordinate	3
z	5	Source Reference SPL	77.8
		Source Ref. Distance (ft.)	23

Grid Upper Left (C,R)

1 1

Grid Lower Right (C,R)

120 90

		Receiver Location			
Column	Row	X-coord	Y-coord	Z-coord	Cumulative SPL
1	1	348	348	5	4.2
1	2	348	696	5	4.5
1	3	348	1044	5	4.7
1	4	348	1392	5	4.9
1	5	348	1740	5	5.1
1	6	348	2088	5	5.4
1	7	348	2436	5	5.6
1	8	348	2784	5	5.8
1	9	348	3132	5	6.1
1	10	348	3480	5	6.3
1	11	348	3828	5	6.5
1	12	348	4176	5	6.8
1	13	348	4524	5	7.0
1	14	348	4872	5	7.2
1	15	348	5220	5	7.4
1	16	348	5568	5	7.7
1	17	348	5916	5	7.9
1	18	348	6264	5	8.1
1	19	348	6612	5	8.3
1	20	348	6960	5	8.5
1	21	348	7308	5	8.7
1	22	348	7656	5	8.9
1	23	348	8004	5	9.0
1	24	348	8352	5	9.2
1	25	348	8700	5	9.4
1	26	348	9048	5	9.6
1	27	348	9396	5	9.7
1	28	348	9744	5	9.9
1	29	348	10092	5	10.0

grid scale	ft	Noise Source Description	Type	SPL (dBA)	Ref. Distance (ft)
x	348	Tesla MegaPack	MGP	98.2	3.28
y	348	SMA Inverter	INV	64	32.8
		Sub-station Step-up Transformer	SUB	89	3.28
		Mid-voltage Transformer	TRN	77.2	3.28
		HVAC for O&M Bld.	HVAC	72	3.28

Source Inventory with Model Grid Coordinate Locations and Sound Pressure Reference Levels

Source	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Source Tag	**I001**	**I002**	**I003**	**I004**	**I005**	**I006**	**I007**	**I008**	**I009**	**I010**	**I011**	**I012**	**I013**	**I014**	**I015**	**I016**	**I017**	**I018**	**I019**	**I020**
Source X-coordinate (feet)	14268	14964	16008	16704	17748	17748	16704	16008	14964	14268	14964	16008	16704	17748	17748	16704	16008	15312	16704	17748
Source Y-coordinate (feet)	7656	7656	7656	7656	7656	8352	8352	8352	8352	8352	9396	9396	9396	9396	10092	10092	10092	10092	10788	10788
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Source Tag	**I021**	**I022**	**I023**	**I024**	**I025**	**I026**	**I027**	**I028**	**I029**	**I030**	**I031**	**I032**	**I033**	**I034**	**I035**	**I036**	**I037**	**I038**	**I039**	**I040**
Source X-coordinate (feet)	18792	19836	20532	21576	22620	23316	24360	24360	23316	22620	21576	20532	19836	18792	20532	21576	22620	23664	24360	24360
Source Y-coordinate (feet)	7656	7656	7656	7656	7656	7656	7656	8352	8352	8352	8352	8352	8352	8352	9048	9396	9396	9396	9396	10092
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Source Tag	**I041**	**I042**	**I043**	**I044**	**I045**	**I046**	**I047**	**I048**	**I049**	**I050**	**I051**	**I052**	**I053**	**I054**	**I055**	**I056**	**I057**	**I058**	**I059**	**I060**
Source X-coordinate (feet)	23664	22620	21576	20880	21576	22620	23664	24360	25404	24360	23664	22620	21576	20880	22968	23664	24360	25404	24708	23664
Source Y-coordinate (feet)	10092	10092	10092	10092	10788	10788	10788	10788	12528	12180	12180	11832	11832	11832	12528	12876	12876	13920	13920	13920
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Source Tag	**I061**	**I062**	**I063**	**I064**	**I065**	**I066**	**I067**	**I068**	**I069**	**I070**	**I071**	**I072**	**I073**	**I074**	**I075**	**I076**	**I077**	**I078**	**I079**	**I080**
Source X-coordinate (feet)	20532	21576	22272	23316	24360	25056	25056	24360	23316	22620	21924	21228	20184	19836	20532	22620	23664	24360	25056	23664
Source Y-coordinate (feet)	14616	14616	14616	14616	14616	14616	15312	15312	15312	15312	15312	15312	15660	16356	16356	16356	16356	16356	16356	17052
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
Source Tag	**I081**	**I082**	**I083**	**I084**	**I085**	**I086**	**M001**	**M002**	**M003**	**M004**	**M005**	**M006**	**M007**	**M008**	**M009**	**M010**	**M011**	**M012**	**M013**	**M014**
Source X-coordinate (feet)	24708	25404	26448	27144	28188	27492	26448	25404	24708	23664	24708	25404	26448	27492	28188	29580	28884	29928	29232	28188
Source Y-coordinate (feet)	17052	17052	17052	17052	17748	18096	18096	18096	18096	18096	18792	18792	18792	18792	18792	18792	18444	19488	19488	19488
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
Source Tag	**M015**	**M016**	**M017**	**M018**	**M019**	**M020**	**M021**	**M022**	**M023**	**M024**	**M025**	**M026**	**M027**	**M028**	**M029**	**M030**	**M031**	**M032**	**M033**	**M034**
Source X-coordinate (feet)	27492	26448	25404	23664	23664	24360	26448	27144	28188	29232	29928	30972	31320	29928	29232	28188	27492	25404	24708	23664
Source Y-coordinate (feet)	19488	19488	19488	19488	20184	20184	20184	20184	20184	20184	20184	20184	21228	21228	21228	21228	21228	21228	21228	21228
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
Source Tag	**M035**	**M036**	**M037**	**M038**	**M039**	**M040**	**M041**	**M042**	**M043**	**M044**	**M045**	**M046**	**M047**	**M048**	**M049**	**M050**	**M051**	**M052**	**M053**	**M054**
Source X-coordinate (feet)	28884	29928	30972	31668	32016	30972	29928	29232	28536	29928	30972	31668	32712	32712	31668	30972	30276	31668	32712	32712
Source Y-coordinate (feet)	22272	22272	22272	22272	23316	23316	23316	23316	23316	24012	24012	24012	24012	24708	24708	24708	24708	25752	25752	26448
Source Type	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV	INV
Source Refernce SPL	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Source Reference Dist. (ft.)	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8	32.8
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Source Tag	**M055**	**M056**	**M057**	**M058**	**M059**	**M060**	**M061**	**M062**	**M063**	**M064**	**M065**	**M066**	**M067**	**M068**	**M069**	**M070**	**M071**	**M072**	**M073**	**M074**
Source X-coordinate (feet)	31668	18444	18792	19140	19140	18792	18444	18444	18792	19140	18444	18792	19140	19488	19488	19488	19488	19140	18792	18444
Source Y-coordinate (feet)	26448	14616	14616	14616	14964	14964	14964	15312	15312	15312	14268	14268	14268	14616	14964	15312	15660	15660	15660	15660
Source Type	INV	MGP	MGP	MGP	MGP	MGP	MGP	MGP	MGP	MGP	TRN	TRN	TRN	TRN	TRN	TRN	TRN	TRN	TRN	SUB
Source Refernce SPL	64	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	98.2	77.2	77.2	77.2	77.2	77.2	77.2	77.2	77.2	77.2	89
Source Reference Dist. (ft.)	32.8	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28	3.28
Source Height Above Grade (ft.)	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Source	161	162	162	163
Source Tag	**M075**	**M076**	**GEN01**	**GEN02**
Source X-coordinate (feet)	18792	19140	19488	19836
Source Y-coordinate (feet)	16008	16356	16008	16008
Source Type	MGP	MGP	3	3
Source Refernce SPL	79	79	77.8	77.8
Source Reference Dist. (ft.)	3.28	3.28	23	23
Source Height Above Grade (ft.)	8	8	3	3

Receiver Inventory with Model Grid Coordinate Locations and Predicted Operational Sound Level Exposure

Receiver Tag	ST1	ST2	ST3	ST4
Receiver X-coordinate (feet)	1392	21576	33408	18096
Receiver Y-coordinate (feet)	27492	27492	26100	16704
Receiver Ht Above Ground (ft)	5	5	5	5
SPL Predicted at Receiver	**6.1**	**20.0**	**35.7**	**50.7**

Appendix M

Traffic Generation Assessment

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MEMORANDUM

To:	Tandy McMannes, Pelicans Jaw Solar, LLC
From:	Mladen Popovic, AICP, Transportation Planner
	Dennis Pascua, Transportation Services Manager
Subject:	Traffic Generation Assessment for the Pelicans Jaw Hybrid Solar Project
Date:	February 20, 2023
cc:	Keith Carwana, Dudek
Attachments:	Attachment A – Resumes
	Attachment B – Figure 1 – Project Location and Study Area

Executive Summary

This Traffic Generation Assessment was prepared in support of an application submitted by Pelicans Jaw Solar, LLC for the proposed development of the Pelicans Jaw Hybrid Solar Project (Project), a solar energy facility on unincorporated lands in northwestern Kern County (County). The Project site is located adjacent, and to the south of the border of Kern County with Kings County, approximately two miles east of the U.S. Interstate 5.

This Traffic Generation Assessment includes a trip generation analysis of the Project's construction and (permanent) operations and maintenance (O&M) phases; a vehicle miles traveled (VMT) screening analysis; project access evaluation, and pedestrian, bicycle, and transit analysis. This assessment is based on the County's General Plan Circulation Element (2009), and applicable CEQA guidelines, including adherence to Senate Bill (SB) 743 and guidelines from the Governor's Office of Planning and Research (OPR, 2018).

The Project is expected to generate nominal vehicular trips during its O&M phase associated with routine maintenance and upkeep of the proposed facility. Therefore, the following assessment focuses on the peak construction phase of Project traffic, specifically where construction subphases may overlap with one another, and would temporarily generate the highest amount of Project construction traffic.

Traffic volumes are very low in the area (50 ADT on Twisselman Road and 40 ADT on Lost Hills Road) due to the surrounding agricultural and livestock grazing uses which generate minimal traffic. Based on those volumes Twisselman Road, east of Interstate 5, is not used as a through route for regional and local traffic, and primarily serves the adjacent agricultural and livestock grazing uses. Therefore, the addition of construction traffic by the Project is not expected to have any impacts on transit in the area, nor on pedestrian or bicycle facilities within the vicinity of the area. Operation of the Project is expected to generate nominal permanent vehicular trips within the study area associated with standard operations of the Project.

This Traffic Generation Assessment was prepared by Dennis Pascua and Mladen Popovic, AICP. Resumes are provided in Attachment A.

1 Project Description

The Project would include up to 500-megawatt (MW) of photovoltaic solar generation and a battery energy storage system (BESS) with a capacity up to 4,000-megawatt hour (MWhr) located on approximately 3,371 acres of private property in Kern County, California.

The Project site is proposed to be located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 (I-5) located approximately two miles to the west. The Project is situated within portions of Sections 4, 5, 6, 8, 9, 15, 16, and 22 of Township 25 South, Range 21 East, San Bernardino Base and Meridian. The Project site is generally bordered by Twisselman Road to the south, Lost Hills Road to the east, Kern and Kings County line to the north, and I-5 to the west (Figure 1).

Construction of the Project is anticipated to occur in three phases, with the first phase consisting of the installation of 300 MW of photovoltaic solar and the installation of up to 2,000-MWhr of battery energy storage beginning in the first quarter 2024 and becoming commercially operational in the fourth quarter of 2024 (up to 12 months). The second and third phase would consist of the installation of 200 MW of photovoltaic solar (phase two) and the installation of up to 2,000-MWhr of battery energy storage (phase three) to begin construction in the first quarter of 2024 and become commercially operational in the fourth quarter 2024 (up to 12 months). The operational life of the Project is anticipated to be 35 years.

The Project would primarily consist of photovoltaic (PV) panels, a single-axis tracker system, inverters and transformers, electrical cabling and communication lines, on-site switchgear, a collector substation, generation interconnection (gen-tie) line, access roads, security fence, an O&M facility, and a supervisory control and data acquisition (SCADA) system. The Project would also include a Pacific Gas and Electric (PG&E) switching station that would interconnect with the existing PG&E 230-kilovolt (kV) overhead transmission lines that traverse the Project site. The PG&E switching station would be located on-site, within the Project boundaries. The final location of the PG&E switching station is subject to change pending ongoing environmental surveys and consultation with PG&E.

Existing roads would be used to the extent possible. The main Project access roads would be I-5 and Twisselman Road. Twisselman Road is an existing east/west paved two lane County Road. Two points of access are being proposed from Twisselman Road to provide ingress/egress to the Project site:

- An approximately one-mile-long access road extending north from Twisselman Road to the southwest corner of APN 044-150-170.
- An access road extending from the intersection of Twisselman Road and the southeast corner of APN 044-130-160.

Each access road would include a 24-foot-wide unpaved driveway with up to 5-foot shoulders on either side, for a total width of 34-feet. There is the potential that one or both of the proposed access routes will be developed pending detailed engineering design; therefore, for the purposes of this analysis, both access routes were assumed to be constructed, operated, and maintained.

Internal roads would be constructed to allow fire and maintenance vehicle access. All internal access roads within the Project site would be up to 24 feet wide and cleared, graded, and compacted. Up to a 30-foot-wide perimeter road separating the solar arrays from the perimeter fence would be constructed within the entire perimeter of the Project. The roads would be constructed to allow fire and maintenance vehicle access.

2 Existing Setting

This section describes key study area roadways, as well as transit, pedestrian, and bicycle facilities within the vicinity of the Project. The extent of these facilities constitutes the study area evaluated in this analysis. Regional and site access is also described.

2.1 Roadway Network

The following describes the roadway network in the Project's vicinity.

Interstate 5

I-5 is located west of the Project and would provide regional access to the Project site via its interchange with Twisselman Road. I-5 serves as a central transportation corridor that connects the Project site to other major corridors and nearby communities. It is a north-south oriented, four-lane freeway with posted speed limits of 65 and 70 miles per hour (MPH) along various segments. Based on 2020 daily traffic counts from Caltrans, at Twisselman Road, I-5 carries approximately 32,500 average daily traffic (ADT).

Twisselman Road

Twisselman Road is an east-west oriented, two-lane, undivided, and unimproved (i.e., no curb and gutter) roadway located immediately south of the Project site. The Kern County General Plan Circulation Element does not provide a classification for this roadway. The roadway connects the Project site to I-5 to the west. No pedestrian or bicycle facilities are present on either side of the roadway within the vicinity of the Project site. There is no posted speed limit. Land uses along Twisselman Road are primarily agricultural. Based on 2020 traffic volumes from the Kern Council of Governments (COG), east of I-5, Twisselman Road carries approximately 50 ADT, and west of I-5, Twisselman Road carries approximately 600 ADT.

Lost Hills Road

Lost Hills Road is a north-south, two-lane, undivided, and unimproved roadway located immediately east of the Project site. The Kern County General Plan Circulation Element also does not provide a classification for this roadway. The roadway connects the Project site to Twisselman Road to the west. No pedestrian or bicycle facilities are present on either side of the roadway within the vicinity of the Project site. There is no posted speed limit. Land uses along Lost Hills Road are primarily agricultural. Based on 2020 traffic volumes from the Kern COG, south of Twisselman Road, Lost Hills Road carries approximately 40 ADT.

2.2 Transit Facilities

Kern County is served primarily by bus services. There are no passenger train services in the area of Kern County. A description of the transit service providers is provided below.

Kern Transit

Kern Transit is a transit service that provides passenger bus service between and in the rural communities of Kern County. There are 16 fixed transit routes available in most communities (Kern Transit 2022). The closest route to the Project site is Route 115 from Lost Hills to Bakersfield and is approximately 8 miles south of the Project site. The closest bus stop on this route is at Trailer Park/Lost Hills Road which is about 12 miles to the south of the Project.

2.3 Pedestrian and Bicycle Facilities

Since Twisselman Road and Lost Hills Road are unimproved, there are no pedestrian facilities in the vicinity of the Project site. Similarly, there are no existing bicycle facilities in the vicinity of the Project site. Per the Kern Region Active Transportation Plan (Kern COG, 2018), there are no planned pedestrian and bicycle facilities in the Project vicinity.

3 Trip Generation

The peak construction period of the Project where the highest volumes of construction-related traffic would be generated is planned to occur over a two-week period from April 2, 2024, to April 16, 2024, where multiple phases of Project construction would occur concurrently. Trip generation estimates for the peak construction phase are based on the number of workers and trucks that would be required for the proposed construction activities. Construction traffic includes the number of workers and the amount of truck traffic that would be generated to and from the site daily and during the AM and PM peak commuting hours. The maximum number of construction-related trips is expected to occur over a series of construction phases that would overlap or occur concurrently. Therefore, the overall peak construction period was utilized to calculate the estimated trip generation for the Project.

3.1 Construction Trip Generation

Generally, construction work schedules are expected to be 10 hours per day Monday through Friday, excluding federal holidays. Typically, the workday would consist of one shift beginning as early as 6:00 a.m. and ending as late as 7:00 p.m. The work schedule may be modified throughout the year to account for the changing weather conditions. For instance, during hot weather, it may be necessary to start work earlier to for protect the health safety of workers and/or avoid pouring concrete during high ambient temperatures. Additional hours and/or weekend work (Saturdays and Sundays) may be necessary to make up schedule deficiencies, or to complete critical construction activities (e.g., PV block construction, foundation pouring, or working around time-critical shutdowns and constraints). During the startup phase of the Project, some activities might be performed over the weekend.

Night work may occur during the installation of solar modules as well as work on inverters, transformers, and the substation, which may be required on a limited basis during the night to support commissioning and operations/maintenance. Solar module installation is a labor-intensive activity that requires a large workforce, working in an open-air environment. Allowing crews to work during the cooler nighttime hours would reduce crew exposure to peak daytime summer temperatures and the associated risk of heat illness. Nighttime work may not be limited to summer months.

Any night work conducted would be limited to solar module installation, wire management, inverter, and BESS commissioning. Solar module installation consists of unpackaging the solar modules from boxes and installing the modules onto the racking system with fasteners. Wire management involves connecting the solar modules of each power block together with wires that extend to each power block's inverter. Night work may occur 5 days per week (Monday through Friday), 10 hours per day from 7:00 p.m. to 5:00 a.m. Each crew would work within a specified lighted work area. These work areas would progress through each power block as work is completed across the Project site.

Based on the analysis of the construction schedule and phases, it has been determined that during the construction of the Project, multiple phases would generate peak construction worker and truck traffic, thereby representing the peak construction period. This phase is anticipated to occur between April 2, 2024, and April 16, 2024. To account for the impact construction-related trucks may have compared to passenger vehicles, passenger car equivalence (PCE) factors were applied to the trip generation estimates to account for truck traffic associated with construction activity. A 1.0 PCE factor was applied to passenger vehicles, 2.0 PCE for vendor trucks (which also includes trucks hauling water from off-site locations), and 3.0 for haul trucks. The trip generation estimates during the peak construction period for the Project are summarized in Table 1 below.

Table 1. Peak Day Construction Trip Generation Estimates

Vehicle Type	Daily Quantity		Daily Trips	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Non-PCE Adjusted Trip Generation									
Construction Workers[1]	464	workers	928	464	0	464	0	464	464
Vendor Trucks	16	trucks	32	2	2	4	2	2	4
Haul Trucks[2]	21	trucks	42	2	2	4	2	2	4
Peak Trip Total (Non-PCE)			**1,002**	**468**	**4**	**472**	**4**	**468**	**472**
PCE Adjusted Trip Generation									
Construction Workers	464	workers	928	464	0	464	0	464	464
Vendor Trucks[3]	16	trucks	64	4	4	8	4	4	8
Haul Trucks[3]	21	trucks	126	6	6	12	6	6	12
Peak Trip Total (PCE)			**1,118**	**474**	**10**	**484**	**10**	**474**	**484**

1 Conservatively assumes all construction workers arrive in the AM peak hour and depart the site in the PM peak hour.
2 Vendor and Haul trucks are assumed to arrive and depart the site evenly throughout the workday. Vendor trucks include water trucks.
3 Vendor trucks were estimated to have an approximately 2.0 PCE adjusted value, while haul trucks were estimated to have an approximately 3.0 PCE adjusted value.

As shown in Table 1, the peak day of construction for the Project would generate approximately 1,002 daily trips, 472 AM peak hour trips (468 inbound and 4 outbound), and 472 PM peak hour trips (4 inbound and 468 outbound) during the peak day of construction for the Project. After trip generation estimates were adjusted utilizing PCE factors, the peak day of construction for the Project would generate approximately 1,118 daily PCE trips, 484 AM PCE peak hour trips (474 inbound and 10 outbound), and 484 PM PCE peak hour trips (10 inbound and 474 outbound).

For all other phases of construction, the amount of vehicular traffic is estimated to be less than the peak day. All construction-related traffic would be temporary and short term and would be removed from the study area roadway network upon completion of the Project.

3.2 Permanent Operations

Upon commissioning, the Project would enter the operational phase. For the duration of the operational phase, the Project would be maintained by up to five permanent staff employees and monitored remotely via a SCADA system. On-site maintenance staff would be responsible for security, vegetation management, permit compliance, and Project repairs. Daily trips generated by the project would be less than 50 daily trips associated with the five permanent employees commuting to the site, visitors, and/or deliveries.

Project maintenance performed on the site would consist of vegetation management, maintaining compliance with Project permits, and inspection and replacement of Project equipment. Maintenance would occur during daylight hours, when possible. Maintenance program elements include:

- Managing a group of prequalified maintenance and repair firms who can meet the O&M needs of the facility throughout its life;
- Implementing a responsive, optimized cleaning schedule;
- Responding to facility emergencies and failures in a timely manner;
- Maintaining an inventory of spare parts to ensure timely repairs and consistent plant output;
- Maintaining a log to effectively record and track all maintenance problems; and
- Performing maintenance on the Project site as required to clear obstructive ground cover.

The permanent operations, or O&M phase, of the Project is expected to have nominal operational vehicular trips associated with routine maintenance and upkeep of facilities, and therefore the number of permanent trips (less than 50 daily trips) associated with the Project is not expected to impact the study area roadway network. The roadway conditions in the Project vicinity would not substantially differ from existing conditions.

4 Construction Traffic Management Plan

As shown in Table 1, the peak day of construction for the Project would generate approximately 1,002 daily trips, 472 AM peak hour trips (468 inbound and 4 outbound), and 472 PM peak hour trips (4 inbound and 468 outbound). All construction related trips would be temporary for the duration of Project construction and background traffic volumes and travel patterns would return to pre-construction conditions upon the completion of construction.

Prior to initiation of construction activities, the construction traffic management plan will be prepared by the contractor and filed with the County. The construction traffic management plan would include strategies to reduce the number of trucks that would be generated during both the AM and PM peak hours. Potential traffic management measures may include:

- Limiting worker and truck traffic during the AM and PM peak hours.
- Identification of alternative routes of travel and/or site access driveways to reduce construction vehicle congestion.
- Methods to increase efficiency, to reduce the overall number of trucks by identifying nearby areas for off-site staging or material storage.
- Flaggers that serve to alert motorists to slow moving trucks.
- Temporary advance warning signage on roadways to warn motorists of construction activity in the vicinity.

5 Project Access

Two points of access to the Project site are proposed from Twisselman Road: 1) an approximately one-mile-long access road extending north from Twisselman Road to the southwest corner of APN 044-150-170; and, 2) an access road extending from the intersection of Twisselman Road and the southeast corner of APN 044-130-160. Each access road would include a 24-foot-wide unpaved driveway with up to 5-foot shoulders on either side, for a total width of 34-feet. There is the potential that one or both of the proposed access routes will be developed pending detailed engineering design; therefore, for the purposes of this analysis, both access routes were assumed to be constructed, operated, and maintained.

Based on 2020 traffic volumes from the Kern COG, east of I-5, in the Project vicinity, Twisselman Road carries relatively low traffic volumes of approximately 50 ADT. Traffic volumes are very low in the area due to the surrounding agricultural and livestock grazing uses which generate minimal traffic. Additionally, Twisselman Road terminates to the east at Lost Hills Road (approximately 2.6 miles from I-5). Volumes on Lost Hills Road are also relatively low at approximately 40 ADT. Therefore, based on those volumes Twisselman Road, east of I-5, is not used as a through route for regional and local traffic, and primarily serves the adjacent agricultural and livestock grazing uses.

Twisselman Road has wide shoulders with no pedestrian or bicycle facilities, therefore, is expected to have sufficient roadway width to accommodate large trucks. The roadway contains no curved segments, high landscaping, and signage, therefore Project site driveways would have adequate sight distance so that trucks exiting the site would be visible to oncoming traffic and would allow for traffic to slow down or in some cases completely come to a stop. In situations where there may be a large amount of slow-moving truck traffic entering or exiting the Project site at one time, the contractor should perform this activity during off-peak times and utilize flaggers to warn of slow-moving trucks ahead. It is expected that construction workers would park on-site and would not be staged or transported from any offsite location. Additionally, the Project site would be readily accessible by emergency vehicles along Twisselman Road, Lost Hills Road, and its internal access roads.

6 VMT Analysis

On September 27, 2013, Senate Bill (SB) 743 was signed into law, which creates a process to change the way that transportation impacts are analyzed under California Environmental Quality Act (CEQA). SB 743 required the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to level of service (LOS) for evaluating transportation impacts. Under the new transportation guidelines, LOS, or vehicle delay, will no longer be considered an environmental impact under CEQA. OPR recommended Vehicle Miles Traveled (VMT) as the most appropriate measure of project transportation impacts for land use projects and land use plans. The updates to the CEQA Guidelines required under SB 743 were approved on December 28, 2018. The OPR Technical Advisory (OPR 2018) provides guidance and tools to properly carry out the principles within SB 743 and how to evaluate transportation impacts in CEQA.

Under these guidelines, VMT has been adopted as the most appropriate measure of transportation impacts under CEQA. The OPR's regulatory text indicates that a public agency may immediately commence implementation of the new transportation impact guidelines, and that the guidelines must be implemented statewide by July 1, 2020. The Updated CEQA Guidelines state that "*…generally, vehicle miles traveled (VMT) is the most appropriate measure of transportation impacts…*" and define VMT as "*…the amount and distance of automobile travel attributable to a project….*" It should be noted that "automobile" refers to on-road passenger vehicles, specifically cars and light

trucks. Heavy-duty truck VMT could be included for modeling convenience and ease of calculation (for example, where models or data provide combined auto and heavy truck VMT). Other relevant considerations may include the effects of the project on transit and non-motorized travel.

The details of applicable screening and VMT analysis methodology is provided below. If the project does not meet the applicable screening criteria, then further analysis is required.

6.1 Project Screening

The OPR Technical Advisory states that agencies may screen out VMT impacts using a project's size, maps, transit availability, and provision of affordable housing (OPR 2018).

- **Screening Threshold for Small Projects (110 daily trips or less):** The permanent O&M of the Project would be maintained by up to five permanent staff employees and monitored remotely via a SCADA system. O&M related trips would be less than 50 daily trips. Therefore, the Project would screen out of VMT analysis and can be presumed to have a less than significant impact to VMT since it would generate 110 or less (permanent) daily trips. All construction-related traffic would be temporary and short term and would be removed from the study area roadway network upon completion of the Project.
- **Presumption of Less Than Significant Impact Near Transit Stations:** As discussed in Section 2.2, the closest Kern County transit route to the Project site is Route 115 from Lost Hills to Bakersfield and is approximately 8 miles south of the Project site. The closest bus stop on this route is at Trailer Park/Lost Hills Road which is about 12 miles to the south of the Project. Therefore, the Project site is not located within 0.5 miles of high-quality transit corridor and cannot be screened using the proximity to transit availability criteria.
- **Presumption of Less Than Significant Impact for Affordable Residential Development:** The Project does not propose affordable residential units and is not a residential development.
- **Presumption of Less Than Significant Impact for Local Serving Retail:** For development projects, if the project leads to a net increase in provision of locally serving retail, transportation impacts from the retail portion of the development should be presumed to be less than significant. Generally, local-serving retail less than 50,000 square feet can be assumed to cause a less-than-significant transportation impact. The Project is not considered a retail project; therefore, it cannot be screened out using this criterion.

Because the Project can be screened out from further VMT analysis based on the Small Projects screening criteria, and consistent with CEQA Guidelines Section 15064.3(b)(3), this Assessment instead provides a qualitative analysis of construction traffic. Thus, the Project would not conflict or be inconsistent with CEQA Guidelines Section 15064.3(b), and transportation impacts under CEQA would be less than significant.

7 LOS Analysis

To comply with the County's General Plan Circulation Element level of service (LOS) policies, below is a roadway segment LOS analysis of Twisselman Road for the peak day of construction activities where the Project would (temporarily) generate approximately 484 AM PCE trips, and 484 PM PCE trips. Twisselman Road would be the primary access road to the Project site during its construction. Project construction trips were assumed to be equally split between the northbound and southbound directions of I-5. Table 2 presents the peak hour roadway segment LOS analysis for the peak day of project construction.

Table 2. Peak Day Construction Peak Hour Roadway Segment LOS

Roadway Segment	Daily[1]	Peak Hour				
		Existing[2]	Project	Existing Plus Project	V/C[3]	LOS
Twisselman Road, West Of I-5 Southbound Ramps						
Eastbound; AM Peak Hour	300	150	0	150	0.088	LOS A
Westbound; PM Peak Hour	300	150	0	150	0.088	LOS A
Twisselman Road, Between I-5 Northbound and Southbound Ramps						
Eastbound; AM Peak Hour	163	82	237	319	0.188	LOS A
Westbound; PM Peak Hour	163	82	237	319	0.188	LOS A
Twisselmand Road, East Of I-5 Northbound Ramps						
Eastbound; AM Peak Hour	25	13	474	487	0.286	LOS A
Westbound; PM Peak Hour	25	13	474	487	0.286	LOS A

1 Existing daily volumes from 2020 traffic volumes from the Kern Council of Governments (COG).
2 Existing AM and PM peak hour volumes are conservatively assumed to be one-half of the daily traffic volumes, respectively.
3 Volume to Capacity (V/C) and Level of Service (LOS). Per the Highway Capacity Manual (HCM, 6th Edition), Chapter 15, Two-Lane Highways, the per lane peak hour capacity for a two-lane highway is 1,700 vehicles per hour per lane (vphpl).

Based on the table, under existing no project conditions, all three study segments of Twisselman Road currently operate at LOS A. With the addition of the Project's peak construction traffic, all three segments would continue to operate at LOS A. The County's LOS threshold is LOS D and therefore, addition of the Project's (temporary) peak day construction traffic would not result in any inconsistencies with the County's LOS D policy.

As noted above, daily trips generated by the (permanent) O&M phase of the Project would be less than 50 daily trips associated with the five permanent employees commuting to the site, visitors, and/or deliveries. Since the Project's O&M trips are lower than its peak construction trips, the Project's O&M phase would also be consistent with the County's LOS D policy.

8 Conclusions

The Project would include up to 500-megawatt (MW) of photovoltaic solar generation and a battery energy storage system (BESS) with a capacity up to 4,000-megawatt hour (MWhr) located on approximately 3,371 acres of private property in Kern County, California. The main Project access roads would be I-5 and Twisselman Road. Twisselman Road is an existing east/west paved two lane County Road. Two points of access are being proposed from Twisselman Road to provide ingress/egress to the Project site.

Since there would only be a nominal amount of permanent vehicular traffic associated with O&M of the Project, the peak construction day of the Project was analyzed as the focus of this evaluation. As shown in Table 1, the peak day of construction for the Project would generate approximately 1,002 daily trips, 472 AM peak hour trips (468 inbound and 4 outbound), and 472 PM peak hour trips (4 inbound and 468 outbound) during the peak day of construction for the Project. After trip generation estimates were adjusted utilizing PCE factors, the peak day of construction for the Project would generate approximately 1,118 daily PCE trips, 484 AM PCE peak hour trips (474 inbound and 10 outbound), and 484 PM PCE peak hour trips (10 inbound and 474 outbound). For all other subphases of construction, the amount of vehicular traffic is estimated to be less than the peak period of construction. All

construction-related traffic would be temporary and short term and would be removed from the area roadway network upon completion of the Project. The construction of the Project is not expected to have any impacts on transit in the area, nor on pedestrian or bicycle facilities within the vicinity of the area.

Additionally, a VMT screening analysis was performed, and it was determined a VMT analysis would not be warranted based on OPR Small Project screening criteria. Additionally, all construction trips would be temporary trips and would only exist during construction of the Project. Operation of the Project is expected to generate nominal permanent vehicular trips within the study area associated with standard operations of the Project. Since the Project would generate fewer than 110 permanent daily vehicle trips, no further VMT analysis was required.

With the addition of the Project's peak construction traffic, all three segments would continue to operate at LOS A. The County's LOS threshold is LOS D and therefore, addition of the Project's (temporary) peak day construction traffic would not result in any inconsistencies with the County's LOS D policy. Daily trips generated by the (permanent) O&M phase of the Project would be less than 50 daily trips associated with the five permanent employees commuting to the site, visitors, and/or deliveries. Since the Project's O&M trips are lower than its peak construction trips, the Project's O&M phase would also be consistent with the County's LOS D policy.

The roadways that would provide site access and driveway access to the Project site are wide enough to accommodate emergency vehicles and large trucks. Project driveways would be expected to be located so that slow trucks exiting the site would be visible to oncoming traffic and would allow for traffic to slow down or in some cases completely come to a stop. In situations where there may be a large amount of slow-moving truck traffic entering or exiting the Project site at one time, it is recommended that the contractor utilize flaggers and/or advanced warning signs to warn of slow-moving trucks ahead.

Prior to initiation of construction activities, the construction traffic management plan will be prepared by the contractor and filed with the County. The construction traffic management plan would include strategies to reduce the number of trucks that would be generated during both the AM and PM peak hours. Potential traffic management measures may include:

- Limiting worker and truck traffic during the AM and PM peak hours.
- Identification of alternative routes of travel and/or site access driveways to reduce construction vehicle congestion.
- Methods to increase efficiency, to reduce the overall number of trucks by identifying nearby areas for off-site staging or material storage.
- Flaggers that serve to alert motorists to slow moving trucks.
- Temporary advance warning signage on roadways to warn motorists of construction activity in the vicinity.

9 References

Kern Council of Governments, 2018. Kern Region Active Transportation Plan. Accessed August 19, 2022. https://www.kerncog.org/wp-content/uploads/2018/04/Kern_ATP_Plan.pdf

Kern Council of Governments, 2020. Regional Traffic Count Data. Accessed August 19, 2022. https://www.kerncog.org/traffic-counts/

Kern County, 2009. Kern County General Plan, Circulation Element. Accessed August 18, 2022. https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf

Kern Transit, 2022. Route 115. Accessed August 18, 2022. https://kerntransit.org/routes/route-115/#timetable-detail-maps

OPR (Governor's Office of Planning and Research). 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. State of California. Accessed August 19, 2022. http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf.

Attachment A

Resumes

Dennis Pascua

SENIOR TRANSPORTATION PLANNER

Dennis Pascua is a senior transportation planner and Dudek's transportation services manager with 28 years' experience in transportation planning/ engineering throughout California. Mr. Pascua has successfully managed a variety of projects for local agencies and private developers, including traffic and circulation impact analyses and parking demand studies in both highly urbanized and rural areas. He is highly experienced with California Environmental Quality Act/National Environmental Policy Act and transportation topics and policies surrounding active transportation, context sensitive solutions, and complete streets throughout California. Mr. Pascua also offers an international perspective, having managed transportation planning projects in the Philippines, Japan, and the United Arab Emirates.

Education

University of California, Irvine

BA, Social Ecology (Environmental Analysis and Design)

Professional Affiliations

American Planning Association

Association of Environmental Professionals

Institute of Transportation Engineers

Orange County Traffic Engineering Council

Project Experience

ReCurrent Crimson Solar Project Joint Environmental Impact Statement/ Environmental Impact Report/Land Use Plan Amendment (EIS/EIR/PA), California Department of Fish and Wildlife (CDFW), Riverside County. Task leader for transportation and responsible for working closely with the project manager and CDFW, in providing CEQA adequacy review for an approximately 350 megawatt (MW) solar photovoltaic (PV) energy generating facility, energy storage facility, and related infrastructure on Bureau of Land Management (BLM)-administered land in unincorporated Riverside County. Assisted with review of the traffic plan and reports and preparation of data gap analyses. Also, reviewed the EIS/EIR traffic section, prepared for BLM by others, for CEQA adequacy under our CEQA retainer contract with CDFW.

Sanborn Solar and Gen-Tie Route Project, Kern County, California. Managed the in-house Transportation team that prepared a TIA that identified potential construction-related traffic impacts associated with a proposed photovoltaic solar facility and associated infrastructure (gen-tie) necessary to generate up to a combined 300 megawatts of renewable electrical energy. The proposed project consisted of two sites: the northern site is approximately 1,118 acres; and, the southern site is approximately 983 acres. The southern site is directly north of Edwards Air Force Base Solar project. The project impacts were evaluated under CEQA and NEPA. The TIA evaluated existing traffic conditions, including roadway segment and intersection levels of service along or in proximity to the gen-tie route options; estimated trip generation and trip characteristics for construction-related activities of the gen-tie options; analyzed the potential for traffic impacts to occur as a result of construction of the gen-tie; described the significance of the potential impacts; and, identified mitigation measures, for construction-related traffic impacts.

Gen-Tie Routes for Edwards Air Force Base Solar Enhanced Use Lease Project, Kern County, California. Managed the in-house Transportation team that prepared a traffic impact analysis (TIA) that identified potential construction-related traffic impacts associated with the proposed 230-kilovolt gen-tie route options that would connect the Edwards Air Force Base (EAFB) solar generation site with the existing Westwind Substation in the first phase of the

project, and to the Southern California Edison Windhub Substation in subsequent phases of the project. The project impacts were evaluated under CEQA and NEPA. This project is located south of the Sanborn Solar and Gen-Tie project. The TIA evaluated existing traffic conditions, including roadway segment and intersection levels of service along or in proximity to the gen-tie route options; estimated trip generation and trip characteristics for construction-related activities of the gen-tie options; analyzed the potential for traffic impacts to occur as a result of construction of the gen-tie; described the significance of the potential impacts; and, identified mitigation measures, for construction-related traffic impacts.

Martin Substation/Egbert Switching Station Project, On-Call CEQA/NEPA Services, California Public Utilities Commission (CPUC), San Francisco, California. Serving as senior transportation specialist for review of the Pacific Gas & Electric's proposed switching station and transmission line project. Responsibilities included review of the traffic section of Proponent's Environmental Assessment, preparation of the traffic section of an Initial Study and Environmental Impact Report, and responses to public comments related to traffic issues.

South Lake Avenue Solar and Energy Storage Project, Fresno County, California. Managed the in-house Transportation team that prepared a TIA that identified potential construction-related traffic impacts associated with a proposed photovoltaic solar facility and associated infrastructure for a renewable electrical energy project. The Project site is located approximately 30 miles southwest of the City of Fresno and 3.4 miles south-southwest of the unincorporated community of Five Points. The TIA evaluated existing traffic conditions, including roadway segment and intersection levels of service adjacent to the project site; estimated trip generation and trip characteristics for construction-related activities; and, identified mitigation measures, for construction-related traffic impacts.

Campo Wind Project EIS-EIR, San Diego County, California. Managed the in-house Transportation team that prepared a TIA for the Campo Wind Project, a wind energy generation project located on the Campo Band of Diegueño Mission Indians Reservation. The project consists of construction and operation of a renewable wind energy project consisting of 60 wind turbines and associated facilities including, meteorological towers, an operations and maintenance (O&M) facility; access roads, an approximately 8.5-mile-long generation transmission line; a collector substation, a high-voltage substation, and a switchyard to interconnect the project to the existing San Diego Gas & Electric (SDG&E) Sunrise Powerlink. The TIA primarily evaluated the project's construction-level impacts and documented existing traffic conditions including roadway segment and intersection levels of service along or in proximity to the project.

LADWP On-Call Environmental Services, Los Angeles, California. Managed Traffic Impact Analysis (TIAs) for the following projects prepared under an on-call contract with the City of Los Angeles Department of Water and Power (LADWP), the nation's largest municipal utility: Power Plant 1 and Power Plant 2 Transmission Line Conversion; Tujunga Central Groundwater Station; North Hollywood Groundwater Station; De Soto Avenue Trunk Line Replacement; De Soto Water Tanks; and Van Norman Complex Vegetation and Maintenance Projects. The TIAs prepared, or currently being prepared, involve the analysis of construction-related traffic and potential lane closures on major public thoroughfares. Construction mitigation measures include the preparation of a Construction Traffic Management Plan that includes traffic control plans for roadway construction, and transportation demand management for construction worker traffic. Dudek has also coordinated with the Department of Transportation and Bureau of Engineering on those projects.

Mladen Popovic, AICP

TRANSPORTATION PLANNER

Mladen Popovic (*MLAH-den PAH-puh-vitch; he/him*) is a transportation planner with 7 years' experience focusing on transportation impacts for a wide variety of projects. Mr. Popovic has an educational background in planning and experience working within traffic impact analysis procedures, including vehicle miles traveled analysis, data collection, cumulative project development, trip generation calculations, level of service (LOS) analysis for intersections and roadway segments, signal warrant analysis, construction traffic, internal circulation and access evaluation, and vehicle turning analysis. He has utilized various types of transportation and design software including Synchro, Traffix, AutoTurn, as well as other technical programs, such as ArcGIS and AutoCAD.

Education

University of California, Santa Barbara
BA (with Honors), Geographic Information Systems
BA (with Honors), Environmental Studies

University of California, Irvine
Masters, Urban and Regional Planning

Certifications

AICP No. 31419

Professional Affiliations

American Planning Association

Project Experience

Gonzaga Ridge Wind Repowering Project EIR, Merced County, California. Worked as part of the transportation team on Gonzaga Ridge Wind Repowering Project EIR, including preparation of the EIR Transportation section and associated Technical Memorandum. Located within Pacheco State Park, the project would replace outdated existing wind turbines, improve reliability of energy capture, optimize the project's function and efficiency, and help meet California's goal to target of 100 percent carbon-free electricity by 2045 (Senate Bill 100) and reducing greenhouse gas emissions to 1990 levels by 2020 (California Global Warming Solutions Act of 2006/Assembly Bill 32.

Traffic Impact Analysis, Dodge Flat Solar Energy Center, Washoe County, Nevada. Worked on a Traffic Impact Analysis to analyze concerns with a proposed solar energy project in Washoe County, Nevada. The project occurred primarily within the Pyramid Lake Paiute Tribe's territory and along a major thoroughfare for the annual Burning Man Festival. This necessitated a detailed understanding of the Tribe's transportation network, their historical use of these facilities, and the future outcomes desired for the community.

Orange County Sanitation District Facilities Master Plan EIR, Orange County, California. Worked as part of a team on the transportation analysis and reporting for the project's Program EIR for the Sanitation District's 2017 Facilities Master Plan. The analysis covers projects included in a 20-year Capital Improvement Program to ensure that the Orange County Sanitation District could sustain its infrastructure, meet future regulatory requirements, and continue to provide reliable service to the public. The project included facilities at Reclamation Plant No. 1 in Fountain Valley, Treatment Plant No. 2 in Huntington Beach, the sewer collection system, and improvements at various pump stations. All 75 project- and program-level projects were evaluated quantitatively at either a project-level or representative project approach.

Santa Cruz Water Rights Project EIR, City of Santa Cruz, California. Worked as part of the transportation team on the Santa Cruz Water Rights Project EIR, including preperaton of the EIR Transportation section. Components of the project include modifications to existing water rights and related actions required to implement the proposed modifications, including

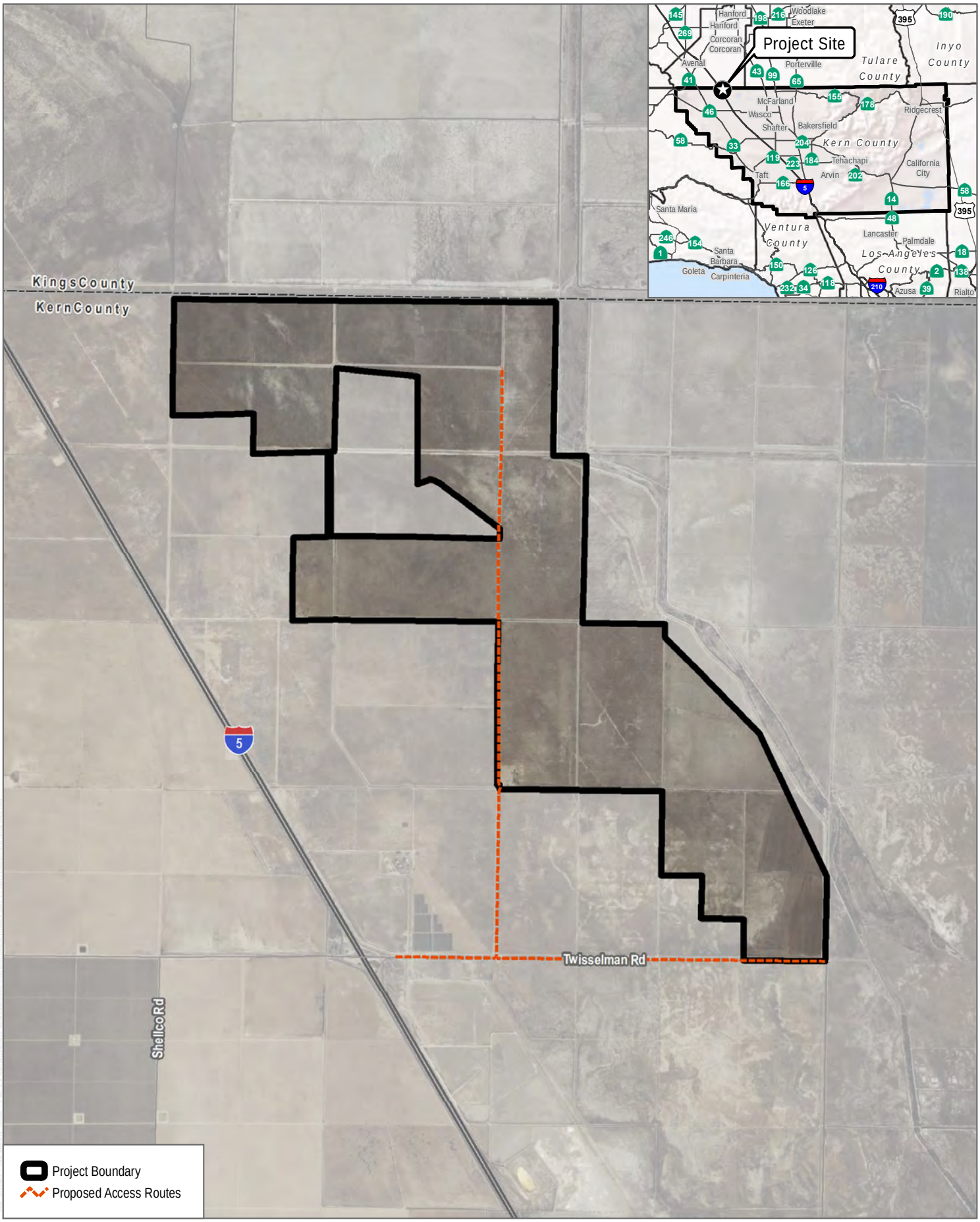
expansion of place of use, clarifications on method and points of diversion and rediversion, adding an underground storage supplement, extension of time to put water to full beneficial use, and incorporation of bypass requirements for each water right. The underlying purpose of the project is to improve City of Santa Cruz water system flexibility while enhancing stream flows for local anadromous fisheries. Physical infrastructure improvements include aquifer storage and recovery facilities in the Beltz system and potentially elsewhere, intertie facilities to allow for water transfers with neighboring agencies, and improvements to the Tait Diversion/Coast Pump Station and the Felton Diversion.

Santa Cruz County Sustainability Update, Santa Cruz County, California. Providing transportation assessment and analysis for the EIR of a comprehensive update to Santa Cruz County's General Plan/Local Coastal Program and modernization of the County Code. The current General Plan/Local Coastal Program will reflect new state laws, new regional and local plans, and a community vision that is focused on sustainable growth. Key changes include establishing a multi-modal transportation network, preserving agricultural land, and modernizing commercial and industrial properties. Tasks include transportation analysis, preparation of technical analysis, and preparation of EIR sections.

Los Angeles Department of Water and Power Projects, Los Angeles, California. Worked as a part of a team multiple Los Angeles Department of Water and Power projects that analyzed various construction impacts associated with trunk line, pipeline, and facility construction. The analyses focused on the temporary construction impacts upon both residential and urban corridors, impacts to pedestrian and multi-modal accessibility, and LOS. As part of the Los Angeles Department of Transportation guidelines, critical movement analysis was performed for a wide range of areas across Los Angeles.

Attachment B

Figure 1



SOURCE: Bing 2022, County of Kern 2020, Open Street Map 2019

DUDEK

0 2,000 4,000 Feet

FIGURE 1

Project Location and Study Area

Pelicans Jaw Hybrid Solar Project

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Appendix N

Water Supply Assessment

Water Supply Assessment

Pelicans Jaw Hybrid Solar Project

FEBRUARY 2023

Prepared for:

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Executive Summary

The Pelicans Jaw Hybrid Solar Project (PJHSP, or Project) has been determined, by Kern County (County), acting as lead agency, to require preparation of an environmental impact report (EIR) pursuant to the California Environmental Quality Act (CEQA), based on their experience with other comparable projects. The County has determined that a Water Supply Assessment (WSA), consistent with the requirements of Senate Bill 610, is needed to support preparation of the EIR, and the discretionary land use decision that will be undertaken by the County Board of Supervisors. Pelicans Jaw Solar, LLC proposes to entitle, construct, operate, and maintain the PJHSP, which would consist of up to 500-megawatt of photovoltaic solar generation and up to 4,000-megawatt hours (MWhr) of battery energy storage. The 3,371-acre Project site is located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 located approximately two miles to the west. The Applicant would be required to obtain a permit from the Kern County Public Health Services Department for the construction of a new groundwater well or the modification of any existing on-site well that is suitable for rehabilitation. This Water Supply Assessment was prepared under the supervision of Dylan Duvergé and Devin Pritchard-Peterson. Mr. Duvergé is a licensed professional geologist (CA PG No. 9244) with over 10 years' experience in water resources management and recent specialized experience overseeing preparation of multiple Water Supply Assessments for renewable energy projects in the Central Valley and the deserts of southern California, and similar documents in Nevada. Mr. Pritchard-Peterson is a hydrogeologist with over 7 years' professional experience in the fields of water resources management, groundwater supply development, and environmental permitting and compliance. Mr. Pritchard-Peterson has significant experience developing groundwater management plans, completing hydrogeological investigations, conducting aquifer tests, and analyzing hydrologic data.

This WSA has estimated the water demand for the Project to be 1,200 acre-feet over 36 years; reviewed information on available water supplies, groundwater conditions, and applicable Groundwater Sustainability Plans; and analyzed the worst-case pumping scenario. Based on this work, this WSA has concluded that there are sufficient water supplies to serve the Project's construction and operational water demands under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year period (as well as the Project's operational lifetime) and has identified sufficient backup sources of water to give the applicant the flexibility to respond to unanticipated events or constraints. Furthermore, the water demand of the project can be served without having adverse impacts on groundwater resources, including the consideration of six sustainability indicators established by the Sustainable Groundwater Management Act (i.e., groundwater levels decline, aquifer storage reduction, water quality degradation, land subsidence, surface water depletion and groundwater-dependent ecosystems).

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
BVWSD	Buena Vista Water Storage District
CEQA	California Environmental Quality Act
County	Kern County
CVP	Central Valley Project
CWC	California Water Code
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
KGA	Kern Groundwater Authority
lbs	pounds
LHUD	Lost Hills Utility District
LHWD	Lost Hills Water District
MW	megawatt
O&M	operation and maintenance
PJHSP (or Project)	Pelicans Jaw Hybrid Solar Project
PWS	public water system
RMW	representative monitoring well
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SJVKCGS	San Joaquin Valley – Kern County Groundwater Subbasin
SWP	State Water Project
USGS	U.S. Geological Survey
WDWA	Westside District Water Authority
WSA	Water Supply Assessment
WWQC	Westside Water Quality Coalition

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1 Introduction

1.1 Purpose of Document

The Pelicans Jaw Hybrid Solar Project (PJHSP, or Project), has been determined, by Kern County (County), acting as lead agency, to require preparation of an environmental impact report (EIR), pursuant to the California Environmental Quality Act (CEQA), based on their experience with other comparable projects. The County has determined that a Water Supply Assessment (WSA), consistent with the requirements of Senate Bill (SB 610), is needed to support preparation of the EIR, and the discretionary land use decision that will be undertaken by the County Board of Supervisors. SB 610 was passed on January 1, 2002, amending the California Water Code (Sections 10910–10915) to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies and to ensure that land use decisions for certain large development projects are fully informed as to whether sufficient water supplies are available to meet project demands. SB 610 requires the preparation of a WSA for a project that is subject to CEQA and meets certain requirements.

The Project satisfies the statutory definition of a "project" for the purpose of determining SB 610 applicability because it is considered an industrial facility in excess of 40 acres in size, per CWC Section 10912(a)(5). Furthermore, because the Project is not within the service area of a public water system (PWS), as defined in CWC Section 10912(c), the County, as the CEQA lead agency, is responsible for the preparation of a WSA, which will be included for the consideration of the potential for significant environmental impacts on surface and groundwater water resources in the EIR. In compliance with SB 610, this WSA examines the availability of the identified water supply under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, accounting for the projected water demand of the PJHSP plus other existing and planned future uses of the identified water supply.

Furthermore, per CWC Section 10910(f), because the water supply for the Project would include groundwater from an unadjudicated basin in a state of critical overdraft, this WSA also includes a detailed discussion and analysis of how the proposed groundwater use would affect groundwater conditions in the underlying basin, as well as identification whether a Groundwater Sustainability Plan (GSP) has been adopted for the basin. The analysis is also intended to provide the Kern Groundwater Authority (KGA) Groundwater Sustainability Agency (GSAs) with information needed to support a "written verification" that would allow the Kern County Public Health Services Department to authorize a new or modified well permit, per Executive Order (EO) N-7-22 adopted on March 28, 2022. This EO places limits on the issuance of permits for new or altered groundwater wells in a basin subject to the Sustainable Groundwater Management Act (SGMA) and classified as medium or high priority without first obtaining written verification from the KGA GSA that the proposed groundwater extraction would not be in conflict with applicable goals and sustainability criteria contained in the GSP.

This Water Supply Assessment has been prepared to support the project planning efforts being undertaken by Pelicans Jaw Solar, LLC, (Applicant) to support planning and design efforts, technical studies required by Kern County to inform the environmental impact report, and related permitting. The report was prepared under the supervision of Dylan Duvergé and Devin Pritchard-Peterson. Mr. Duvergé is a licensed professional geologist (CA PG No. 9244) with over 10 years' experience in water resources management and recent specialized experience overseeing preparation of multiple Water Supply Assessments for renewable energy projects in the Central Valley

and the deserts of southern California, and similar documents in Nevada. Mr. Pritchard-Peterson is a hydrogeologist with over 7 years' professional experience in the fields of water resources management, groundwater supply development, and environmental permitting and compliance. Mr. Pritchard-Peterson has significant experience developing groundwater management plans, completing hydrogeological investigations, conducting aquifer tests, and analyzing hydrologic data (Appendix A).

1.2 Project Location and Description

The Applicant proposes to entitle, construct, operate, and maintain the PJHSP, which would consist of up to 500-megawatt (MW) of photovoltaic solar generation and up to 4,000-MWhr of battery energy storage. The Applicant is pursuing a Conditional Use Permit and General Plan Amendment from the County Planning and Natural Resources Department. Construction of the Project is anticipated to occur in three phases, with the first phase consisting of the installation of 300 MW of photovoltaic solar and the installation of up to 2,000-MWhr of battery energy storage beginning in the first quarter 2024 and becoming commercially operational in the fourth quarter of 2024 (up to 12 months). The second and third phase would consist of the installation of 200 MW of photovoltaic solar (phase two) and the installation of up to 2,000-MWhr of battery energy storage (phase three) to begin construction in the first quarter of 2024 and become commercially operational in the fourth quarter 2024 (up to 12 months). The anticipated operational life of the Project is anticipated to be 35 years. This WSA considers water resource availability over a 36-year period because it includes the construction phases to occur over one year (2024), plus the project's 35-year operational lifetime.

The 3,371-acre Project site is located in northwestern Kern County, adjacent to the southern border of Kings County with direct access from Interstate 5 (I-5) located approximately two miles to the west. The Project is situated within portions of Sections 4, 5, 6, 7, 8, 9, 15, 16, and 22 of Township 25 South, Range 21 East, San Bernardino Base and Meridian (Table 1). The Project site is generally bordered by Twisselman Road to the south, Lost Hills Road to the east, Kern and Kings County line to the north, and Interstate (I)-5 to the west. The two 7.5-Minute Series U.S. Geological Survey (USGS) topographic quadrangle maps intersected by the Project site consist of the Lone Tree and West Camp quadrangles (Table 1).

Table 1. Project Site Location Information

Assessor's Parcel Numbers (APNs)	
044-101-020	044-103-080
044-101-030	044-150-050
044-101-050	044-150-170
044-101-060	044-103-090 (portion of)
044-102-010	044-110-030
044-102-030	044-110-250
044-102-050	044-130-160
044-130-390	044-130-180
044-102-220	044-130-210
044-103-010 (portion of)	044-102-210
044-103-040 (portion of)	044-110-010
044-103-060 (portion of)	044-101-160
044-102-230	044-101-110 (portion of)[1]
Township & Range Sections	
Township 25 South, Range 21 East, Section 4	Township 25 South, Range 21 East, Section 9
Township 25 South, Range 21 East, Section 5	Township 25 South, Range 21 East, Section 15
Township 25 South, Range 21 East, Section 6	Township 25 South, Range 21 East, Section 16
Township 25 South, Range 21 East, Section 8	Township 25 South, Range 21 East, Section 22
Township 25 South, Range 21 East, Section 7	
USGS 7.5-Topographic Quadrangles	
West Camp	Lone Tree

1 A 40- to 100-foot-wide easement is included within APN 044-101-110 to accommodate a 34.5-kV collection line.

The project site has a long history of use for agricultural land practices including cotton, alfalfa, and safflower prior to the mid-1990s, and thereafter and at the time of preparation of this report was being used for sheep and cattle grazing. The Project site is bordered by undeveloped, agricultural, and grazing land. At the closest point, I-5 is approximately 900 feet to the west of the Project site. Overhead electrical transmission lines traverse the west side of the Project site in a northwest to southeast direction.

The Project would primarily consist of photovoltaic (PV) panels, a single-axis tracker system, inverters and transformers, electrical cabling and communication lines, on-site switchgear, an underground or above ground (or a combination of both) 34.5-kV collection system, a collector substation, generation interconnection (gen-tie) line, access roads, security fence, an operations and maintenance (O&M) facility, and a supervisory control and data acquisition (SCADA) system. The Project would also include a Pacific Gas and Electric (PG&E) switching station that would interconnect with the existing PG&E 230-kilovolt (kV) overhead transmission lines that traverse the Project site. The PG&E switching station would be located on-site, within the Project boundaries. The final location of the PG&E switching station is subject to change pending ongoing environmental surveys and consultation with PG&E. Solar energy would be captured by an array of PV panels mounted to a single axis tracking system. The PV panels convert incoming sunlight to direct current electrical energy. The panels would be arranged in series to effectively increase voltage. These chains of panels are called "strings" and provide the basic building block of power conversion in the solar array.

1.3 Water Supply Assessment Applicability

The original intent of SB 610 was to address water supply sufficiency primarily for urban development projects, and/or other projects that have large water demands. The water demand benchmark used in SB 610 for when a project is required to prepare a WSA is generally the amount of water used by a 500-unit residential development project. This amount varies from place to place throughout municipal areas California, but for reference, would generally not ever be less than 100 AFY[1], even for most modern and water-efficient residential development projects. The statute attempts to define size thresholds for commercial and industrial projects to approximate those that would have similarly large water demands. The threshold for an industrial facility is one which is greater than 40 acres in size, per CWC Section 10912(a)(5). Although SB 610 does not define an industrial facility, it appears based on the purpose and intent of the statute that it was contemplating typical urban industrial land uses rather than solar electric facilities. Given the long-term operation and maintenance water demand of the PJHSP would be much lower than a 500-unit residential development project (see Section 2), an argument could be made that the requirements of SB 610 do not technically apply to the Project. Nevertheless, out of an abundance of caution, and because analysis required by SB 610 is useful for the CEQA process and (due to Executive Order N-7-22) permitting of new or modified water wells, this WSA has been prepared for the PJHSP in satisfaction of the requirements of SB 610.

The CWC, as amended by SB 610, requires that a WSA address the following questions:

- Is there a public water system that will service the PJHSP?
- Is there a current urban water management plan that accounts for the PJHSP demand?
- Is groundwater a component of the supplies for the PJHSP?
- Are there sufficient supplies to serve the PJHSP over the next 20 years?

Furthermore, the WSA is required to answer a primary question:

> Will the total projected water supplies available during normal, single-dry, and multiple-dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?

The following sections address the SB 610 WSA questions as they relate to the PJHSP.

1.3.1 Is there a public water system that will service the Project?

The Project site is not connected to a PWS as defined by CWC Section 10912. Furthermore, the PJHSP does not propose a physical connection to any PWSs. The following information on the Lost Hills Water District (LHWD) and nearby PWSs is included below for reference only.

The Project site is within the service area of the LHWD, which participates as a member of the Westside District Water Authority (WDWA), who in turn is a member of the KGA (Figure 1). The LHWD was formed in 1963 to provide irrigation water from the State Water Project (SWP) to the LHWD. Agricultural activities within LHWD's service area rely primarily on surface water from the Aqueduct. Groundwater use in the LHWD is mostly limited to periods of

[1] This amount is for illustrative purposes only, and accounts for indoor water use efficiency standard in the California Code of Regulations (Title 23, Section 697) of 55 – 75 gallons per capita per day, an average household size of 3 persons, and excludes outdoor (landscaping) water demands.

contracted surface water shortfalls and is generally relied upon for the purpose of blending. During periods of drought the LHWD also relies on groundwater coordination with adjacent Water Districts or growers as well as for surface water transfers, supplemental water purchases and nearby water banking programs (i.e., Berrenda Mesa and Pioneer Projects) (WDWA 2019). The LHWD owns and operates over 23 miles of concrete or geomembrane-lined canals, 42 miles of pipelines, and an additional 27 miles of unlined canals, most of which are out of use (WDWA 2019). The Project site is in Service Area 6 of the LHUD, which consists of dirt canals that historically delivered water for irrigation; however, the area is no longer receiving deliveries of irrigation water since farming stopped in the 1990s in this area.

The Lost Hills Utility District (LHUD) has a community water system serving 2,412 people (the town of Lost Hills) that obtains its water from two groundwater wells located 12 miles east of the town (Well 3 - East and Well 4 - North) (SDWIS 2022a). LHUD's community water system has 443 service connections and is located outside of the Project boundary (on SR-46 off of I-5, about 10 miles south of the Project site). LHUD does not qualify as PWS as defined by CWC Section 10912 because it has less than 3,000 service connections (SDWIS 2022a). Lost Hills Utility District provides construction water to those construction companies who need access to a fire hydrant located within their water system by applying for a construction water meter, and thus can serve as a backup option for the Project (LHUD 2022).

The Wonderful Company (Wonderful Hulling and Shelling) also has a water system (Water System No. CA1502759) whose main water source is raw water from the Berrrenda-Mesa Canal. The water system consists of a distribution system and 36 unmetered commercial/industrial connections that serves a population of 742 non-transient persons and 954 transient persons. However, this water system is not within the Project's boundaries and does not qualify as PWS as defined by CWC Section 10912 because it has less than 3,000 service connections (SDWIS 2022a).

1.3.2 Is there a current urban water management plan that accounts for the Project demand?

There is no urban water management plan that covers the PJHSP site.

1.3.3 Is groundwater a component of the supplies for the project?

Groundwater from one or more on-site wells is proposed to be the main source of supply proposed for the PJHSP site. Surface water from the Buena Vista Water Storage District and/or groundwater from the Lost Hills Utility District are proposed as a secondary (i.e., backup) sources of supply in the event water quality constraints preclude use of on-site groundwater.

1.3.4 Are there sufficient supplies to serve the project over the next 20 years

Based on the assessment discussed in Section 6, Conclusion, of this report, sufficient water resources would be available to serve the Project's construction and operational water demands under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year period required by the legislation and the 35-year project life. In addition, Project implementation would not significantly impact groundwater resources, groundwater-dependent ecosystems (GDEs), adjacent groundwater wells, or land subsidence on-site or in the surrounding vicinity.

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2 Project Water Demand

Even when incorporating the Project's high short-term demand for construction activities, the amortized water demand of the Project over the 36-year period (the approximate 1-year construction phase plus the assumed 35-year operational life) is substantially less than the amortized agricultural water demand of the prior 36 years due to irrigation and stock water requirements. The 36-year water demand for the Project is estimated to be 1,200 acre-feet (AF) in total, or about 33.3 acre-feet per year (AFY) when both the construction and operation and maintenance (O&M) water demands are amortized over 36 years. The 36-year historical water demand of the Project site is not known but can be reasonably assumed to be an order of magnitude higher based on its agricultural history. The proposed source of water for the Project is groundwater, with imported (i.e., trucked) water from the Buena Vista Water Storage District (BVWSD) and/or hydrant water from the LHUD serving as a backup and/or supplemental source of supply. The following sections provide additional detail on the Project site's historical and proposed water demands.

2.1 Existing and Historical Water Demand

Based on communication from the landowner, the Project site has not been used for irrigated agriculture in the last ten years (2012 through 2022) but is now being used for sheep and cattle grazing (Wonderful Orchards 2022). This is consistent with historical imagery from Google Earth, as well as crop mapping data from the California Department of Water Resources (DWR) (DWR 2022a). Review of historical imagery suggests that the Project parcels switched from irrigated agriculture to being used as rangeland sometime in the early- to mid-1990s. According to the Groundwater Sustainability Plan for the WDWA, the site was used to cultivate a mix of cotton, alfalfa, and safflower with a very high percentage (i.e., 75% -100%) of coverage in 1993 (WDWA 2019). This type of land use would have required water on the order of thousands of AFY. As a point of reference, alfalfa in the San Joaquin Valley typically requires 50 inches of water each growing season[2], with only about 6 of those inches coming from precipitation in an average water year. Even if just half the Project site were planted with alfalfa, it would have required almost 6,000 AFY[3]. Since the 1990s, during which much of the 70,453 farmable acreage within the LHWD service area was in cultivation, the coverage of irrigated agriculture has declined steadily within the LHWD service area due to poor imported water reliability and poor groundwater quality (WDWA 2019). As of 2015, the LHWD had 27,900 acres under irrigated cultivation (WDWA 2019).

Although utilizing dry rangeland for cattle and sheep grazing is not considered a water-intensive land use, it is worth estimating the stock water requirements of livestock that the Project site could support, because that is water that would not be used once the Project is developed as a solar facility (since the area available for rangeland in the region would be reduced by an equivalent amount). Based U.S. Department of Agriculture (USDA) estimates of rangeland productivity by soil unit, the Project site is estimated to be capable of producing 1,216,000 pounds (lbs) of forage in an average year, or about 3,331 lbs/day (NRCS 2022). It should be noted that the majority of the site (about 74%) is underlain by soil units for which the USDA has no forage estimate, and thus this forage estimate accounts for 26% of the site only. It is likely that the remainder of the site offers forage, though perhaps minimal forage and only during wet periods. The daily dry matter intake of a cow ranges from 1.5 to 3 percent of its body weight each day. Assuming the average weight of one beef cow/calf is 1,000 lbs, the upper range for the dry matter intake of a cow/calf would be 30 lbs/day. Given the conservative assumptions above, it is reasonable to estimate

[2] https://alfalfa.ucdavis.edu/+symposium/proceedings/1975/75-78.Pdf
[3] (3,371 acres / 2) x ((50 inches – 6 inches) / (12 inches/foot)) = 6,000 AFY

that the site could support an average of 108 heads[4] of cattle per year while it has been used for grazing. However, correspondence with the landowner indicates that there are currently 10 cows on-site seasonally due to lack of forage (Widhalm, pers. comm., 2022). Because the site is arid, hot, and has feed with a low water content, it is estimated that each head of cattle would require an average of 20 gallons of water per day (UNL 2011). Therefore, the existing water demand of this site is estimated to be about 0.22 AFY[5]. The existing source of stock water is an onsite well run by a small solar pump located on the northern portion of the site (Widhalm, pers. comm., 2022).

Although the water demand of rangeland (i.e., stock water) is rather low, it is nonetheless appreciable. When considering a longer historical time horizon equivalent to the of the proposed Project (inclusive of the site's history of irrigated agriculture), the average annual water demand over the past 36 years would be quite high. While the exact amount is not possible to estimate with any degree of certainty, even just one year of irrigation for the historical crops grown (i.e., cotton, alfalfa, and safflower) would far surpass that total water demand of the Project over the next 36 years.

2.2 Proposed Water Demand

It is anticipated that the Project would require up to 500 acre-feet (AF) of water during all construction phases of the Project, which all together are anticipated to occur over about 1 year. Subsequent operation and maintenance of the Project during the 35-year operational life would require approximately 20 AFY of water, primarily for solar PV module washing and for the O&M building. Table 2 provides the anticipated water demands for all phases of the Project, including an amortized water demand over the 36-year period encompassing both the construction and operational phases of the Project. Construction and O&M water demands are detailed in the subsequent sections.

Table 2. Project Water Demand

Project Phase	Water Demand	Uses
Construction Phase	500 AF	Soil compaction, dust control, and sanitary needs for construction workers.
Operation and Maintenance (35 years)	20 AFY (700 AF)	Panel washing and O&M needs.
Total Project Water Demand	**1,200 AF**	
36-Year Amortized Water Demand	**33.3 AFY**	

Project = Pelicans Jaw Hybrid Solar Project; AF = acre-feet; AFY = acre-feet per year

2.2.1 Construction Water Demand

The primary uses of water during the construction phase would be for soil compaction, dust control, and sanitary needs for construction workers. The estimate of water demand for the construction phase of the Project based on actual metered water usage recorded by Dudek for the construction of eight other solar energy projects, primarily in the deserts of southern California. The median water use for these projects was 1.13 AF/MW. Given the annual precipitation in the PJHSP area (about 6 inches/year) is higher than in the deserts of southern California, and desert soils are more erodible than those of the Central Valley floor, 1 AF/MW was considered a reasonable estimate for the water demands of the PJHSP. Furthermore, the Project site is flat and would require minimal to no grading, and

4 (3,331 lbs/day) / (30 lbs/day) = 108 head of cattle
5 (10 * 20 gal/day) x 365 days = (246,575 gal/year) / (325851 gal/acre) = 0.22 AFY

a low-impact mow and roll technique would be used to remove surface vegetation, while keeping root systems in place, which minimizes dust generation and the associated water requirements.

Therefore, the construction water demand of the Project is estimated to be 500 AF over one year. This implies that one or more wells would need to have a yield of at least 310 gallons per minute (GPM) if the water demand were averaged out over the construction phases. However, because the rate of water demand is variable, peak water demands occurring in the initial site preparation and grading phase of construction would be higher, while those occurring during the installation and testing phases would be lower.

2.2.2 Operation and Maintenance Water Demand

The O&M water demand for the Project is estimated to be 20 AFY and would consist of solar panel washing and water needs for the O&M building. The water would be sourced from on-site groundwater (if it is of suitable quality), trucked in from off-site (LHUD hydrant, a commercial water hauling service, or bottled water), or a combination thereof. For the purposes of the groundwater impacts analysis in this WSA, it is assumed that all O&M water would come from one or more on-site groundwater wells, treated as appropriate for the proposed use.

The water demand for a single panel-washing event is estimated to be approximately up to 19.8 AFY[6]. The frequency of panel washings would be based on the monitored output of the plant (i.e., to maintain the optimum generating efficiency), weather events, and the amount of airborne dust particulates in the geographic area over an amount of time. Based on this variability, it was assumed, for the purposes of this WSA, that panel washing for the Project would occur once annually during operations, even though it is common for these facilities to maintain optimum generating efficiency for several years without the need for panel washing. A high-pressure attachment to a small four-wheel-drive panel-washing vehicle would spray water on the panels.

It is anticipated that up to five permanent staff employees would use an onsite O&M building for ongoing facility monitoring, equipment storage, and repairs. The O&M building is expected to be a prefabricated commercial structure. Permanent restroom facilities with septic tanks and/or portable toilets would be used for sanitary purposes at the O&M building, and a permanent water source in the form of trucked water, well water, or bottled water would be provided for the staff. The soils on-site are suitable for septic tanks (Ninyo & Moore, July 2022). A generous water demand of 0.2 AFY is included in the overall O&M water to cover the sanitary needs of the O&M building.

This estimate is consistent with prevailing rates of construction and operational water use for several of the solar projects recently proposed in Kern County (Rincon Consultants 2020, ICF 2021). There would be no landscaping/irrigation needs associated with the O&M building or anywhere else on the Project site, which substantially cuts down on the long-term water demand of the Project.

[6] 12,900 gallons/MW x 500 MW x 1 washings/year x (1 gallon/325,851 AF) = 19.8 AF (rounded)

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3 Water Resources Plans and Programs

As discussed in Section 1.3.2, there are no Urban Water Management Plans applicable to the Project area, which means that the relevant water resource plans and programs are limited to SGMA, well permitting and construction standards, and the recently enacted Executive Order N-7-22, which are described below.

3.1 Sustainable Groundwater Management Act

SGMA is a package of three bills (Assembly Bill 1739, SB 1168, and SB 1319) and provides local agencies with a framework for managing groundwater basins in a sustainable manner. The SGMA establishes minimum standards for sustainable groundwater management, roles and responsibilities for local agencies that manage groundwater resources, priorities, and timelines to achieve sustainable groundwater management within 20 years of adoption of a GSP. Central to the SGMA are the identification of critically overdrafted basins; prioritization of groundwater basins; establishment of GSAs; and preparation and implementation of GSPs for medium-priority, high-priority, and critically over-drafted basins. The SGMA required Groundwater Sustainability Agencies to be formed by June 30, 2017. GSPs must consider all beneficial uses and users of groundwater in the basin, as well as include measurable objectives and interim milestones that ensure basin sustainability. A basin may be managed by a single GSP or multiple coordinated GSPs. At the state level, DWR has the primary role in the implementation, administration, and oversight of the SGMA, with the State Water Resources Control Board stepping in should a local agency be found to not be managing groundwater in a sustainable manner.

At its core, SGMA is intended to achieve sustainability for DWR-defined groundwater basins over a 20-year planning horizon. Sustainable management is defined under SGMA as the absence of undesirable results, which consist of:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degradation of water quality
- Significant and unreasonable land subsidence
- Groundwater-related surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of surface water

The GSPs developed for each groundwater basin subject to SGMA must individually or in combination (depending on whether a single or multiple GSAs exist within the same subbasin) outline how the basin is to achieve sustainability within 20 years, through establishment of sustainable management criteria (i.e., minimum thresholds and measurable objectives) and implementation of projects and management actions.

The Project is within the San Joaquin Valley – Kern County Groundwater Subbasin (SJVKCGS or Subbasin) (DWR Basin no. 5-022.14), which is designated by DWR as a high-priority basin in a state of critical overdraft (see Section 4.2.2). The Project is within the boundaries of the WDWA, which is one of 10 member agencies within the Kern Groundwater Authority (KGA) GSA. The KGA GSA provides local policy makers, stakeholders, and the public a forum to monitor, report and/or discuss groundwater activities and identify and address any local groundwater issues. The KGA was formed for the purpose of:

- Coordinating groundwater management programs and activities;
- Identifying and addressing issues pertaining to sustainable groundwater management; and
- Establishing a framework for local groundwater management.

KGA's approach to SGMA compliance is to prepare an "umbrella" GSP that covers the entire service area boundary, with each of its member agencies (including WDWA) preparing "Chapter" GSPs that are incorporated into the umbrella GSP by reference (WDWA 2020, KGA 2020). The GSP outlines a plan to achieve a condition of sustainable groundwater management by establishing numeric thresholds that indicate the Subbasin is being managed sustainably, as well as numerous projects and management actions that are supportive of the GSP's sustainability goals. The sustainability goals include correcting the Subbasin's status as being in a condition of critical overdraft, as well as preventing significant and unreasonable declines in groundwater levels, groundwater quality, and subsidence by 2040. Furthermore, the Project proposes to use water from the BVWSD as a supplemental/backup source. Because the BVWSD has opted to act as its own GSA (rather than being a member of the KGA), it has prepared its own GSP (BVWSD 2020).

DWR determined the aforementioned GSPs to be incomplete for several reasons, including lack of consistency among chapter GSPs in defining undesirable results within the basin as a whole and certain sustainable management criteria deficiencies (DWR 2022b). Although these GSPs have not yet been formally approved by DWR, they are being used in this WSA for the purpose of evaluating water supply availability and the Project's potential impacts on groundwater sustainability.

3.2 Groundwater Well Permitting and Construction Standards

Because groundwater is being proposed as a source of supply for the Project, it is likely that the Applicant would be required to obtain a permit from the Kern County Public Health Services Department for the construction of a new groundwater well or the modification of any existing on-site well that is suitable for rehabilitation.

Well permits within the Subbasin are issued by the Kern County Public Health Services Department Water Well Program and will continue under SGMA, the County retaining jurisdiction over the water well permitting process. The Water Well Program issues permits to construct, reconstruct, and destroy water wells. All wells must be constructed in accordance with Kern County Ordinance Code, Section 14.08, and DWR Bulletin 74-81 and Bulletin 74-90, except as modified by subsequent revisions. Groundwater well standards include, for example, setback criteria, proper sealing requirements, standards for materials, and well completion report requirements, among others. In addition to the permit requirement, the construction of most groundwater wells requires an inspection to verify correct seal preparation and placement. The ordinance requires, among other things, that domestic and agricultural wells be installed a minimum distance from potential pollution and contaminant sources; water quality be tested for new and reconstructed wells; an NSF 61 approved flowmeter be installed; and the final well construction be inspected by Kern County staff.

3.3 Executive Order N-7-22

California's Governor Gavin Newsom released Executive Order N-7-22 on March 28, 2022, in response to the state's ongoing drought conditions. The executive order includes limitations on building new wells or altering existing ones, as long as the well at issue provides at least two acre-feet per year of groundwater. The general limitation requires findings that extracting the groundwater (1) would not interfere with nearby wells and (2) is not likely "to cause subsidence that would adversely impact or damage nearby infrastructure." The executive order also includes a separate requirement for wells in a medium- or high-priority basin under the Sustainable Groundwater Management Act (SGMA). There, the Groundwater Sustainability Agency must make written findings that the well would not (1) be inconsistent with the applicable Groundwater Sustainability Plan and (2) decrease the likelihood of achieving an applicable sustainability goal.

Because groundwater is being proposed as a source of supply for the Project, it is likely that the Applicant would be required to obtain a permit from the Kern County Public Health Services Department for the construction of a new groundwater well or the modification of any existing on-site well that is suitable for rehabilitation. Section 5 of this report provides the justification required for the GSA to issue written findings necessary to allow groundwater to be used as a source of supply for the Project.

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4 Water Resources Inventory

4.1 Local Surface Water

Review of the State Water Resources Control Board water rights information system indicates three inactive points of diversion from the Kern River Canal in the vicinity of the project, which are shown in Figure 2 (SWRCB 2022). Due to scarce rainfall and lack of access to local surface water, such as springs or reservoirs, local surface water is not available as a source of water supply for the PJHSP. However, several important surface water features exist in proximity to the Project site and are described below and shown in Figure 2.

Topography across the project site is generally level with a slight slope to the east/northeast. Elevations range from approximately 215 feet above mean sea level (amsl) near the eastern edge to approximately 220 feet amsl at the northwestern corner of the site. The Kern River Flood Canal flows southward approximately 1,000 feet east of the eastern project boundary. The U.S. Geological Survey topographic quadrangle and National Hydrography Dataset depict various canals and ditches within the project area, as shown in Figure 2 (USGS 2020). An important surface water feature, the Kern National Wildlife Refuge (KNWR) is located to the northeast of the Project site. Established in 1960, habitats within the KNWR consist of:

- Seasonal Wetlands of which a significant portion are irrigated via deliveries from the Central Valley Project (CVP);
- Moist Soil Units are wetland habitats that are divided into irrigated and seasonal units;
- Seasonal Marsh are areas within the KNWR that maintain water depths of between 4 feet and a few inches and do not typically receive summer irrigation;
- Riparian Areas are located along former or seasonal stream courses within the KNWR; and
- Upland Areas are drier and are not irrigated during the summer and rely solely on precipitation as their source of water. Upland areas within the KNWR are generally closed to the public and are located in the northeast and northwest portions (LHWD portion) of the refuge.

4.2 Groundwater

Groundwater from one or more new and/or rehabilitated on-site wells is the primary proposed source of water for the construction and operational phases of the PJHSP. Based on the estimated water demand, single or combined well yields would need to be approximately at least 310 gpm for the construction phases and at least 12 gpm for operation and maintenance. The discussion below identifies the underlying groundwater basin; summarizes relevant information from the applicable GSPs; presents information on local aquifer properties, well locations and yields, and groundwater levels; and summarizes the water quality problems present in the area.

Based on the information gathered below, the underlying aquifer has sufficient yields to support the Project's water demands over the next 20 years regardless of the water year type. Furthermore, because the LHWD service area is not expected to experience an increase in the coverage of irrigated agriculture (the historical trend has been a decrease) or any appreciable growth in urban/municipal uses (currently limited to small communities), this determination is accurate even when accounting for existing and planned future uses of the accessible groundwater in northwestern Kern County. However, it should be noted that groundwater, while likely suitable for panel washing, may not be suitable as a source of water for potable/sanitary needs. If the well water quality does not meet potable

standards, and the required treatment is determined to be infeasible or cost-prohibitive, water for the O&M building would need to be trucked in from off-site source such as the LHUD metered hydrant, a commercial water hauling service, or a bottled water service.

4.2.1 Groundwater Basin Description

The San Joaquin Valley – Kern County Groundwater Subbasin (SJVKCGS or Subbasin) (California Department of Water Resources [DWR] Basin no. 5-022.14) is a 1,945,000-acre subbasin located within the southernmost portion of the Tulare Lake Hydrologic Region of the San Joaquin River Basin and is bounded by the Sierra Nevada on the east; by the Tehachapi Mountains, San Emigdio Mountains, and White Wolf Subbasin on the South; and the Coast Range (Temblor Range) on the west (KGA 2020). The PJHSP site is located in the northwestern part of the SJVKCGS against the boundary between the SJVKCGS and San Joaquin Valley – Tulare Lake Basin (DWR Basin no. 5-022.12) to the north (Figure 3). Hydrological systems in the SJVKCGS include numerous rivers, lakes, and canals. Canals and conveyance systems within the SJVKCGS supply water for beneficial uses throughout the Subbasin (KGA 2020).

The general description from DWR Bulletin 118 (California's Groundwater), states the following (DWR 2020):

> The San Joaquin Valley comprises the southernmost portion of the Great Valley Geomorphic Province. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the folded and faulted Coast Ranges on the west. The Kern County Subbasin is located at the southern end of the San Joaquin Valley and underlies the City of Bakersfield and many other communities. The Kern County Groundwater Subbasin predominately consists of Quaternary and Tertiary non-marine sedimentary deposits. The subbasin is bound on the north by the Kern County line and the Tulare Lake and Tule Groundwater Subbasins. The subbasin is bound on the east by Miocene marine sedimentary rocks, Mesozoic granitic rocks, and Pre-Cretaceous metamorphic rocks that comprise the Greenhorn Mountains, Breckenridge Mountain, Bear Mountain, and the Tehachapi Mountains. The White Wolf Fault bounds the southeastern portion of the subbasin. The Plio-Pleistocene non-marine and Miocene marine sedimentary deposits comprising the San Emigdio Mountains form the southern boundary. The western boundary is formed by various marine sedimentary deposits, ranging in age from Cretaceous to Pliocene, that comprise the Temblor Range.

Groundwater comprises approximately 80% of the water supply within the Subbasin (DWR 2019) and most of the land use within the Subbasin is agricultural, with most of the irrigated acreage dedicated to field crops and fruit and nut orchards. Kern County Water Agency estimates the total water in storage to be 40,000,000 AF and dewatered aquifer storage to be 10,000,000 AF (DWR 2003) contained within sediments that comprise the shallow to intermediate depth water-bearing deposits which are primarily continental deposits of Tertiary and Quaternary age. Form oldest to youngest the deposits include the Olcese and Santa Margarita Formations; the Tulare Formation, the Kern River Formation; older alluvium/stream deposits; and younger alluvium and coeval flood basin deposits (KGA 2020). An important regional aquitard, the Corcoran Clay, vertically separates the younger unconfined Quaternary alluvial aquifer from the underlying confined to semi-confined aquifers (e.g., the Olcese and Santa Margarita Formations, the Tulare Formation, and the Kern River Formation). The primary aquifer underlying the Project site is the Tulare Formation.

4.2.2 Department of Water Resources 2019 Basin Prioritization

Basin Prioritization is a technical process that utilizes the best available data and information to classify California's 515 groundwater basins into one of four categories high-, medium-, low-, or very low-priority. The technical process is based on eight components that are identified in the California Water Code Section 10933(b). The SJVKCGB is designated as "high priority" by DWR (DWR 2019). This designation requires the preparation of a GSP under SGMA (see Section 3.1, Sustainable Groundwater Management Act). The eight components that are used to determine basin priority include factors such as existing population and anticipated population growth; groundwater well density; agricultural demands; and the historical and current documented impacts to water levels and storage, groundwater quality, subsidence, or groundwater-dependent ecosystems. DWR defaulted to a high ranking for the SJVKCGB because it has been determined to be in a state of critical overdraft[7], which means it gets a high priority ranking regardless of the scoring for other factors in the basin prioritization process (DWR 2019).

However, individual components of the priority determination where the SJVKCGB scored highly, as well as data on average water uses and well densities, are still useful for providing context against which to compare the Project's proposed water demand. Notable metrics assigned to the SJVKCGB consist of the following (DWR 2019):

- Total population overlying the basin, which was 699,730 in 2010, is expected to grow by 54% by the year 2030 to an estimated population of 1,074,931. The majority of this population growth is expected to occur on the east side of the Subbasin.
- The Subbasin scored highly on metrics for irrigated acreage and on overall level of groundwater reliance. There are approximately 725,633 acres of irrigated agriculture within the SJVKCGB, resulting in an irrigated agriculture density of 261 acres per square mile.
- The long-term average rate of groundwater use within the Subbasin is 1.43 AFY per acre. In terms of total water supply, groundwater is estimated to constitute an average of 80% of all water supplies available within the Subbasin.
- The documented impacts on the Subbasin that resulted in the highest score are related to chronic groundwater levels and land subsidence. Groundwater level hydrographs generally show declining groundwater levels over the long term, and groundwater constitutes a significant component of the SJVKCGB water supply.

As a point of comparison to the average per-acre groundwater use within the Subbasin, the Project's 36-year amortized water demand of 33.3 AFY would be equivalent to 0.01 AFY per acre, which is roughly three orders of magnitude less than the Subbasin's average groundwater use of 1.43 AFY per acre.

4.2.3 On-Site Well Inventory and Groundwater Level Trends

A review of DWR's well completion database was completed to gather data on well counts and depths by township and range in all sections that intersect the Project, as well as the remainder of the Sections in Township 25 South, Range 21 East. The results are shown in Figure 4 and Table 3. The database reveals a number of wells on site and in the surrounding area, consisting primarily of agricultural wells, with depths that average about 900 feet below the ground surface ("bgs"), up to a maximum of 1,041 feet bgs (DWR 2020b). In Table 2, "Other" wells consist of

[7] A basin is subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts. Overdraft occurs where the average annual amount of groundwater extraction exceeds the long-term average annual supply of water to the basin.

test wells, monitoring wells, cathodic protection well, other wells of unknown or unlisted use, and well destructions. These wells are generally much shallower, ranging in depth between 18 and 552 feet bgs (DWR 2022c). It should be noted that the records shown in Table 3 are a minimum, since some wells may not have an associated well completion report, depending on a variety of factors such as when and for what purpose they were drilled, who the driller was, database/transcription errors, among others. Lithological logs of the wells generally indicate thick sequences of clay/shale interbedded with sand and gravel. Where static water levels were noted, they ranged from 7 feet bgs to 233 feet bgs, with the shallower water levels (between 7 and 50 feet bgs) being representative of wells screened in the unconfined Quaternary alluvial aquifer, and the deeper water levels (between 204 and 233 feet bgs) being representative of wells screened in the confined/semi-confined Tulare Formation.

There were only two well completion reports for wells within the Project site, which consisted of one 510-foot deep agricultural well with a 14-inch diameter steel casing drilled in 1976, and one record of a well destruction in 2010. The agricultural well record indicates it is screened above the Corcoran Clay layer, but there is no information on water level, yield, or pump tests. These two well logs are included in Appendix B for reference. Based on the similar well depth and location in the same Township and Range Section (T06SR08E16), it is possible that the well drilled in 1976 was destroyed in 2010.

In addition to records of well completion reports, groundwater level monitoring wells in the vicinity of the Project site were reviewed for information on depth to first groundwater and hydrographs that show trends over time (DWR 2020d). As shown in Figure 4, there are numerous groundwater monitoring wells in the vicinity of the Project site, twelve of which have sufficient groundwater level data available to establish trends, even if some only span a few years in time (DWR 2020d). Hydrographs of relevant monitoring wells are presented in Appendix C. The hydrographs indicate that the wells in the area penetrate two distinct aquifers: 1) the unconfined alluvial aquifer above the Corcoran Clay represented by wells that have groundwater levels near the ground surface (i.e., within 50 feet) and the confined/semi-confined Tulare Formation that have groundwater levels in the range of 100 to 250 feet bgs.

The hydrographs in Appendix C suggest that the deeper wells that tap the Tulare Formation have been experiencing a long-term decline in water level elevations since at least the 1960s, whereas the shallower wells accessing the unconfined aquifer have been showing a relatively stable long-term trend (though water level records for these wells span relatively short periods and do not extend past 2011) (DWR 2022d). The monitoring well with the longest and most consistent record of water level measurements is Well No. 22638 (State Well ID No. 25S21E01R001M), located 3.1 miles from the eastern edge of the Project boundary (Figure 4). This well is also a key representative monitoring well (RMW) for SGMA, referred to as RMW-181-WDWA. The quantitative sustainability criteria for RMW-181-WDWA are as follows:

- A Minimum Threshold value of -115 feet below mean sea level (msl)
- A Measurable objective value of -62 feet below msl.

Table 3. DWR Well Completion Report Statistics for Township 25 South, Range 21 East

Township and Range Section	Domestic Well Count	Average Well Depth, in Feet (Range)	Agricultural (Irrigation) Well Count	Average Well Depth, in Feet (Range)	Other Well Count	Average Well Depth, in Feet (Range)
Onsite						
T06SR08E16	—	—	1	510	1	—
Offsite						
T06SR08E1	—	—	7	974 (940 – 1,020)	5	98 (20 – 204)
T06SR08E2	—	—	—	—	1	Unknown
T06SR08E3	—	—	5	1,019 (1,000 – 1,041)	—	—
T06SR08E7	—	—	—	—	3	Unknown
T06SR08E10	—	—	2	1,015	—	—
T06SR08E12	—	—	—	—	1	22
T06SR08E13	1	450	2	900 (880 – 920)	1	Unknown
T06SR08E14	—	—	1	920	—	—
T06SR08E19	—	—	1	Unknown	1	18
T06SR08E20	1	552	1	1,230	10	475 (300 – 552)
T06SR08E24	—	—	1	845	—	—
T06SR08E26	—	—	1	402	—	—
T06SR08E28	—	—	—	—	1	Unknown
T06SR08E30	—	—	—	—	1	18
T06SR08E31	—	—	—	—	3	18
T06SR08E32	—	—	—	—	2	18
T06SR08E33	—	—	—	—	1	18
T06SR08E35	—	—	—	—	2	400

Source: DWR 2022c.

Over the well's 50-year period of record, the groundwater elevation has ranged from a high of 86.64 feet above msl (in 1987) to a low of 69.9 feet below msl (in 2020 — the last available measurement date) (DWR 2022d). Over the long term, the monitoring well has shown declining trend (over 150 feet since 1987), although it should be noted that the last measurement shows an anomalous drop that may possibly be a result of a nearby pumping influence/interference. As more data is gathered over time, a better judgement as to whether its water level has fallen below the 20-year measurable objective can be made.

The review of DWR well completion reports and DWR monitoring well hydrographs are consistent with the hydrogeology, aquifer characteristics, and water level contours presented in WDWA's "Chapter" GSP, as well as DWR's determination that the Subbasin is in a state of critical overdraft.

4.2.4 Aquifer Properties

The Project site is underlain by recent (Holocene and Pleistocene) alluvium which is separated from the underlying Tulare Formation by a low-permeability clay layer that represents a regional aquitard (Corcoran Clay). As such, the groundwater present within the Quaternary alluvium is unconfined, while the groundwater present within the Tulare Formation is confined or semi-confined (KGA 2020). Average precipitation values range from 5 inches at the Subbasin interior to 9 to 13 inches at the Subbasin margins to the east, south, and west. Review of well completion reports for Township 25 South, Range 21 East indicate that the Tulare Formation aquifer interfingered with the Corcoran Clay begins at a depth between 500 to 700 feet bgs, where well yields were reported to range from 1,500 gpm to 2,000 gpm (DWR 2022c). Wells within the wider Subbasin are reported to have average yields ranging from approximately 1,200 to 1,500 gpm (DWR 2006). Given the high well yields documented in the local area and its history of agricultural production, one or more onsite wells constructed with the right depth, diameter and pump would have sufficient yield to supply the Project's peak water demands (note that the sustainability of extracting the Project's water demand from the aquifer is addressed in Section 5). The average difference between well screen bottoms (where known) and the static groundwater level for wells within Township 25 South, Range 21 East is roughly 300 feet (DWR 2022c, 2022d).

Estimates of aquifer hydraulic properties from field pumping or slug tests for the Project site are not available. Therefore, information contained in relevant USGS reports and the KGA and WDWA GSPs are used to provide reasonable estimates and ranges for various hydraulic properties.

The hydraulic properties of the Subbasin vary by location and aquifer unit (KGA 2002; USGS 2009). Sediments on the western side of the Subbasin derived from the Coast Range shales and marine deposits tend to be finer-grained than sediments on the eastern side sourced from granitic parent rock of the Sierra Nevada (KGA 2020; USGS 2009). The hydraulic conductivity of the coarse-grained Coast Range sands in the central San Joaquin Valley is estimated to be 31 feet per day ("ft/d"), and of the Sierra Nevada sands is 104 ft/d (Belitz and Phillips 1995). In comparison, in the northeastern San Joaquin Valley aquifer hydraulic conductivity is estimated to range from 6.5 to 820 ft/d (USGS 2009). The estimated hydraulic conductivity of fine-grained sediments in the central San Joaquin Valley is 4×10^{-3} ft/d (Belitz and Phillips 1995). In KGA's review of hydraulic conductivity values for the SJVKCGS subbasin specifically, the hydraulic conductivity was estimated to range from 3 to 250 ft/d with a median of 60 ft/d (KGA 2020). The estimated vertical hydraulic conductivity of the Corcoran Clay is 6.6×10^{-6} ft/d (USGS 2009). The average transmissivity of the Subbasin is estimated to be approximately 16,000 square feet per day ("ft^2/d"; KGA 2020). The DWR groundwater basin description for the Subbasin lists the specific yield values for the unconfined aquifer (Tulare and Kern River Formations and overlying alluvium) lists the range as 8.0 to 19.5 percent with an average value of 12.4 percent representing an interval thickness of 175 to 2,900 feet and averaging approximately 600 feet (DWR 2006). In general, the higher values in the range are associated with sediments of the Kern River Fan west of Bakersfield.

4.2.4 Groundwater Quality

Concerns related to groundwater quality are largely related to non-point sources and/or naturally occurring constituents. Primary constituents of concern throughout the Subbasin are total dissolved solids ("TDS"), nitrate as nitrogen (nitrate as N), boron, hexavalent chrome, and pesticides (WDWA 2019). In the WDWA management area, marine-derived formations have contributed to the documented poor and unsuitable quality of groundwater. Along the western side of the Subbasin, including the WDWA, unconfined/semi-confined groundwater is characterized geochemically as Na/Ca-SO4 water with TDS concentrations most often above 2,000 mg/L. Other deeper

groundwater aquifers beneath the WDWA, and elsewhere in the Subbasin, are referred to as sodium-chloride (Na- Cl) water, which exhibits high to very high levels of TDS and is likely saline connate water (WDWA 2019). The high salinity of the underlying groundwater is the primary reason there are so few domestic, municipal and/or agricultural wells in the vicinity when compared to the central part and east side of the Subbasin (see Figure 4).

In 2016, the Westside Water Quality Coalition (WWQC) prepared a Basin Plan Amendment Workplan (BPAW) which is inclusive of a significant portion of the irrigated lands within the WDWA (WWQC 2016). The BPAW recommends delisting municipal and unlimited agriculture as a designated beneficial use for perched and deeper unconfined/semiconfined groundwater due to natural poor groundwater quality. Importantly, confined groundwater sources immediately east of the Lost Hill Anticline would remain unchanged with regards to current designated use, pending further monitoring. The Project site is located east of this anticline, indicating that higher-quality groundwater than is typical for the WDWA may be found beneath the Project site. Furthermore, the WWQC (2016) states that the groundwater salinity of the unconfined/semi-confined groundwater in the vicinity of the Project site is used for stock watering and occasionally for irrigation, after blending with higher quality imported water from the State Water Project (SWP) and that confined groundwater is of somewhat lower salinity and is also used occasionally for irrigation, after blending with higher quality SWP water. Therefore, it is probable that the confined/semi-confined groundwater aquifer beneath the Project site would be suitable for PV solar module washing, especially if blended with imported water. Typically, PV panel washing requires a TDS of less than 1,500 mg/L.

The LHUD, described in Section 1.3.1, utilizes two groundwater wells for its potable supply, and thus raw water quality data is available for these two wells (SWRCB 2022a). Well 4 (North) TDS level before treatment has ranged between 260 and 820 mg/L between 2011 and 2020. Well 3 (East) TDS level before treatment has ranged between 330 and 600 mg/L over the same timeframe. Although this does not guarantee that water quality on-site will be suitable without treatment for potable use, it indicates that the closest nearby wells with publicly available water quality data do not show MCL exceedances for TDS (LHUD 2021). Table 4 provides data for raw (untreated) groundwater quality from the LHUD public supply Well 4.

Table 4. Groundwater Quality within LHUD Groundwater Supply Well 4

Analysis	Unit	Average	Range	Comparison Concentration
TDS	mg/L	550	260 – 820	1,000 (SMCL)
Nitrate as N	µg/L	5.4	0.6 - 11	45 (MCL-CA)
Copper & Lead	µg/L	ND	NA	5 (Lead) & 50 (Copper)
Iron	µg/L	141.8	77 – 210	300
Arsenic	µg/L	6.6	1.1 – 16	10 (MCL-US)
Hexavalent chrome	µg/L	0.98	N/A (1 sample)	10 (MCL-US)
Pesticides	µg/L	ND	NA	Varies

Source: SWRCB 2022a.
Notes: ND = Not Detected; NA = Not Applicable; TDS = total dissolved solids; mg/L = milligrams per liter; µg/L = micrograms per liter; SMCL = Secondary MCL; MCL-US = Federal drinking water maximum concentration; MCL-CA = California drinking water maximum concentration.

4.3 Imported Water

Imported water — either from the Kern River, the State Water Project and/or the Central Valley Project — is the primary source of water for agricultural uses within the northwest portion of Kern County and the larger region. The

water agencies shown in Figure 2, including the LHWD whose service area encompasses the Project, predominantly consist of wholesale customers for SWP and/or CVP water who then provide this water for use in agricultural irrigation (though municipal uses do constitute a minor fraction of the water supply). As discussed in the prior section (Section 4.2) and below (Section 5), there is sufficient yield from the underlying aquifer to supply to Project with its full water demand of 1,200 AF over 36 years, provided the groundwater is treated to suitable quality for its intended use. However, because the Applicant has yet to identify specific existing wells or new well locations where groundwater would be obtained, and because the KGA GSA has not yet formally approved of the proposed use of groundwater, for the purposes of SB 610 compliance, backup water supply options proposed for the Project include 1) import of surface water from BVWSD and/or 2) purchase of off-site treated groundwater obtained via metered hydrant from LHUD. Both sources are located over 10 miles south of the Project site.

Dudek contacted nearby water districts, including the LHWD, Semitropic Water Service District and BVWSD to inquire about water supply availability for the PJSHP. The LHWD stated it can only commit to providing water immediately prior to the construction phase, that it cannot provide will-serve letters, and that the availability would be contingent upon the water year type (i.e., its SWP allocation) (LHUD 2020). Furthermore, the Semitropic Water Service District stated it was unable to provide water for construction purposes (SWSD 2020). The only water agency willing to supply water for construction was the BVWSD, which is located about 14 road miles south of the center of the Project site. Although the BVWSD service area does not encompass the Project site, it has provided a will-serve letter indicating a willingness to supply the construction needs of the Project for up to 500 AF (Appendix D). The LHUD is a PWS located about 12 miles south of the Project site that routinely sells construction water to contractors from a fire hydrant. Construction water from LHUD is available with application for a construction water meter. Therefore, these sources of water are being included in this WSA to ensure water supply reliability even though on-site groundwater has sufficient yield.

Based on the information contained within the GSP prepared by the BVWSD (2020), it is expected to have sufficient entitlements to serve the Project with 500 AF during project construction. The GSP provides the following information which demonstrates BVWSD's ability to supply the Project's construction water demand (BVWSD 2020):

> "The BVWSD was organized in July 1924 to manage the irrigation and drainage systems and water rights originally held by Henry Miller and Charles Lux of the Lux Land Company. The District controls an average entitlement of approximately 150,000 AFY of surface water from the Kern River along with an additional entitlement of approximately 21,300 AFY from the State Water Project. Prior to the construction of the State Water Project (SWP), the Kern River was the BVWSD's sole source of surface water. Kern River water is now stored in Lake Isabella for release in response to water orders from the District. With construction of the SWP regulated diversions from the Kern River have been supplemented by schedulable deliveries from the California Aqueduct, which runs immediately to the west of the BVWSD.
>
> The BVWSD's diversions from the Kern River are based on an average entitlement of 156,000 AFY delivered by First Point interests to the Second Point of Measurement, undiminished by delivery losses. Buena Vista's entitlement is 96.044% of this flow or 149,828 AFY. This entitlement is expected to remain essentially intact during the period of SGMA implementation with the BVGSA applying a future average annual entitlement of 147,000 AFY for the 2030 and 2070 budgets.
>
> Deliveries of SWP water of 13,392 estimated for 2020 are based on the BVWSD's Table A allocation of 21,600 AFY after adjustment by DWR's 62% projected system reliability. Under the

> 2030 climate change scenario, the 2020 Table A supply is reduced by 22.3% to 10,070 AFY. Under the 2070 scenario, the Table A supply is reduced by 25.6% to 9,642 AFY.
>
> The BVWSD has historically taken an average of 1,800 AFY of Article 21 water. Because of the development of the Palms and the Corn Camp water banking projects described in Section 7 – Projects, Management Actions and Adaptive Management Actions, the amount of Article 21 water to be received by the GSA in 2040 and 2070 is expected to increase to 3,900 AFY.
>
> The water budget table for 2020, 2030 and 2070 demonstrates that when applying agreed upon values for native yield, precipitation and climate change projections, the BVGSA is in surplus and will remain in surplus through 2070 albeit with the surplus diminishing due primarily to anticipated increases in irrigation demand with climate change being an important but secondary factor. Nevertheless, due largely to the BVWSD's entitlement to the Kern River and the District's history of conjunctive management, the BVGSA has the resources and the mechanisms to remain in balance internally and to contribute to achieving sustainability throughout the Kern County Subbasin."

In its GSP, the BVWSD projects its water demands versus its available supplies out to 2070, in consideration of anticipated climate change, reduced SWP deliveries, reduced precipitation, and the anticipated growth in water demand within its service area. Its accounting of water demand versus supply for 2020 indicates a surplus of 77,477 AFY (BVWSD 2020). For the 2030 and 2070 projections, BVWSD indicates a surplus of 22,751 AFY and 2,031 AFY, respectively (BVWSD 2020). Because of the substantial differences between BVWSD's available entitlements and the amount it delivers or transfers, there is no reason to doubt its ability to supply the project with 500 AF of water for construction, even in a critically dry water year, and in consideration of other future commitments (Appendix D).

4.4 Reclaimed Water

There is no source of reclaimed water available to the Project for construction and/or O&M needs.

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5 Groundwater Impact Evaluation

Although the Project would use 500 AF for construction and up to 33.3 AFY for O&M, conversion of the site from agriculture to solar electric is supportive of the GSP's long-term goal of achieving a balanced water budget because it would use less water over the long term than the preceding 36 years, and despite the parcels being zoned for agriculture, would preclude future use of the site for irrigated agriculture even if water of sufficient quality/quantity became available. As discussed in Section 4.2.2, the proposed water use is roughly three orders of magnitude less than the Subbasin's average groundwater use of 1.43 AFY per acre.

Consequently, this analysis focuses on local effects for each of SGMA's sustainability criteria, using the "Chapter" GSP prepared by WDWA to examine whether pumping an onsite groundwater well would result in any adverse impacts or conflict with any management goals and objectives in the GSP. Because an on-site well location has yet to be identified, a worst-case scenario is assumed in this analysis. This consists of assuming that the entire Project water demand would come from one onsite well and that it would be located as close as possible to the nearest representative monitoring well for SGMA, referred to as RMW-181-WDWA. This monitoring well is used to track compliance with established minimum thresholds and measurable objectives and can also be used as a proxy for impacts to groundwater-dependent ecosystems since it is located near the southwest corner of the KNWR. Because multiple sources of water have been identified, including imported surface water from BVWSD and treated groundwater from a LHUD hydrant, and because groundwater quality may be unsuitable for certain uses (especially potable uses), it could be that on-site groundwater would serve only part of the Project's needs such as dust control, and/or may need to be blended higher quality water sources from offsite for panel washing. The minor potable/sanitary water demands for the O&M building would likely be imported from off-site (e.g., LHUD hydrant, a commercial water hauling service, or bottled water).

5.1 Groundwater Level Decline

When water is extracted from a well, groundwater levels around the well decline creating a cone of depression. The cone of depression is deepest at the well and extends radially to a distance away from the well where water-level decline (or drawdown) is effectively zero. Therefore, groundwater extraction for construction and O&M would result in groundwater level drawdown in the vicinity of the PJSHP production well. To evaluate the potential impact of Project pumping on local groundwater levels, an analytical approach to estimate drawdown induced by well extraction at various distances from the Project production well was employed. The following estimate of groundwater drawdown at various distances from the production well induced by Project pumping relies on the Cooper-Jacob approximation of the Theis non-equilibrium flow equation (USGS 1962):

$$s = \frac{264Q}{T} log_{10} \frac{0.3Tt}{r^2S}$$

Where:

s = predicted drawdown (feet)
Q = average pumping rate (ft^3/d)
T = transmissivity (ft^2/d)
t = time since pumping started
r = distance from pumping well (feet)

S = coefficient of storage (dimensionless)

The Cooper-Jacob method was verified by validating that dimensionless time (u) is sufficiently small (u <0.05) using the equation as follows:

$$u = \frac{r^2 S}{4Tt}$$

Where:

u = time (dimensionless)
r = distance from pumping well (feet)
S = coefficient of storage (dimensionless)
T = transmissivity (ft^2/d)
t = time since pumping started

During a constant rate aquifer test, drawdown data plot on a straight line except at large values of u, or small values of 1/u. At values of u less than about 0.05, the Cooper-Jacob approximation is valid (Driscoll 1986).

Values for aquifer transmissivity and storativity[8] used in the calculations were obtained from previous studies. A transmissivity value of 16,000 ft^2/d was used based on the average transmissivity of the Subbasin (KGA 2019). A storativity value of 0.001 was used based on the product of the average specific storage of the Subbasin (4.3×10^{-6} ft^{-1}) and estimated saturated thickness of the aquifer (300 feet) estimated from well completion reports and monitoring well data described in Section 4.2.3 (USGS 2009).

Distance-drawdown calculations were completed assuming the aquifer properties at each well location were the same, and each well were individually pumped to satisfy all Project water demands (Appendix E). Using the equations and aquifer properties defined above, groundwater level decline at the end of Project pumping for construction (500 AF over 12 months) is projected to be 1.10 feet at the nearest RMW (located 3.1-miles to the east of the eastern Project boundary, shown in Figure 4). During the O&M phase, groundwater level decline due to amortized water demand over the first 20 years of the project (inclusive of the construction phases) is projected to be about 0.18 feet at the nearest RMW. Therefore, groundwater extraction for Project construction, assuming the entire construction water demand is satisfied by groundwater pumped from the Subbasin, is predicted to have the greatest impact on groundwater levels. After the Project's 35-year operations lifetime, the drawdown would be similar or less because the average water demand inclusive of construction would decrease over time.

A summary of projected drawdown associated with Project construction is provided in Table 5 and detailed in Appendix E. Although Table 5 includes drawdown calculations at 500 feet and one-mile distances from the eastern Project boundary, these are for reference purposes. There are no public supply wells or domestic wells in the vicinity of the project, so the drawdown at closer distances than the RMW is of little consequence.

[8] Storativity (S) is a dimensionless measure of the volume of water that will be discharged from an aquifer per unit area of the aquifer and per unit reduction in hydraulic head.

Table 5. Projected Drawdown at Key Distances at the End of Each Project Phase

Project Phase	500 Feet	1 Mile	SGMA Indicator Well RMW-181-WDWA (3.1 Miles)
Construction Phase 1	2.94	1.69	1.10
Operation and Maintenance (after 20 years)	0.36	0.24	0.18

Source: Appendix E
Notes: All units are in feet; GDE = groundwater dependent ecosystem.

The simulation presented is a conservative estimate (i.e., worst case scenario) because it assumes the total construction water demand would be satisfied by groundwater, when in fact the Project has considered a combination of onsite groundwater (i.e., new or rehabilitated well), off-site groundwater (LHUD hydrant), and imported surface water (from BVWSD) to meet its water demands. Additionally, the distance-drawdown calculations do not take in to account the influence of groundwater recharge and aquifer boundary conditions on the magnitude of drawdown. Groundwater extraction for Project construction would be temporary, and when pumping stops groundwater levels will recover. The values for aquifer transmissivity and storativity used in the calculations rely on average reported values for the Subbasin and not site-specific data. Thus, it is recommended that if groundwater is pumped from one or more wells onsite, that monitoring of groundwater level drawdown and recovery is performed such that site-specific values of aquifer transmissivity and storativity may be obtained and used to update the analysis herein.

Lastly, the Project would not result in the development of impervious surfaces on the Project site, other than minor spatial requirements for installation of necessary support facilities such as the switchyard pad, O&M building, and BESS. The majority of the Project site would be developed with solar arrays which would not result in impervious surface area development, and a portion of the Project Site would be left undeveloped. Therefore, should it be determined that groundwater is needed to partially supplement the Project's water demand or serve as a secondary source of water for construction and/or O&M, groundwater recharge would not be impeded following implementation of the Project.

Based on the above information, Project impacts to local groundwater levels would be less than significant. A drawdown of a few feet or less as predicted would not be expected to result in a significant reduction in aquifer storage, degradation in groundwater quality, land subsidence, surface water depletion, or impacts to groundwater dependent ecosystems ("GDEs"), as discussed below. Furthermore, as shown in Exhibit 1 below, the WDWA Chapter GSP used the numerical "C2VSimFG=Kern" model to simulate how water levels in RMW-181-WDWA are projected to decline over the next 50 years under various management scenarios. The quantitative thresholds meant to measure compliance with the minimum threshold and the measurable objective (-115 feet and -62 feet below msl, respectively) for the RMW are also included in Exhibit 1. Adding the projected Project-related drawdowns in Table 5 to the simulated hydrograph would not result in exceedance of either level in any of the scenarios shown.

5.2 Aquifer Storage Reduction

To evaluate the potential impact of Project pumping on groundwater in storage, the following equation was used to calculate the available aquifer storage beneath the property on which each proposed Project production well is located:

$$Storage\ Capacity = Area\ of\ Property \times Aquifer\ Thickness \times Aquifer\ Specific\ Yield$$

Where:

Area of Property = size of contiguous owned property where well is located (acres)
Aquifer Thickness = saturated thickness of aquifer (feet)
Aquifer Specific Yield = 0.08 (dimensionless)

The aquifer specific yield used is the low end of the range provided in Section 4.2.4 (the average is 12.4). The calculated aquifer storage beneath the property on which the Project production well would be located is provided in Table 5. In addition, the aquifer storage reduction based on the cumulative Project groundwater extraction volume of 1,200 AF as a percentage of total groundwater in storage is provided in Table 6.

As shown in Table 6, the cumulative Project extraction volume after 36 years of 1,200 AF as a percentage of the total groundwater in storage would be less than 1.5%, indicating a negligible decrease in aquifer storage because of Project-related pumping. Based on the above information, the Project's impacts to groundwater in storage would be less than significant.

Exhibit 1. Projected Groundwater Levels through 2070 in RMW-181-WDWA based on C2VSimFG-Kern

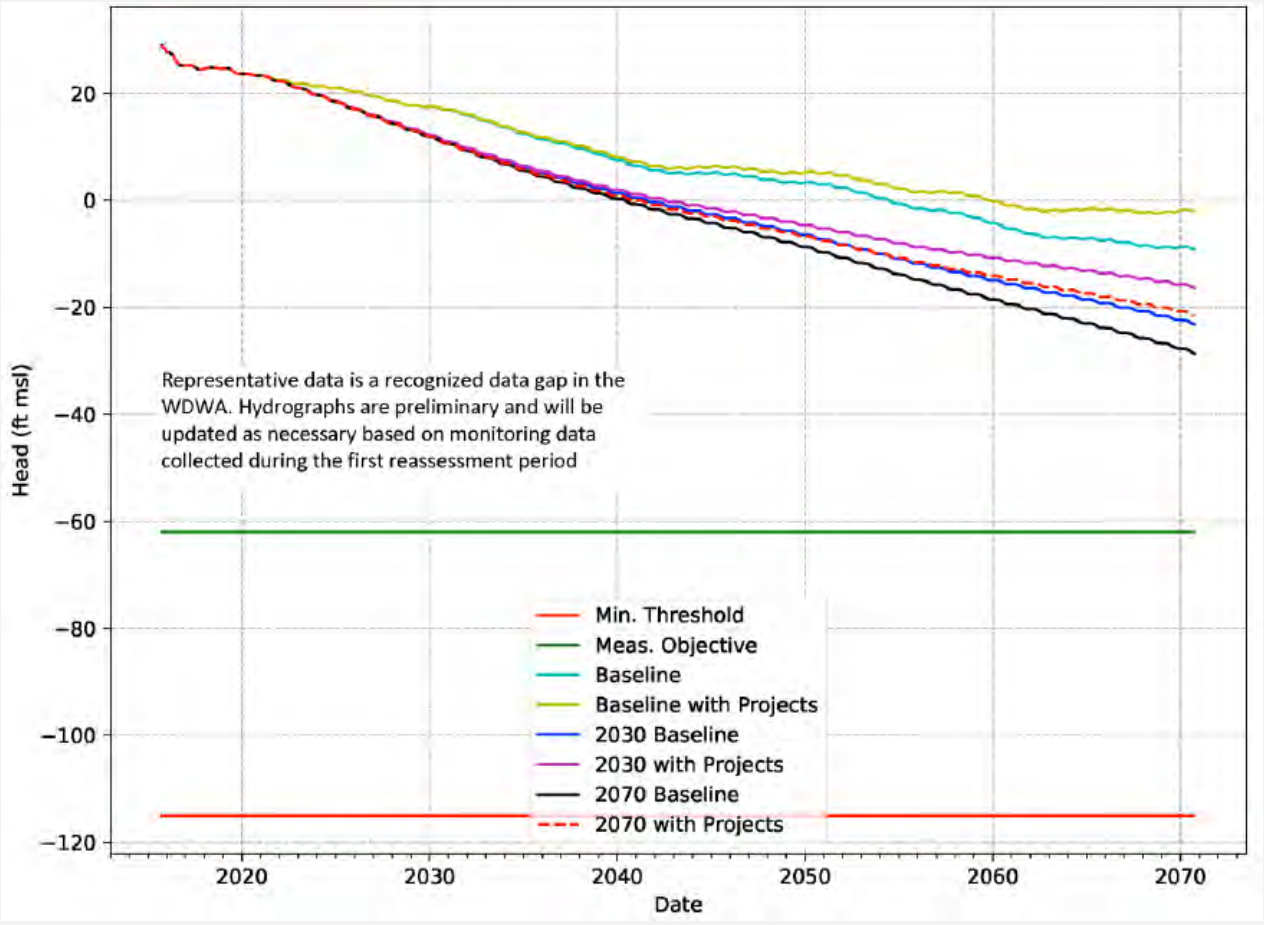

Table 6. Calculated Aquifer Storage and Storage Reduction

Well	Property Size (Acres)[a]	Aquifer Thickness (Feet)	Aquifer Specific Yield	Aquifer Storage (AF)	Aquifer Storage Reduction (%)[b]
Potential On-Site Well	3,273	300	0.08	78,552	1.5

Notes: AF = acre-feet.

[a] Acreage of contiguous property owned by Sandhu Farms and Beltran Farms may be greater than reported in table.

[b] Change in aquifer storage assumes Project groundwater demand of 1,200 acre-feet (1,200/78,552 =0.015).

5.3 Water Quality Degradation

Groundwater quality is documented to be naturally degraded due to elevated concentrations of total dissolved solids (TDS). Groundwater is considered unsuitable for most uses and is non-beneficial for a majority of crops, and in some cases livestock (WDWA 2019). This may limit the available uses of on-site groundwater to dust control and panel washing. Depending on PV panel cleaning requirements, the natural TDS content of the produced groundwater may be too high. A general TDS concentration of about less than 1,500 mg/L is used as a general guideline for panel washing suitability. Because the groundwater underling the Project site has not been tested it is uncertain whether it would be suitable for panel washing. For this reason, two alternative sources of water have been identified, one of which (LHUD) is sufficient quality for potable/sanitary use.

The aforementioned issues are water quality impacts on where the Project would get its water rather than Project-related impacts on water quality. Use of an onsite well to supply groundwater for Project needs would not have an impact on groundwater quality because the intensity of pumping would not be sufficient to cause migration of groundwater contaminant plumes or high-salinity groundwater towards nearby public or domestic supply wells (there are none). Furthermore, the projected decline in groundwater level and reduction in groundwater storage estimated above would not be sufficient to cause an increase in the concentration of TDS and/or other constituents of concern. For these reasons, the proposed use of groundwater would not affect the sustainability goals or sustainable management criteria established in the KGA GSP (KGA 2020).

5.4 Land Subsidence

The compaction or collapse of the pore spaces within the fine-grained sediments of an aquifer system results in the permanent loss of aquifer storage (Borchers and Carpenter 2014). The applicable GSPs document significant subsidence associated with current and historical oilfield pumping activities in the Subbasin (KGA 2020, WDWA 2019). However, subsidence associated with pumping of useable groundwater in the western part of the Subbasin is thought to be low. Regardless of the cause of documented subsidence, the predicted groundwater decline and storage reduction resulting from the Project is both negligible and localized, and thus could not have an appreciable contribution to future subsidence or have an impact on nearby infrastructure (e.g., the California Aqueduct).

5.5 Surface Water Depletion and Groundwater Dependent Ecosystems

There are potential groundwater dependent ecosystems (GDEs) mapped by the Nature Conservancy within and in the vicinity of the Project site, particularly to the northeast within the KNWR (TNC 2022). However, the target aquifer is the Tulare Formation, which has groundwater under confined to semi-confined condition, and is separated from the overlying perched aquifer by the Corcoran Clay layer. For this reason, the groundwater level declines estimated in Section 5.1, even though minor, would not occur within the shallow aquifer which has the potential to intersect the ground surface. Because there isn't a sufficient hydrologic connection between the aquifer targeted by groundwater well and the GDEs mapped in the vicinity, project pumping would have no impact on potential GDE's mapped in the area.

6 Conclusion

Based on a review of available water supplies, groundwater conditions, and sustainability goals and objectives, this WSA has concluded the following:

- The Project has enough water, through use of on-site groundwater, import of water from the Buena Vista Water Storage District, use of the Lost Hills Utility District metered hydrant, and/or commercial water hauler to support both the construction and O&M demands of the project over the next 20 years, even in multiple dry-year conditions. Because the general land use trend in the region is conversion of agriculture to less water-intensive land uses, this conclusion holds even when considering existing and planned future uses of the identified water supplies.
- The Project does not conflict with the applicable goals and sustainability criteria identified in the KGA GSP or the WDWA "Chapter GSP" because:
  - It would not result in exceedance of minimum thresholds or interfere with the achievement of measurable objectives identified in either GSP.
  - It would not physically or administratively conflict or interfere with any of the PMAs identified in either GSP.
  - It would not deplete surface water supplies or adversely impact GDEs because the pumping would occur below the Corcoran Clay layer

For the purposes of CEQA, this WSA supports less than significant conclusions with regard to water supply availability and impacts to groundwater resources. The array of water supply options (onsite groundwater, offsite groundwater, imported surface water and/or commercial hauler) allows the applicant to adapt to the unknowns regarding whether on-site groundwater is suitable for various uses.

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7 References

Belitz, K. and Phillips, S.P. 1995. *Alternative to Agricultural Drains in California's San Joaquin Valley: Results of a Regional-Scale Hydrogeologic Approach*. Water Resources Research, 31(8), pp.1845-1862.

BVWSD 2020. *Buena Vista Water Storage District GSA Final Groundwater Sustainability Plan - Kern County Groundwater Subbasin*. Prepared by GEI Consultants. January 2020.

County of Merced. 2014. *Draft Environmental Impact Report for the Wright Solar Park Conditional Use Permit Application CUP12-017*. Prepared by ICF International. July 2014.

DWR (California Department of Water Resources). 2022a. "California DWR Land Use Viewer." Web Map Viewer. Accessed at https://gis.water.ca.gov/app/CADWRLandUseViewer on May 2, 2022.

DWR. 2022b. "RE: Incomplete Determination of the 2020 Groundwater Sustainability Plans Submitted for the San Joaquin Valley – Kern County Subbasin." Letter to the Kern Groundwater Authority date January 28, 2022.

DWR. 2022c. Well Completion Report Map Application and Data Download: Township 25 South, Range 21 East. Web map application. Accessed May 2, 2022. https://gis.water.ca.gov/app/wcr.

DWR. 2022d. SGMA Data Viewer. Accessed May 2, 2022. https://sgma.water.ca.gov/webgis/?appid= SGMADataViewer.

DWR. 2019. *Sustainable Groundwater Management Act 2019 Basin Prioritization – Process and Results.* May 2020. https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization.

DWR. 2006. *California's Groundwater*. Groundwater Basin Description for the San Joaquin Valley Groundwater Basin — Kern County Subbasin (Basin No. 5-22.14). Bulletin 118. Dated 1/20/2006.

ICF. 2021. *Water Supply Assessment, Sandrini Solar Project*. Prepared for EDP Renewables and Kern County. August 2021.

KGA (Kern Groundwater Authority) 2020. *Groundwater Sustainability Plan, Kern County, CA*. Prepared by GEI Consultants, Inc. January 2020.

LHUD (Lost Hills Utility District). 2022. "Services." Website. Accessed at https://www.lhud.org/services on May 31, 2022.

LHWD (Lost Hills Water District). 2020. "RE: Lost Hills Water District Website Contact form Submit." Email communication between Kipp Vilker (Dudek) and Kris Lawrence (WDWA) dated November 6, 2020.

Ninyo & Moore. *Geological Desktop Assessment Pelicans Jaw Hybrid Solar Project*. Prepared for Pelicans Jaw Solar, LLC and Kern County. July 2022.

NRCS (U.S. Department of Agriculture Natural Resource Conservation Service). 2022. *Custom Soil Resource Report for Kern County, California, Northwestern Part Pelican Jaws Hybrid Solar Project*. Accessed at https://websoilsurvey.sc.egov.usda.gov/ on May 29, 2022.

WDWA (Westside District Water Authority) 2019. *Chapter Groundwater Sustainability Plan*. Prepared by Aquilogic, Inc. for Kern County Groundwater Authority. December 2019.

WWQC (Westside Water Quality Coalition). 2016. *Comprehensive Groundwater Quality Management Plan*. September 20, 2016.

Rincon Consultants, Inc.. 2020. *Water Supply Assessment, Aratina Solar Project*. Prepared for 64NB 8ME LLC. December 2020.

SDWIS (California Safe Drinking Water Information System). 2022a. Water System Details for Lost Hills Utility District (Water System No. CA1510046). Accessed at https://sdwis.waterboards.ca.gov/ on 4/26/2022.

SDWIS (California Safe Drinking Water Information System). 2022b. Water System Details for Wonderful Hulling and Shelling (Water System No. CA1502759). Accessed at https://sdwis.waterboards.ca.gov/ on 4/26/2022.

SWSD (Semitropic Water Service District). 2020. Telephone Communication between Ron Schnabel (Dudek) and Ron Eid (SWSD) regarding construction water availability. 11/10/2020.

SWRCB (State Water Resources Control Board). 2022. *Electronic Water Rights Information Management System (eWRIMS) System GIS*. Point of Diversion (POD) data for the Pelican Jaws Hybrid Solar Project. Web Map Viewer. Accessed at https://waterrightsmaps.waterboards.ca.gov/viewer/index.html?viewer= eWRIMS.eWRIMS_gvh# on May 2, 2022.

TNC (The Nature Conservancy). 2022. "GDE Pulse." Web Map Viewer for Groundwater Dependent Ecosystems. Accessed at https://gde.codefornature.org/#/map on May 2, 2022.

UNL (University of Nebraska, Lincoln). 2011. Water Requirements for Beef Cattle. By Rick Rasby and Troy Walz. Institute of Agriculture and Natural Resources. Publication No. G2060. March 2011.

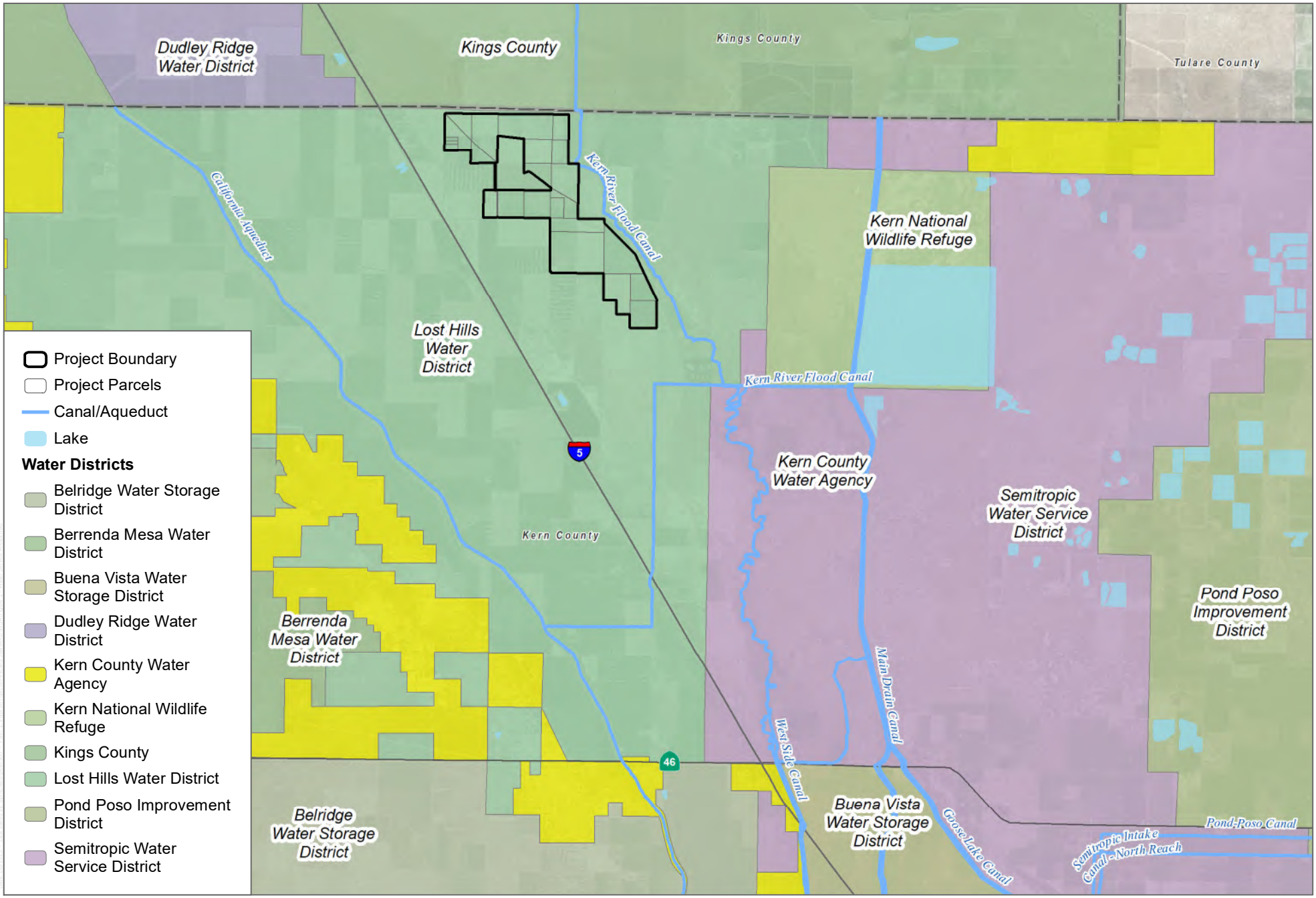
USGS (U.S. Geological Survey). 2022. *The National Map*. Layers: National Hydrography Dataset and Watershed Boundary Dataset. Web Map Viewer. Accessed May 2, 2022. https://www.usgs.gov/programs/national-geospatial-program/national-map.

USGS. 2009. *Groundwater Availability of the Central Valley Aquifer, California*. U.S. Geological Survey Professional Paper 1766.

USGS (U.S. Geological Service). 1962. Theory of Aquifer Tests, Groundwater Hydraulics. Geological Survey Water-Supply Paper No. 1536-E. Prepared by J.G. Ferris, D.B. Knowles, R.H. Brown, and R.W. Stallman. Denver, Colorado: USGS.

Widhalm, Mike. "RE: Pelican Jaw Hybrid Solar Project – Wonderful Company." Email Communication regarding number of cows and stock water onsite. From Mike Widhalm, Director of Property and Risk Management at Wonderful Orchards™. Email dated 6/14/2022.

Wonderful Orchards. 2022. "Re: Wonderful Orchards – Samsung Solar Facility Previous 10-Year Farming History." Letter from Wonderful Orchards to Kern County Planning and Natural Resources Department, undated.



SOURCE: Bing; Kern County; DWR; USGS

DUDEK

0 2 4 Miles

FIGURE 1

Water Service Areas

Water Supply Assessment - Pelicans Jaw Hybrid Solar Project

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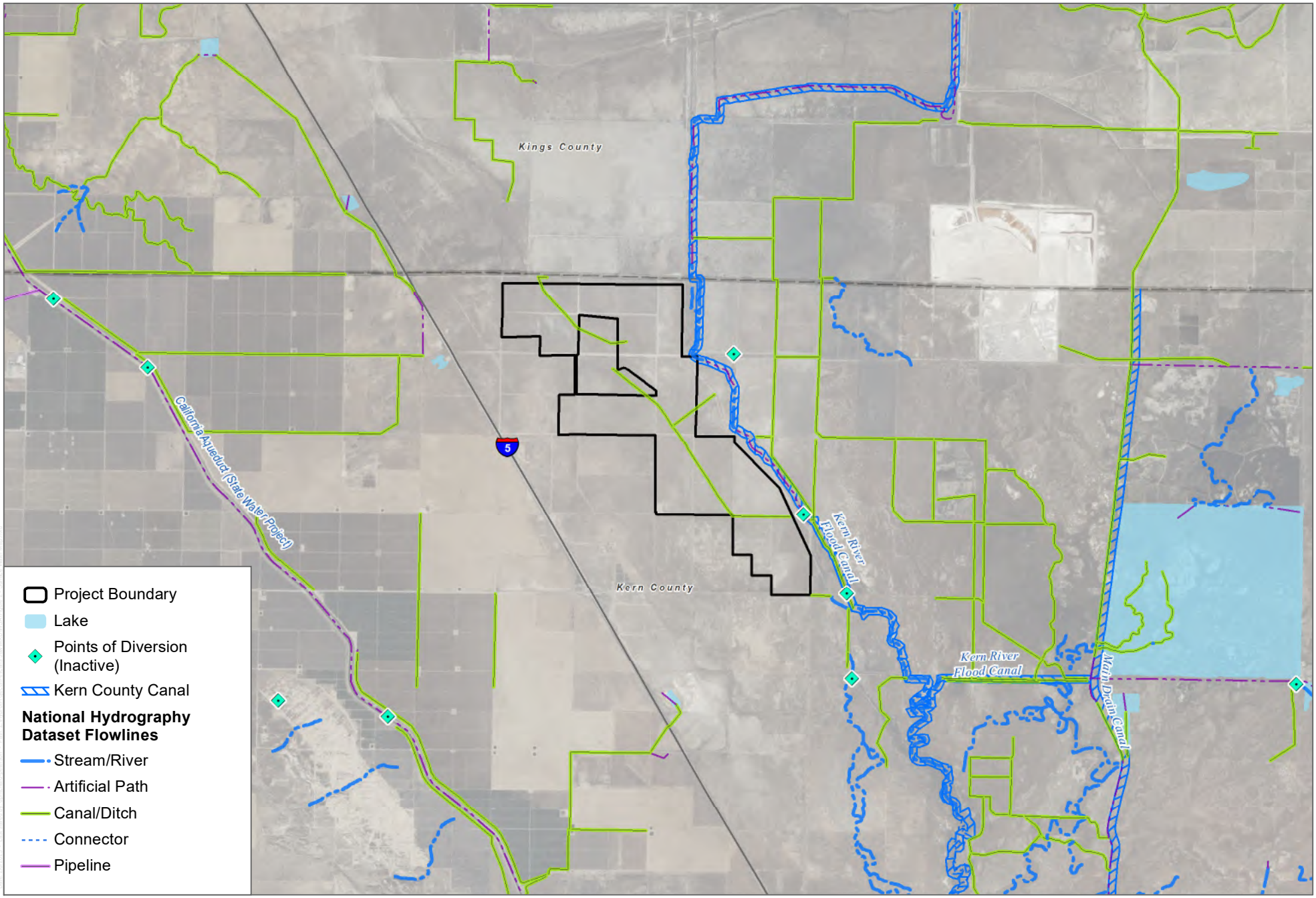

SOURCE: Bing; USGS 2022; eWRIMS 2021; Kern County; Dudek 2021

DUDEK

0 1 2 Miles

FIGURE 2

Surface Water Features

Water Supply Assessment - Pelicans Jaw Hybrid Solar Project

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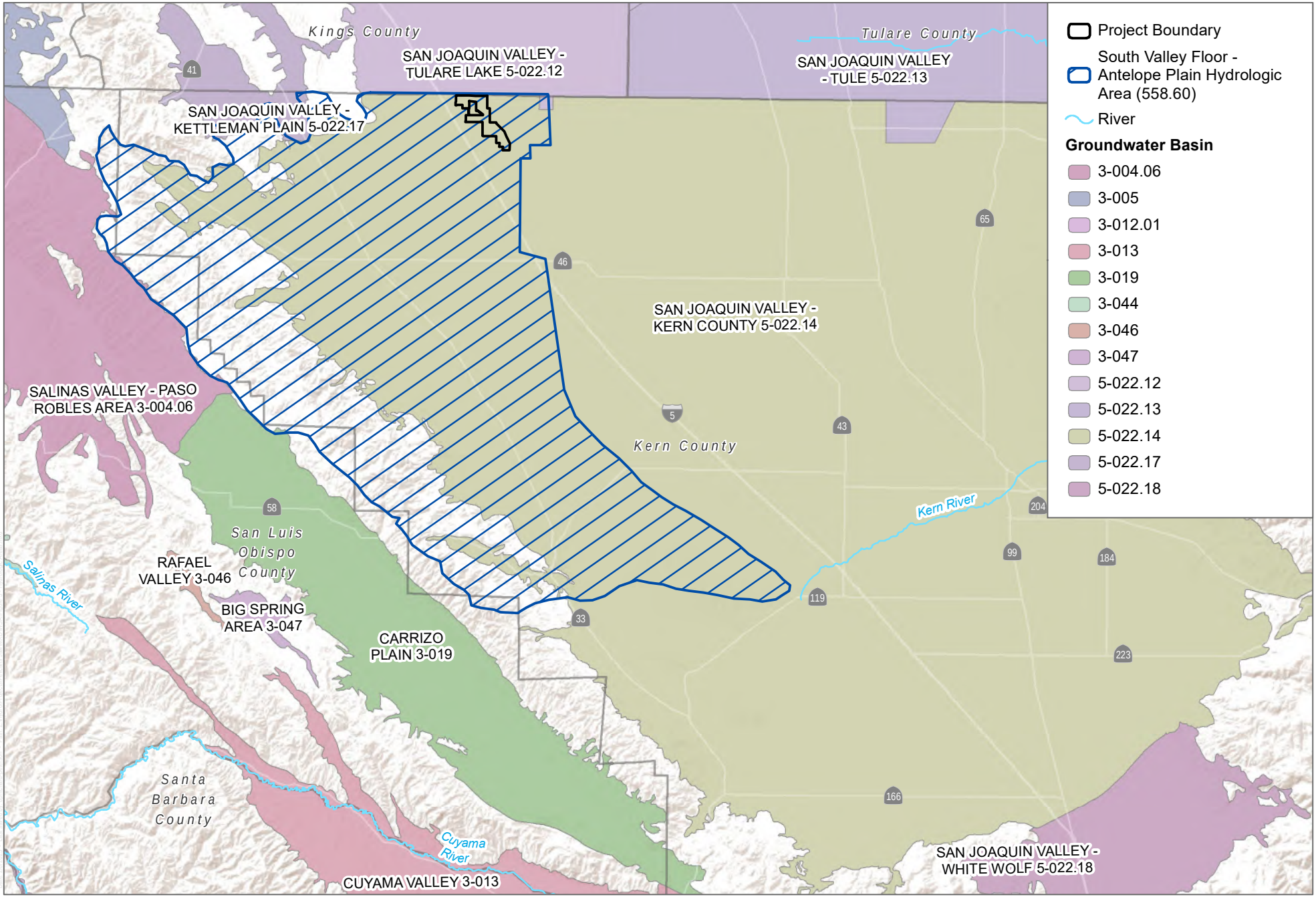

SOURCE: DWR

FIGURE 3

Groundwater Basins and Hydrologic Area

Water Supply Assessment - Pelicans Jaw Hybrid Solar Project

DUDEK

0 5 10 Miles

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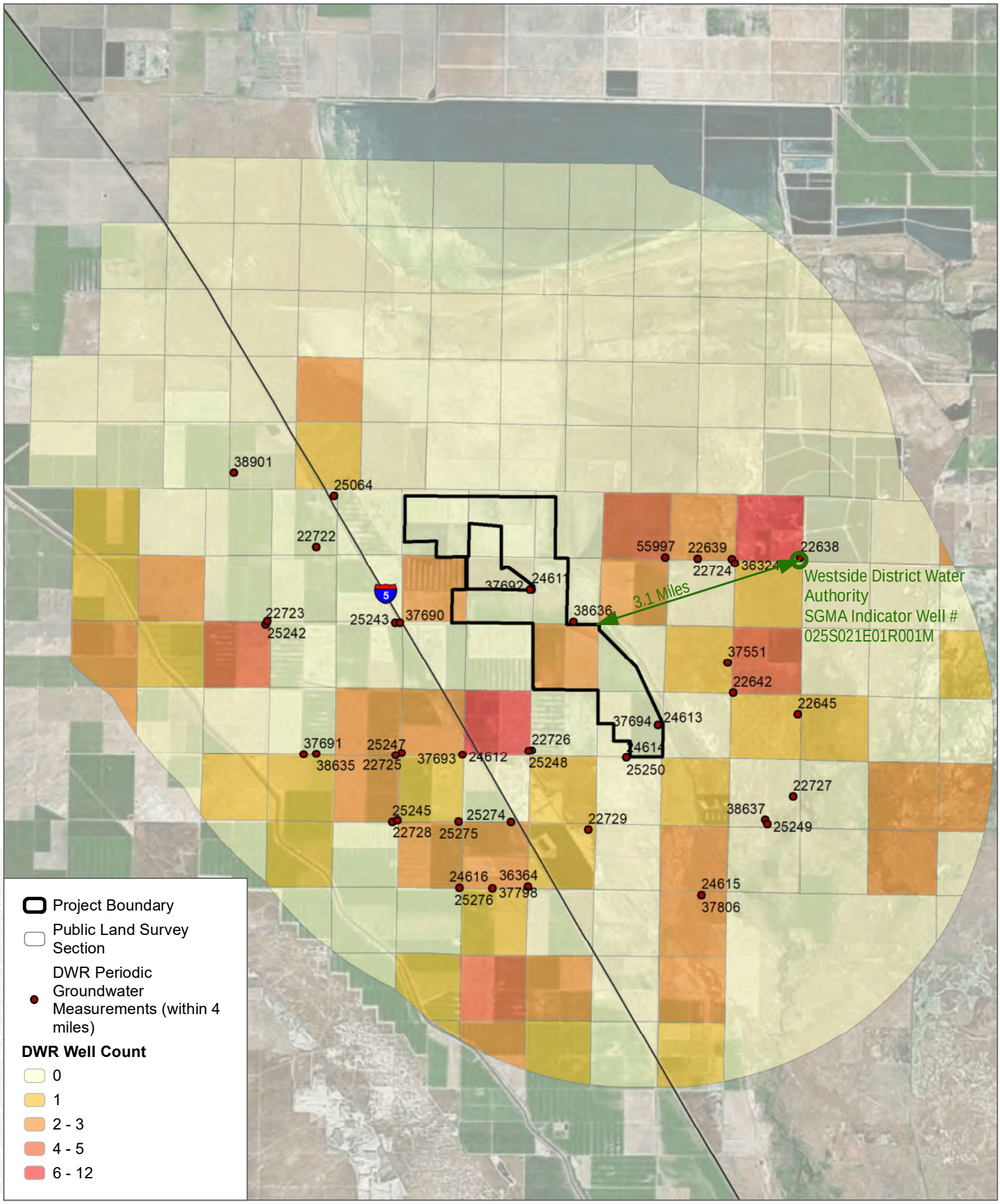

SOURCE: Bing; DWR 2020

DUDEK

0 1 2 Miles

FIGURE 4

Area Wells Map

Water Supply Assessment - Pelicans Jaw Hybrid Solar Project

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Appendix A

Principal Investigator Resumes

Dylan Duvergé, PG

SENIOR HYDROGEOLOGIST

Dylan Duvergé is an environmental analyst and hydrogeologist with 12 years' experience assessing program and project impacts to surface water and groundwater resources; geologic and hydrologic hazards; and soil, mineral, and paleontological resources. Mr. Duvergé assists large-scale planning efforts and individual project proposals through California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) compliance. He has prepared, contributed to, and/or peer reviewed groundwater resource investigations, water supply assessments, hydrology and drainage studies, geotechnical reports, Phase I Environmental Site Assessments, and paleontological resource assessments for various projects throughout California, effectively communicating scientific and regulatory aspects of hydrologic and geologic issues. Experience below is a selection of projects and is not comprehensive.

Education

San Francisco State University
MS, Geosciences, 2011

University of California, Santa Cruz
BA, Environmental Studies, 2005

Certifications

Professional Geologist (PG), CA No. 9244

Qualified SWPPP Developer, CA No. G09244

40-Hour HAZWOPER, as per 29 CFR 1910.120(e), and RCRA DOT

Professional Affiliations

Association of Environmental and Engineering Geology

Association of Environmental Professionals

Groundwater Resources Association of California

Project Experience

Resource Management

GSPs, Fox Canyon Groundwater Management Agency, Ventura County, California. Developed the sections of four Draft GSPs related to population growth, land use development patterns/trends, and relevant land use goals and policies directing growth within each basin. Dudek is working with a technical advisory group to prepare four comprehensive GSPs in accordance with state requirements. The plans consist of historic basin and water use conditions and determination of sustainable basin yield, undesirable results, and thresholds for monitoring. Future conditions are evaluated in terms of potential changes to land use and climate and a plan for proactive management, including data monitoring and implementation of projects and policies will be developed.

Borrego Groundwater Sustainability Plan, County of San Diego and Borrego Water District (BWD). Authoring the Draft Groundwater Sustainability Plan (GSP) for the critically overdrafted Borrego Valley Basin. Assisted in the compilation of current and historical data related to groundwater levels, water quality, and pumping. Working with team members to develop the basin's data management system. The Borrego Valley Basin must submit a GSP to the California Department of Water Resources (DWR) by 2020. Dudek has been assisting the County of San Diego and the BWD for years with numerous aspects of groundwater management, including technical analysis of the existing BWD Demand Offset Water Credits Policy, scientific and jurisdictional analysis of the basin boundaries to obtain a Bulletin 118 basin boundary modification, water replacement cost analysis, and analysis on managing proportional groundwater production cutbacks through a water market approach. Dudek is also providing on-call grant application preparation services and support for various projects through numerous chapters of Proposition 1 for the BWD.

Cojo-Jalama Ranch Groundwater Sustainability, Bixby Management Inc., Santa Barbara, California. Completed a Safe Yield Report on a 25,000-acre ranch in Santa Barbara County using county-approved soil moisture balance method to quantify recharge and sustainable groundwater production, and evaluate potential impacts on groundwater-dependent ecosystems. The study was completed to document that the water demand of the ranch's existing and future cattle operation would fall within the consolidated rock aquifer's sustainable yield, and to comply with county thresholds for determining impact significance under CEQA. The evaluation summarized the hydrogeologic setting, groundwater well distribution and depths, and the results of water level monitoring on the ranch. Prior to the acquisition of the property by the California Nature Conservancy, Dudek had been assisting the client resource evaluation work on the ranch by installing and monitoring gauges to measure rainfall, soil moisture content, and transpiration.

Lehigh Permanente Quarry Reclamation Plan EIR, Santa Clara County, Cupertino, California. Prepared the paleontological resources, mineral resources, and the geology, soils, and seismicity chapters of the EIR. Performed field work in support of the EIR, including rock sampling for analysis of asbestos, and water quality sampling to develop data on selenium concentrations in runoff from overburdened storage areas. The reclamation plan amendment was submitted in accordance with the Surface Mining and Reclamation Act to reclaim lands within an approximately 1,095-acre area that have been affected by surface mining activities since 1975.

Roblar Road Quarry EIR, North Bay Construction Inc., Sonoma County, California. Reviewed and responded to public comments on the Draft EIR for the project related to issues of groundwater, slope stability, naturally occurring asbestos, and seismic hazards. The EIR evaluated a proposal to mine approximately 570,000 cubic yards of basalt annually over a 20-year use permit. The project presented a number of environmental and technical issues, including geotechnical (e.g., slope stability, geologic hazards, blasting impacts) and hydrogeologic issues (e.g., alteration of groundwater gradient and flow, potential seepage into quarry, runoff effects to local creeks), and effects to biological resources. The project was approved in October 2010.

Kunzler Terrace Mine Use Permit and Reclamation Plan EIR, Mendocino County, Ukiah, California. Assisted in a subsurface investigation and preparation of a technical memorandum addressing the potential presence of subsurface archeological resources. Logged a series of on-site test pits for soil type and evidence of paleosols, and drafted a memorandum based on the results that described the soil stratigraphy and the potential for buried archeological artifacts. The Kunzler Terrace Mine is an aggregate mining operation at the confluence of the Russian River and Ackerman Creek. The EIR analyzed the potential impacts of a quarry pit to be developed through three phases totaling approximately 30 acres with a maximum depth of 66 feet.

Pilarcitos Quarry Expansion EIR, San Mateo County, Half Moon Bay, California. Prepared the paleontological resources and the geology, soils, and seismicity chapters of the EIR, in which slope stability was a major issue. Located within the Coastal Zone in the Pilarcitos Creek watershed, near Half Moon Bay, the Pilarcitos Quarry produces a variety of aggregate products from a deposit of decomposed granite and plans to continue operations for 70 years. The EIR examined a substantial expansion of operation into undisturbed areas adjacent to the existing quarry.

Sunol and Niles Dam Removal Project, San Francisco Public Utilities Commission (SFPUC), Sunol, California. Assisted in the yearly collection of stream data along two reaches of Alameda Creek, including the collection of topographic data (profiles and cross sections) using a total station, streambed pebble counts, and photo-monitoring of the creek. The Sunol and Niles Dam Removal Project is a multiyear fish passage and geomorphology monitoring task to assess the annual change in stream characteristics following the removal of two dams on Alameda Creek.

Water System Improvement Program (WSIP), Habitat Reserve Program Technical Studies, SFPUC, San Francisco, California. Conducted technical studies for geology, soils, and paleontological resources. Supported the analysis of hydrology, water quality, and hazardous materials by preparing GIS field maps, as well as figures and tables of baseline physical data, including soil units, rock type, landslide potential, and liquefaction hazards. The program will provide a coordinated and consolidated approach to compensate for habitat impacts that would result from implementation of SFPUC's WSIP facility improvement projects. The Habitat Reserve Program contemplates thousands of acres of habitat improvements located in the San Joaquin Valley, Sunol Valley, Bay Division, and Peninsula regions of the SFPUC water system.

Energy

Utility-Scale Solar Energy Development (Confidential Projects and Clients), California and Nevada. Prepared SB610 Water Supply Assessments for 6 utility-scale solar energy projects in San Diego County, Kern County, Sacramento County, Stanslaus County, Contra Costa County, California; and Nye County, Nevada.

Desert Renewables Energy Conservation Plan (DRECP), Aspen Environmental Group, Various, California. Dudek is assisting the California Energy Commission in the preparation and environmental analysis of the DRECP. The plan will help provide effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects. The DRECP is focused on the desert regions and adjacent lands of seven California counties: Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego. Developed a new baseline dataset identifying the paleontological sensitivity of rock formations within the 22 million-acre planning area. He also authored the paleontological resources section of the EIS/EIR, which assessed the potential desert-wide effects of renewable energy development on paleontological resources.

Soitec Solar Development, Soitec Solar Inc., Boulevard, California. Dudek was contracted by a confidential client to prepare an EIR and supporting technical studies for the development of four solar energy projects with a combined electrical generating capacity of 170 megawatts (MW) in eastern San Diego County. Served as part of the team that prepared the Groundwater Investigation Reports for each project, and he authored the Groundwater Inventory and Allocation Plan that addressed cumulative impacts to groundwater supply in eastern San Diego County. He also authored the hydrology and water quality sections of the Draft EIR.

Utility-Scale Solar Energy Development (Five Projects), BLM, Desert Region, California. Played a key role in analysis of visual resources for five fast-track solar energy projects in BLM's California Desert District: (1) the 1,000-MW Blythe Solar Power Project EIS, (2) the 250 MW Genesis Solar Energy Project EIS, (3) the 500 MW Palen Solar Power Project EIS, (4) the 550 MW Desert Sunlight Solar Project, and (5) the 750 MW McCoy Solar Energy Project. Identified and resolved critical data gaps, crafted a workable approach to visual resource management (VRM) issues, and coordinated directly with BLM's National Lead for VRM to ensure proper assessment and mitigation of visual resource issues. Provided technical review and support for the analysis of geology and soils, paleontological resources, and mineral resources. Prior to the EIS phases of these projects, conducted application for certification and plan of development reviews in the areas of geology, soils, mineral resources, paleontological resources, and visual resources.

Tres Vaqueros Wind Energy Project, County of Contra Costa, California. Supervised and peer-reviewed the hydrology, geology, and hazardous materials sections of the EIR, and wrote the paleontological resources section. The EIR analyzed the "repowering" of the existing facility by replacing all of the existing turbines and civil/electrical infrastructure (except for the on-site substation) with 42 new wind turbines. Key environmental issues included biological resources (primarily avian and bat species), aesthetics, hydrology, and public safety. The County certified the EIR and approved the project on April 26, 2011.

McHenry Solar Farm Project EIR, SunPower, Modesto, California. Supervised and peer-reviewed the geology and soils and visual resources sections, and wrote the hydrology and water quality, paleontological resources, and mineral resources sections for this EIR. This project consisted of installation of photovoltaic panels, an operations and maintenance building, parking, a substation, transmission gen-tie, and other ancillary facilities on a 167-acre site previously used for agricultural production. The energy production would be used by the local utility to meet its renewable energy portfolio goals in response to state and federal policies. The project was constructed and is in operation.

Federal

Level 3 Powerline Road Fiber Optic Installation, HP Communications, Inc., Fort Irwin, San Bernardino, California. Dudek was contracted to provide environmental and project management services necessary for the approval and construction of the Level 3 Powerline Road Fiber Optic Installation Project for HP Communications Inc., located in Fort Irwin, San Bernardino County, California. Level 3 Communications (Level 3), owner of a current Right-of-Way (ROW) Grant for a fiber optic communications line traversing public lands, through their agent Coastal Communications, requested to amend their ROW grant to include lands within the Fort Irwin Military Reservation administered by both the Department of Defense and the BLM. Helped craft the project description and prepared numerous technical sections of the Administrative Draft of the Environmental Assessment; he also assisted with GIS tasks, production of figures, and general project support and coordination.

Visual Resource Inventory of Washington County, BLM Saint George Field Office, Saint George, Utah. As part of an internship sponsored by the Geological Society of America, conducted a visual resource inventory of Washington County, Utah, intended to delineate areas of priority for the preservation of visual values. Collected GPS data paired with over 300 photographs documenting the visual quality of key observation points over a 2-month period. Developed several GIS datasets evaluating landscape exposure to highway travelers, defining distance zones, and summarizing scenic quality evaluations of photographed areas; and documented methods and procedures using ArcGIS model builder and GIS metadata. Produced numerous maps, pamphlets and other cartographic products illustrating key recreational routes, trails, and access limitations for off-highway vehicle users.

Merced River Comprehensive Management Plan and EIS, National Park Service (NPS), Yosemite National Park, California. Prepared the condition assessment for the geologic values of the river corridor, and prepared the EIS section addressing geology, soils, and geologic hazards. Analyzed the potential for increased visitation, foot-traffic, and social trails to denude vegetation, compact soils and subsequently lead to the development of erosional channels. The Comprehensive Management Plan for the Merced Wild and Scenic River in Yosemite National Park includes the preparation of a condition assessment of the river's outstandingly remarkable values (defined by the Wild and Scenic Rivers Act as the unique characteristics that make a river worthy of special protection), a draft and final EIS, and the accompanying Comprehensive Management Plan.

AC34 America's Cup Environmental Assessment, NPS, San Francisco, California. Served as technical analyst responsible for analyzing impacts to geologic and soil resources on Presidio Trust lands and within the Golden Gate National Recreational Area. Analyzed the potential for increased visitation, foot-traffic, and social trails to denude vegetation, compact soils and subsequently lead to the development of erosional channels. This was a fast-track effort to complete NEPA documentation for one of the largest sporting events ever proposed for the San Francisco Bay.

Water/Wastewater

Pure Water Program EIR/EIS and the Pure Water Program North City Project EIR/EIS, City of San Diego Development Services Department and the Bureau of Reclamation, San Diego, California. Prepared the hydrology and water quality sections of the Pure Water Program EIR/EIS and the Pure Water Program North City Project

EIR/EIS. As the first project in California to undertake potable reuse using surface water augmentation, evaluated the impacts to water quality and fisheries associated with discharge recycled wastewater into a City-owned municipal water reservoir. Supported the City's effort to receive waste discharge requirements from the RWQCB and permits from CDFW. Pure Water San Diego is the City of San Diego's phased, multiyear program that will provide one-third of San Diego's water supply locally by 2035. Phase 1 of the Pure Water Program includes several projects that will clean recycled water to produce 30 million gallons per day of high quality purified water starting in 2023, reducing the City's dependence on imported water (North City Project). Dudek prepared the Pure Water Program EIR/EIS and the Pure Water Program North City Project EIR/EIS. The North City Project was approved by the City Council in April 2018.

Steephollow Creek and Bear River EIR, Nevada Irrigation District, Grass Valley, California. Dudek prepared the EIR for the Bear River Sediment Removal at Rollins Reservoir Project for the Nevada Irrigation District. The project would restore and maintain reservoir capacity in Rollins Reservoir on an ongoing basis through re-establishment of gravel skimming operations on the Bear River below the confluence with Steephollow Creek. Completed a technical review of the hydrological and geomorphology studies completed for the project, and authored the geology and soils and the hydrology and water quality chapter of the EIR.

North Norco Stage 11 IS/MND, Riverside County Flood Control and Water Conservation District, Norco, California. Authored the bulk of the IS/MND for a stormwater channel improvement project in the City of Norco, proposed by the Riverside County Flood Control and Water Conservation District. Proposed improvements included channel deepening, road crossings, and stormwater best management practices to reduce the extent and frequency of nuisance flooding caused by inadequate channel capacity.

System Infrastructure Protection Program EIR, Metropolitan Water District of Southern California, Orange, California. Dudek was contracted by the Metropolitan Water District of Southern California for the preparation of two Program EIRs for Operations and Maintenance projects in the Orange County and San Bernardino County Operating Regions. Prepared the project description, scoped issues in the IS, and analyzed potential impacts to a variety of environmental resources, including hydrology and water quality.

San Francisco Groundwater Supply Project EIR, San Francisco, California. The San Francisco Groundwater Supply Project is a project under the City's WSIP, and will provide the city up to 4 million gallons of local, sustainable groundwater every day. The project proposes to utilize up to six deep water wells and associated treatment facilities in the city. Dylan prepared the analysis of aesthetics in the EIR and supported the groundwater analyses and investigations of the Westside Basin with maps, figures, and GIS data.

Bay Division Pipelines 3 and 4 Seismic Retrofit at the Hayward Fault, SFPUC, San Francisco, California. Provided project management support through all phases of this project, from preparation of the Draft EIR through to Certification of the Final EIR and project approval. Environmental review was completed ahead of schedule, despite numerous changes in project design that required reanalysis. Provided technical review of a paleontological resources study; wrote the paleontological resources section; produced GIS figures for technical sections; prepared public comment responses; and provided general project support. Supported the analysis of hydrology and water quality by collecting stream flow data, watershed boundaries, and wetland delineations for two intermittent creeks. The Bay Division Pipelines 3 and 4 seismic retrofit at the Hayward Fault involves the replacement and retrofit of pipeline segments crossing the Hayward Fault, including the installation of an articulated vault designed to accommodate movement on the fault.

The Crystal Springs Pipeline No. 2 Project, SFPUC, San Francisco, California. Prepared the hydrology and water quality chapter of the Draft EIR. Helped prepare the physical setting for the geology, soils, and seismicity chapter, and completed the paleontological resources analysis for the cultural resources chapter. In support of these analyses, prepared all GIS figures for the hydrology, geology, and hazardous materials chapters. This project proposed a series of pipeline replacements, cathodic protection measures, and general improvements in order to its increase its seismic reliability. The Administrative Draft EIR for this project received praise from the client, partly due to the series of GIS figures produced in support of the hydrology, geology, and hazards chapters.

Vista Grande Drainage Basin Improvement Project, City of Daly City, California. Assisted with constraints and opportunity analyses, alternatives analysis, and water quality sampling and analysis at Lake Merced. Daly City is proposing the project to address storm-related flooding that currently occurs in the Basin and to provide other environmental benefits, including restoration and management of water levels within Lake Merced. The proposed drainage basin improvements include partial replacement of the existing Vista Grande Canal, replacement of the Vista Grande Tunnel and ocean outfall, a lake outfall and diversion structure, and constructed treatment wetlands.

Devin Pritchard-Peterson

HYDROGEOLOGIST

Devin Pritchard-Peterson (*DEH-vin PRI-churd PEE-tur-sun; he/him*) is a hydrogeologist with 7 years' professional experience in the fields of water resources management, groundwater supply development, and environmental permitting and compliance. Mr. Pritchard-Peterson has significant experience developing groundwater management plans, completing hydrogeological investigations, conducting aquifer tests, and analyzing hydrologic data.

Education

California Polytechnic State University, San Luis Obispo
MS, Hydrogeology, 2018
BS, Hydrology and Watershed Management, 2013

Certifications

40-hour OSHA HAZWOPER

GIT No. 1428

Professional Affiliations

Groundwater Resources Association

Project Experience

Energy

Groundwater Monitoring and Mitigation Plans; Various Clients; San Diego, Riverside, and San Bernardino Counties; California. Developed and implemented groundwater monitoring and mitigation plans as part of the environmental compliance associated with the construction and operation of renewable energy projects. Collected groundwater level and quality data, evaluated groundwater conditions and compared to pre-project baseline conditions, and prepared technical reports to document trends with significance to established action criteria.

Groundwater Resources Investigations, Various Clients, San Diego County, California. Completed groundwater resources investigations reports for renewable energy projects in accordance with County of San Diego requirements. Conducted pumping tests to evaluate well performance and estimate aquifer hydraulic properties, analyzed hydrologic and climatic data, and determined project water demands.

Water Supply Assessments, Various Clients, San Diego and Riverside Counties, California. Prepared water supply assessments for renewable energy projects to assess existing groundwater and surface water availability, evaluated water demands, and determined sufficiency of supply over a 20-year forecast period.

Groundwater Resources Impact Analyses, Various Clients, Stanislaus and Sacramento Counties, California. Evaluated the potential impacts of project pumping on local groundwater resources as part of the California Environmental Quality Act (CEQA) process. Analyses included calculation of groundwater level decline, aquifer storage reduction, water quality degradation, land subsidence, surface water depletion, and impacts to groundwater-dependent ecosystems.

Water Supply Options Screening and Opportunities and Constraints Analysis, Confidential Client, Imperial and Tulare Counties, California. Completed a technical review of water availability, water quality, steps and costs to obtain supply, and methods and costs of wastewater disposal for two proposed green hydrogen projects. The results of the study were used to identify the most viable source of water supply and most feasible method of wastewater disposal for the projects based on existing data and information.

Municipal

Groundwater Resources Evaluation, City of Rio Dell, Humboldt County, California. Assessed whether the city's municipal supply wells are intercepting a subterranean stream flowing in a known and definite channel. Reviewed existing water quality, groundwater level, direction of groundwater flow, and geologic data to determine the source of water to the wells. Performed topographic surveys of the city's wells and installed groundwater monitoring equipment in the wells to track seasonal and long-term trends in groundwater levels.

Water Quality Monitoring Plan and Hydraulic Assessment of Downstream Resources for the San Gabriel Reservoir Post-Fire Emergency Restoration Project, Los Angeles County Department of Public Works, Azusa, California. Developed and implemented a water quality monitoring plan in accordance with requirements set forth by the Regional Water Quality Control Board and California Department of Fish and Wildlife to ensure the protection of water quality in the San Gabriel River during rehabilitation of the San Gabriel Reservoir. Completed cross-section topographic surveys and streamflow monitoring to evaluate the project's impact on flow conditions and aquatic resources.

Hydrogeological Study for Wastewater Treatment Plant, City of Gonzales, California. Evaluated groundwater quality and direction of groundwater flow, identified potential locations for new monitoring wells, and prepared a hydrogeological study report with recommendations to bring the wastewater treatment plant back into compliance with the requirements of the Regional Water Quality Control Board.

Turbidity Monitoring Plan for the Orange County Feeder Blow-Off Structure Rehabilitation Project, Metropolitan Water District of Southern California, Newport Beach, California. Developed and implemented a turbidity monitoring plan to ensure the protection of water quality in Newport Bay during rehabilitation of a Metropolitan Water District of Southern California water pipeline.

Hydrogeological Study, Cuyama Community Services District, New Cuyama, California. Performed aquifer pumping tests and passively monitored groundwater levels in network of groundwater wells to characterize subsurface hydraulic properties, analyze well performance, and determine long-term groundwater availability.

Remediation

Groundwater Quality Monitoring and Reporting for the Excalibur Hotel and Casino Former ARCO Service Station Remediation Site, MGM International, Las Vegas, Nevada. Collected water quality samples from on-site monitoring wells to measure concentrations of benzene and methyl tertiary butyl ether (MTBE) in groundwater beneath the site to determine the effectiveness of remedial activities. Performed quality assurance/quality control of laboratory results and summarized findings in monitoring reports.

Resource Management

San Pasqual Valley Resource Management Plan, City of San Diego, Escondido, California. Assisted in the development of the San Pasqual Valley Resource Management Plan that was prepared to help identify and reduce sources of sediment and nutrients to surface water and groundwater, while simultaneously identifying steps to preserve the natural and cultural resources of the valley.

Groundwater Resources Due Diligence for the Primm Valley Golf Club, MGM International, Nipton, California. Assessed historical and current groundwater conditions in the Ivanpah Valley Groundwater Basin and project wells to determine the sustainability of groundwater resources to satisfy continued project water demands.

Multiple Well Pumping Tests, Confidential Client, San Diego County, California. Conducted 10-day pumping tests in several fractured rock wells that are overlain by alluvial deposits to determine the source of water to the pumping wells and estimate aquifer hydraulic properties. Groundwater level decline and recovery were monitored using pressure transducers and data loggers installed in a network of over 12 wells.

Water Supply Assessment for the El Monte Sand Mining Project, Horizon Hill El Monte Investors LLC, Lakeside, California. Prepared a water supply assessment to evaluate water sources for a proposed sand mining project. Reviewed available well logs and borings to determine depth to bedrock and groundwater conditions.

Groundwater Extraction Feasibility Analysis and Hydrogeologic Report, Imperial County Planning and Development Services, Gordon's Well, California. Completed a hydrogeological characterization and groundwater extraction feasibility analysis for the installation of a new groundwater extraction well on private property in the southeastern part of unincorporated Imperial County.

Groundwater Sustainability Plans for the Borrego Springs, Montecito, San Jacinto, Santa Monica, and Ojai Valley Groundwater Basins; Various Clients; Central and Southern California. Drafted groundwater sustainability plan documents and annual reports, developed sustainable management criteria, presented technical approach and results to stakeholders, created and managed project GIS databases, analyzed hydrologic and climatic data, and assisted with development of data management systems.

Groundwater Resources Investigations, Various Clients, San Diego County, California. Completed groundwater resources investigations for private agricultural and commercial development projects per County of San Diego requirements. Responsibilities included oversight of aquifer pumping tests, evaluation of impacts to off-site well users and groundwater-dependent ecosystems, and preparation of final reports.

Groundwater Well Installation, Confidential Client, San Diego County, California. Logged borehole sediments and supervised drilling operations and well construction to ensure work was completed to design specifications.

Transportation

Water Supply Assessment for the Byron Airport Development Plan, Contra Costa County Department of Conservation and Development, Contra Costa County, California. Evaluated water resource availability, analyzed projected project and non-project water demands, and determined sufficiency of supply over a 20-year forecast period.

Water

Underrepresented Communities Technical Assistance Program, Department of Water Resources, California. Provided underrepresented communities assistance with water system permitting, well testing, groundwater level monitoring, water rights evaluation, and other technical services to address water supply and quality issues.

Groundwater Resources Evaluation and Well Siting and Design Recommendations for Cannabis Cultivation Project, Confidential Client, Santa Barbara County, California. Conducted an evaluation of the occurrence of groundwater underlying the project site to make an appraisal of groundwater quantity and quality and to evaluate potential impacts of project pumping on local groundwater and surface water resources. Provided recommendations for siting and design of a new irrigation well based on the hydrogeologic conditions underlying the project site.

Water Supply Development Report for the U.S. Gypsum Plaster City Plant, U.S. Gypsum, Imperial County, California. Prepared a water supply development report for the Plaster City Plant water infrastructure improvements project to satisfy applicable information requirements of the Imperial Irrigation District Interim Water Supply Policy for Non-Agricultural Projects. The report included a description of the project, projected water demand, and water supply alternatives.

Water Well Assessment, Carlsbad Alkaline Water, Carlsbad, California. Conducted a 24-hour pumping test, estimated aquifer hydraulic properties, and measured the pH of source and product water extracted from the well to determine amount of alkalinity.

Title 22 Source Capacity Test and Water Quality Sampling for Santa Ysabel Trailer Park, Santa Ysabel, California. Conducted a 72-hour source capacity test per County of San Diego and State Water Resources Control Board Division of Drinking Water requirements, analyzed pumping test and water quality data, and prepared final report.

Sampling and Analysis Plan for the Salton Sea North Shore Beach and Yacht Club Dredging Project, Riverside County Economic Development Agency, Mecca, California. Prepared a sampling and analysis plan consistent with the U.S. Army Corps of Engineers guidelines for collection and analysis of sediment samples prior to dredging of a marina for boat access. Planned fieldwork including collection and analysis of sediment cores and a bathymetric survey of the marina.

Encinitas and Leucadia Watersheds Preliminary Stormwater Infiltration Hazard Zones, City of Encinitas, California. Reviewed available groundwater level and quality data for wells and borings located within the Encinitas and Leucadia watersheds, developed a hydrogeologic conceptual model of the study area, synthesized previous geotechnical studies conducted in the area, and established preliminary stormwater infiltration hazard zones.

Waste Discharge Requirements Technical Report for the Ontario Carbon Farm, Huerta del Valle, Ontario, California. Completed a technical report consistent with Regional Water Quality Control Board guidelines to document the specifications of the proposed project, describe the hydrogeology of the site, and determine potential impacts of the project on water quality.

Supplemental Title 22 Engineering Report for the Wagas Ranch Recycled Water Project, Wagas Ranch, Rosamond, California. Completed a Title 22 engineering report per the State of California Department of Public Health guidelines for the use of tertiary recycled water from the Lancaster Water Reclamation Plant to maintain water levels in restricted recreational impoundments at Wagas Ranch.

Other

Report of Composting Site Information for the Ontario Carbon Farm, Huerta del Valle, Ontario, California. Drafted a report describing composting site operations and environmental compliance as part of the project's permitting process.

Phase I Environmental Site Assessments, Various Clients, San Diego County, California and Clark County, Nevada. Completed numerous Phase I environmental site assessments to document current and historical site conditions and identify potential recognized environmental conditions.

Appendix B
Onsite Well Completion Reports

25/21-16

ORIGINAL
File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do Not Fill In

№ 149593

State Well No. _____

Other Well No. _____

(2) LOCATION OF WELL:

County Kern Owner's number, if any

Township, Range, and Section

Distance from cities, roads, railroads, etc. 2mi W of Lost Hills Rd.
1mi 250 N of Twissleman Rd.

(3) TYPE OF WORK *(check)*:

New Well ☒ Deepening ☐ Reconditioning ☐ Destroying ☐

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE *(check)*:

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary Rev. ☒
Cable ☐
Other ☐

(6) CASING INSTALLED:

STEEL: X OTHER:
SINGLE ☒ DOUBLE ☐

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	510	14	¼	28	0	520

If gravel packed

Size of shoe or well ring: bull nose Size of gravel: 5/16x4

Describe joint

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen: Louver

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
210	510	8	4½	1/8x2 3/8

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes ☐ No ☐ To what depth ft.

Were any strata sealed against pollution? Yes ☐ No ☐ If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing

(9) WATER LEVELS:

Depth at which water was first found, if known ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes ☐ No ☐ If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Temperature of water Was a chemical analysis made? Yes ☐ No ☐

Was electric log made of well? Yes ☐ No ☐ If yes, attach copy

11) WELL LOG: UNCONFINED

Total depth 520 ft. Depth of completed well 510 ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to	ft.
0-5	top soil
5-27	clay
27-46	sand
46-75	clay
75-95	sand
95-125	clay
125-132	sand
132-155	clay
155-173	sand
173-178	clay
178-181	sand
181-198	clay
198-209	sand 11
209-220	clay
220-273	sand 53
273-280	clay
280-293	sand 13
293-302	clay
302-305	sand 3
305-319	clay
319-350	sand 31
350-370	clay
370-384	sand 14
384-416	clay
416-433	sand 17
433-457	clay
457-460	sand 3
460-463	clay
463-474	sand 11
474-484	clay
484-493	sand 9
493-510	clay

FIELD CANVASS 5/76
COULD NOT IDENTIFY THIS WELL. DUP

Work started Mar. 17 76. Completed Mar. 19 76

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Grabow Well Drilling Co.
(Person, firm, or corporation) *(Typed or printed)*

Address 12522-9th Ave.
Hanford, Calif.

[SIGNED] _____
(Well Driller)

License No. 288489 Dated Mar. 31, 1976

SKETCH LOCATION OF WELL ON REVERSE SIDE

DWR 188 (REV. 9-68)

8-72 30M TRIP OT OSP

25/21-26 N 16 N

ORIGINAL
File with DWR

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

Do Not Fill In

№ 149593

State Well No. _____

Other Well No. _____

(11) WELL LOG: ABANDONED

Total depth 520 ft. Depth of completed well 510 ft.

Formation: *Describe by color, character, size of material, and structure*

ft. to	ft.	
0-5		top soil
5-27		clay
27-46		sand
46-75		clay
75-95		sand
95-125		clay
125-132		sand
132-155		clay
155-173		sand
173-178		clay
178-181		sand
181-198		clay
198-209		sand 11
209-220		clay
220-273		sand 53
273-280		clay
280-293		sand 13
293-302		clay
302-305		sand 3
305-319		clay
319-350		sand 31
350-370		clay
370-384		sand 14
384-416		clay
416-433		sand 17
433-457		clay
457-460		sand 3
460-463		clay
463-474		sand 11
474-484		clay
484-493		sand 9
493-510		clay

Gr. & Ref. Pt. Elev. = 220'

(2) LOCATION OF WELL:

County Kern Owner's number, if any

Township, Range, and Section

Distance from cities, roads, railroads, etc. 2mi W of Lost Hills Rd.
1mi 250 N of Twissleman Rd.

(3) TYPE OF WORK *(check)*:

New Well ☒ Deepening ☐ Reconditioning ☐ Destroying ☐

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE *(check)*:

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary Rev. ☒
Cable ☐
Other ☐

(6) CASING INSTALLED:

STEEL: X OTHER:
SINGLE ☒ DOUBLE ☐

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	510	14	1/4	28	0	520

If gravel packed

Size of shoe or well ring: bull nose Size of gravel: 5/16x4

Describe joint

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen Louver

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
210	510	8	4	1/8x2 3/8

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes ☐ No ☐ To what depth ft.

Were any strata sealed against pollution? Yes ☐ No ☐ If yes, note depth of strata

From ft. to ft.

From ft. to ft.

Method of sealing

(9) WATER LEVELS: * Temp. Inaccessible

Depth at which water was first found, if known ft.

Standing level before perforating, if known ft.

Standing level after perforating and developing ft.

(10) WELL TESTS:

Was pump test made? Yes ☐ No ☐ If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Temperature of water Was a chemical analysis made? Yes ☐ No ☐

Was electric log made of well? Yes ☐ No ☐ If yes, attach copy

Work started Mar. 17 76 Completed Mar. 19 76

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Grabow Well Drilling Co.
(Person, firm, or corporation) (*Typed or printed*)

Address 12522-9th Ave.
Hanford, Calif.

[SIGNED] _____
(Well Driller)

License No. 288489 Dated Mar. 31, 1976

SKETCH LOCATION OF WELL ON REVERSE SIDE

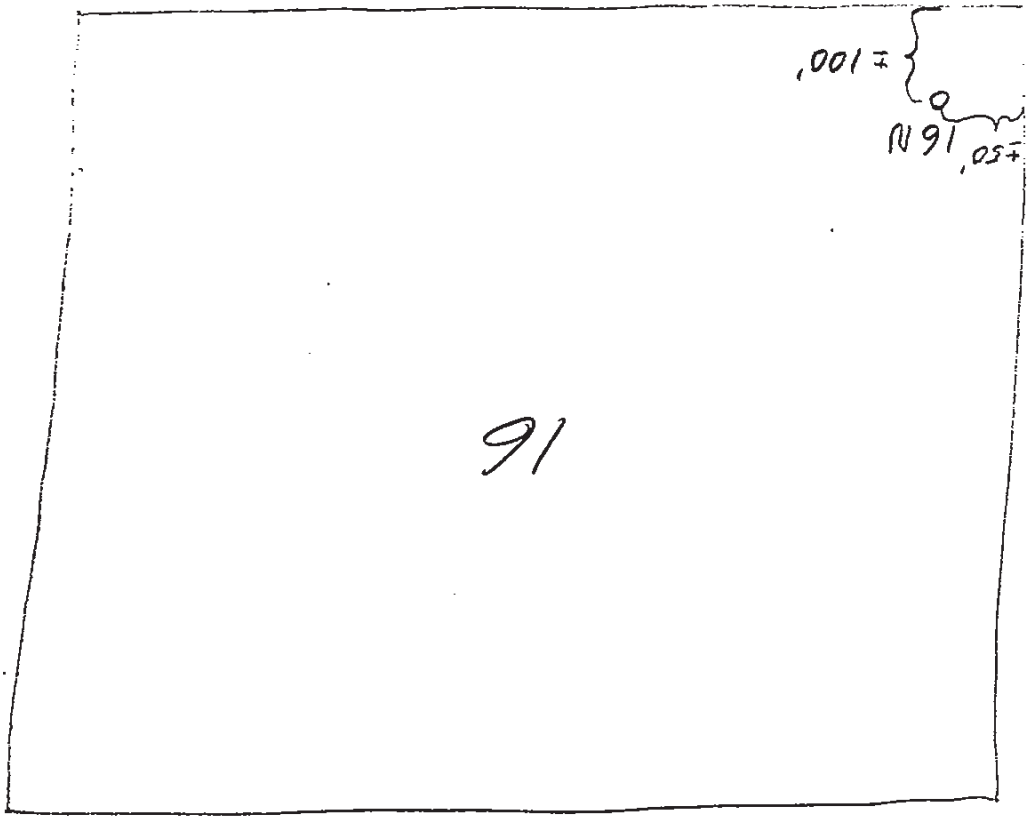
Pump Type Turb. Make Aurora

Power - Diesel - Make Deutz

* Need a 7/8" socket to get into Discharge

DWR 188 (REV. 9-68)

RECEIVED
MAR 19 1979
SAN JOAQUIN DISTRICT



*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. e0123453

Page 1 of 1

Owner's Well Number

Date Work Began 11/02/2010 Date Work Ended 12/13/2010

Local Permit Agency KERN COUNTY HEALTH DEPARTMENT

Permit Number WP 12744 Permit Date 11/22/10

DWR Use Only – Do Not Fill In

State Well Number/Site Number: 25S21E16

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
		ABANDON WELL AS FOLLOWS:
1.		CUT CASING 6' FROM TOP.
2.		FILL WELL FROM 505' TO 101' WITH WELL ROCK
3.		FILLED TO TOP WITH CEMENT.
4.		BACKFILLED HOLE.

Total Depth of Boring Feet

Total Depth of Completed Well Feet

Well Owner

Well Location

Address 3/4E OF I-5 ON TWISSLEMAN 1N E/BANK

City LOST HILLS County Kern

Latitude Deg. Min. Sec. N Longitude Deg. Min. Sec. W

Datum Decimal Lat. Decimal Long.

APN Book 044 Page 150 Parcel 17

Township 25S Range 21E Section 16

Location Sketch

(Sketch must be drawn by hand after form is printed.)

North / West / East / South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. **Please be accurate and complete.**

Activity

- ○ New Well
- ○ Modification/Repair
  - ○ Deepen
  - ○ Other
- ◉ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

- ○ Water Supply
  - ☐ Domestic ☐ Public
  - ☐ Irrigation ☐ Industrial
- ○ Cathodic Protection
- ○ Dewatering
- ○ Heat Exchange
- ○ Injection
- ○ Monitoring
- ○ Remediation
- ○ Sparging
- ○ Test Well
- ○ Vapor Extraction
- ○ Other

Water Level and Yield of Completed Well

Depth to first water (Feet below surface)

Depth to Static Water Level (Feet) Date Measured

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

*May not be representative of a well's long term yield.

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)

Annular Material

Depth from Surface Feet	to Feet	Fill	Description

Attachments

- ☐ Geologic Log
- ☐ Well Construction Diagram
- ☐ Geophysical Log(s)
- ☐ Soil/Water Chemical Analyses
- ☐ Other

Attach additional information, if it exists.

Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

Name S.A. CAMP PUMP AND DRILLING COMPANY (Person, Firm or Corporation)

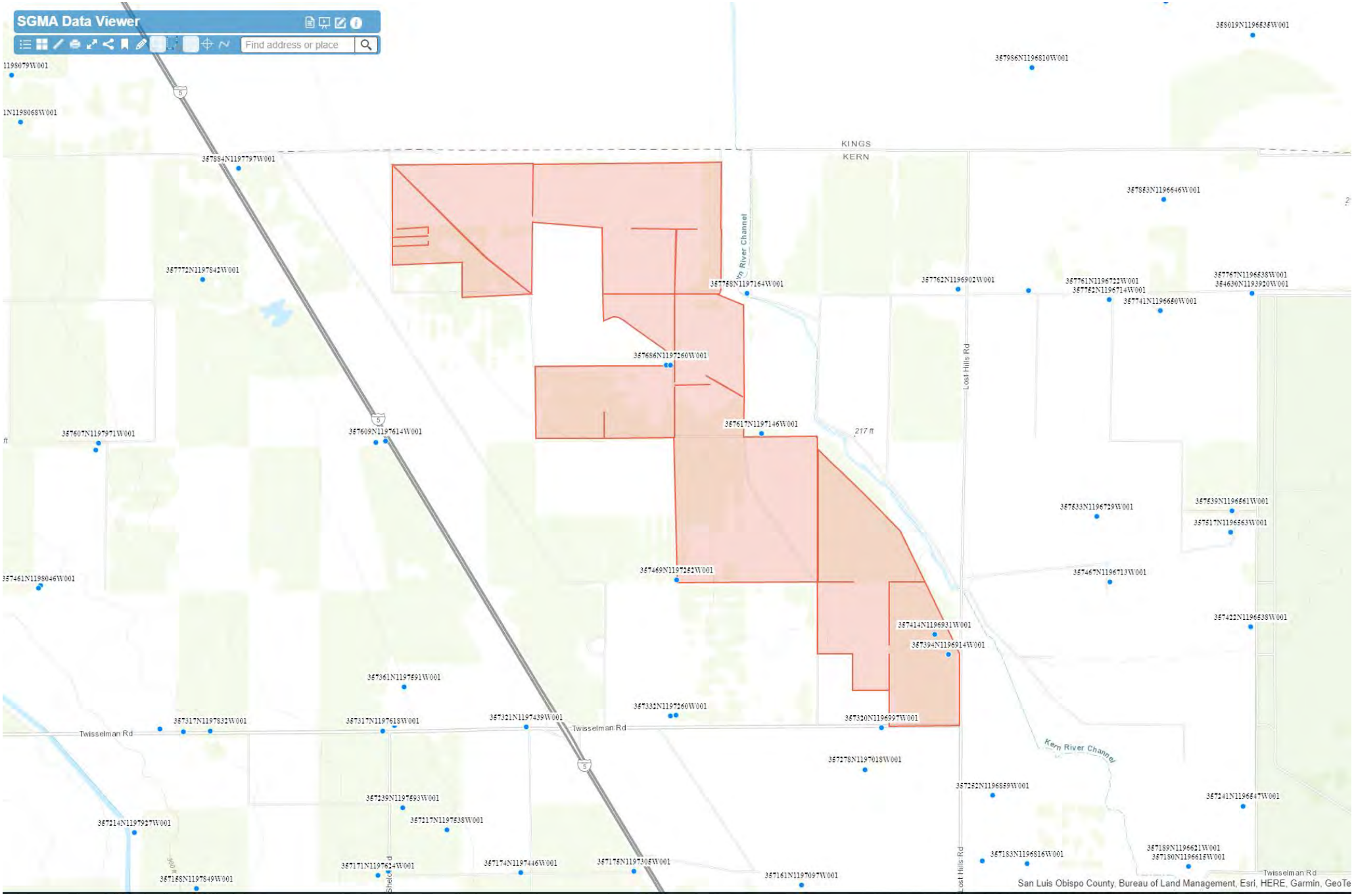
P.O. BOX 82575 (Address) BAKERSFIELD (City) CA (State) 93380 (Zip)

Signed (C-57 Licensed Water Well Contractor) 1/10/2010 (Date Signed) 346951 (C-57 License Number)

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Appendix C
Hydrographs


SGMA Data Viewer
Find address or place
KINGS
KERN
Kern River Channel
Lost Hills Rd
Twisselman Rd
217 ft
San Luis Obispo County, Bureau of Land Management, Esri, HERE, Garmin, GeoTe

ALL MONITORING WELLS WITH MORE THAN 2 GWL MEASUREMENTS

Site Code: 357414N1196931W001
Local Well Name:
State Well Number: 25S21E22H001M
Station ID: 22644
WCR Number:
Latitude: 35.7414
Longitude: -119.6931
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Unknown
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 219.59
Reference Point Elevation: 221.09
Reference Point Description: None Provided
Station Comments:

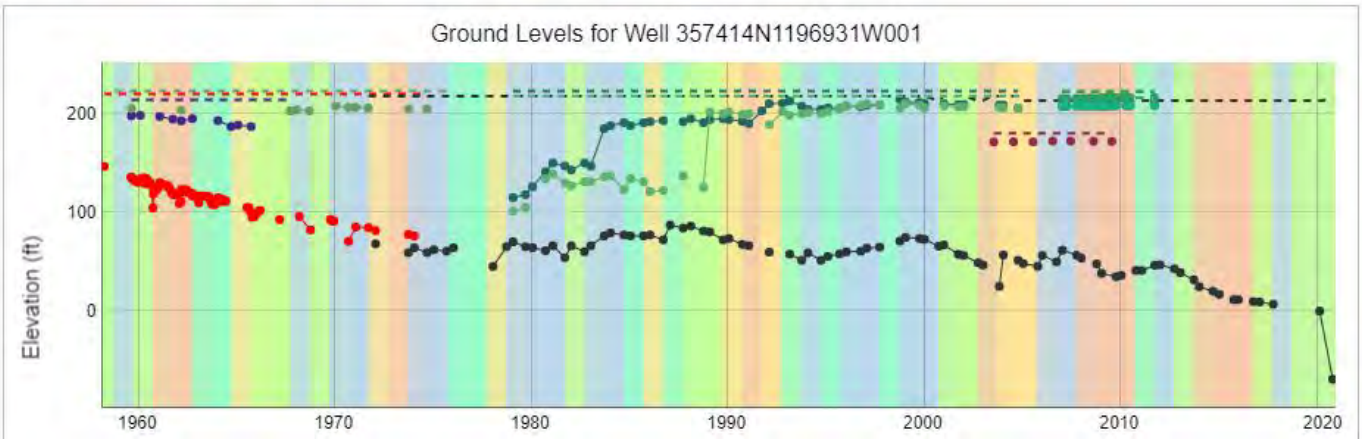
Water Level

Water Year Type

Date: (hover to see values)

-- GSE	— WSE 357414N1196931W001 : 0
-- GSE	— WSE 357767N1196538W001 : 760
-- GSE	— WSE 357467N1196713W001 : 0
-- GSE	— WSE 357469N1197252W001 : 0
-- GSE	— WSE 357686N1197260W001 : 0
-- GSE	— WSE 357394N1196914W001 : 0
-- GSE	— WSE 357320N1196997W001 : 0
-- GSE	— WSE 357758N1197164W001 : 0
-- GSE	— WSE 357533N1196729W001 : 0
-- GSE	— WSE 357252N1196859W001 : 0
-- GSE	— WSE 357686N1197265W001 : 0
-- GSE	— WSE 357617N1197146W001 : 0

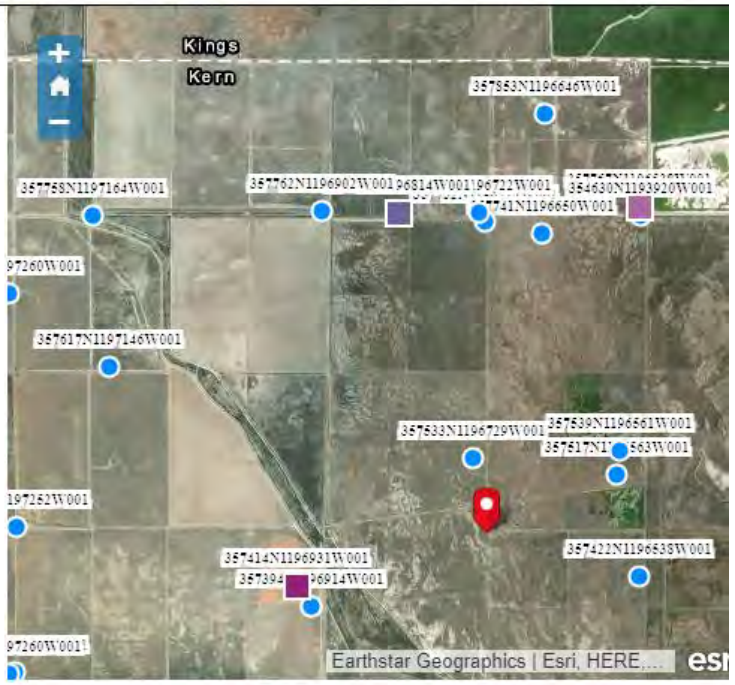
SGMA Water Year Type (HUC: 18030012 - Tulare Lake Bed)
Wet Above Normal Below Normal Dry Critical



AQUIFER (BELOW CORCORAN CLAY) MONITORING WELLS WITH LONG RECORDS

Site Code: 357467N1196713W001 **State Well Number:** 25S21E13N001M

Site Code: 357467N1196713W001
Local Well Name:
State Well Number: 25S21E13N001M
Station ID: 22642
WCR Number:
Latitude: 35.7467
Longitude: -119.6713
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Unknown
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 222.59
Reference Point Elevation: 223.59
Reference Point Description: None Provided
Station Comments:



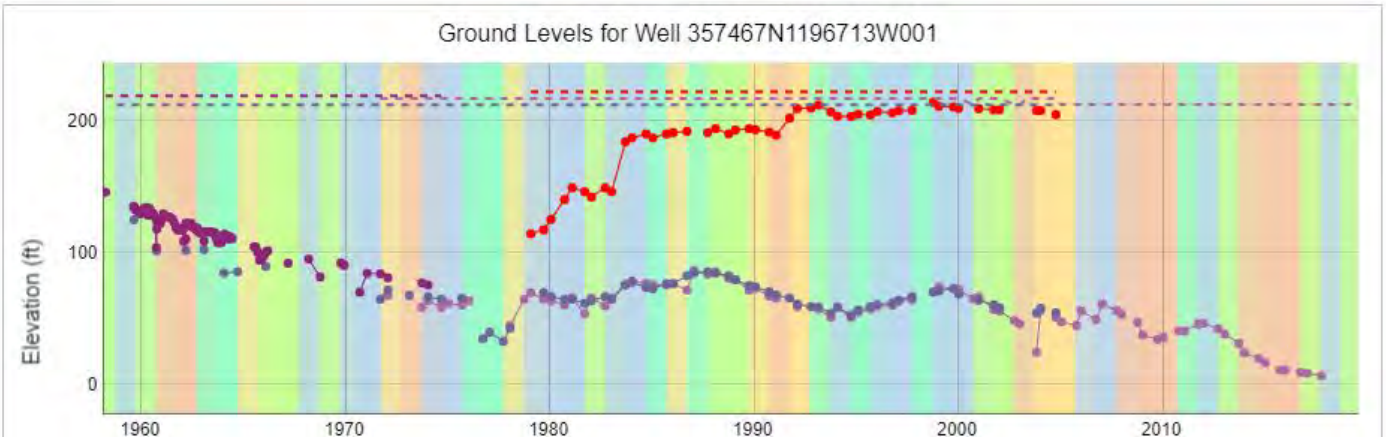
Water Level

Water Year Type

Date: (hover to see values)

- -- GSE
- -- GSE
- -- GSE
- -- GSE
- — WSE 357467N1196713W001 : 0
- — WSE 357767N1196538W001 : 760
- — WSE 357761N1196814W001 : 0
- — WSE 357414N1196931W001 : 0

SGMA Water Year Type (HUC: 18030012 - Tulare Lake Bed)
Wet Above Normal Below Normal Dry Critical



ONSITE AND OFFSITE WELLS FOR 2007 THROUGH 2011

Site Code: 357686N1197260W001 **State Well Number:** 25S21E08H001M **Local Well Name:** 25S21E08H001M

Site Code: 357686N1197260W001
Local Well Name: 25S21E08H001M
State Well Number: 25S21E08H001M
Station ID: 24611
WCR Number:
Latitude: 35.7686
Longitude: -119.726
Station Organization ID:
Station Organization Name:
Well Location Description:
Well Use Type: Unknown
Well Completion Type: Single Well
Well Depth (feet bgs):
Top Perforation (feet bgs):
Bottom Perforation (feet bgs):
Ground Surface Elevation: 215.97
Reference Point Elevation: 216.97
Reference Point Description: None Provided
Station Comments:

Water Level

Water Year Type

Date: (hover to see values)

- -- GSE
- -- GSE
- -- GSE
- -- GSE
- -- GSE

- — WSE 357686N1197260W001 : 0
- — WSE 357333N1197253W001 : 0
- — WSE 357394N1196914W001 : 0
- — WSE 357320N1196997W001 : 0
- — WSE 357617N1197146W001 : 0

SGMA Water Year Type (HUC: 18030012 - Tulare Lake Bed)
Wet Above Normal Below Normal Dry Critical

Appendix D

BVWSD Will Serve Letter

Buena Vista Water Storage District
P.O. Box 756 • 525 N. Main Street
Buttonwillow, California 93206
Phone: (661) 324-1101 • (661) 764-5510
Fax: (661) 764-5053

DIRECTORS:
John Vidovich - President
Terry Chicca - Vice President
Jeof Wyrick - Secretary
Julien Parsons
Larry Ritchie

STAFF:
Tim Ashlock – Engineer-Manager
Andrew Bell – Hydrographer
Marybeth Brooks – Controller
Adam Sevier – Superintendent
Angela Thompson – Executive Assistant

December 3, 2020

Katrina Slayton
Planning Division Chief
County of Kern
Planning & Natural Resources Department

SUBJECT – Will Serve Letter for Pelicans Jaw Solar Project (the "Project")

This Will Serve Letter is being submitted to Kern County for the purposes of confirming that the Buena Vista Water Storage District can and is willing to provide water to Pelicans Jaw Solar, LLC for use during construction of Project currently proposed by Pelicans Jaw Solar, LLC in Kern and Kings County. The Buena Vista Water Storage District will be able to supply the Project with their estimated need of approximately 500 acre-feet of water during construction.

Prior to Project construction, Pelicans Jaw Solar, LLC shall confirm the amount, cost, and delivery methods of water with the Buena Vista Water Storage District.

This Will Serve Letter is subject to termination at any time upon written notice to Pelicans Jaw Solar, LLC.

If you have any questions, please contact Andrew Bell at 661-324-1101 or via email at andrewb@bvh2o.com.

Sincerely,

Tim Ashlock
Engineer - Manager

Cc: Pelicans Jaw Solar, LLC, c/o Samsung Solar Energy 2, LLC, Attention: Mr. Jong-hun Kim, 5601 E. Slauson Ave., Suite 101
Commerce, CA 90040
P: Water Sales/Will Serve Letters/Pelican Jaw Solar Plant

Appendix E
Drawdown Calculations

Construction Phase: Drawdown after 12-Months

Time (days)	Distance (ft)	Discharge (ft^3/day)	Transmisivity (ft^2/day)	Storativity	Drawdown (ft)	u
426	25	59675	18000	0.001	4.515	0.0000
426	50	59675	18000	0.001	4.150	0.0000
426	100	59675	18000	0.001	3.784	0.0000
426	300	59675	18000	0.001	3.205	0.0000
426	500	59675	18000	0.001	2.936	0.0000
426	5,280	59675	18000	0.001	1.694	0.0009
426	16,368	59675	18000	0.001	1.098	0.0087

0.05

*Drawdown calculated using Cooper-Jacob approximation of the Theis non-equilibrium flow equation

$$s = \frac{2.3\,Q}{4\pi T} \log_{10} \frac{2.25\,Tt}{r^2 S}$$

Kruseman equation 3.7 page 65

$$u = \frac{r^2 S}{4Tt}$$

u valid if suffciently small (u < 0.05) Driscoll 2003.

s= drawdown
Q= ammortized pumping rate (cubic feet per day)
T= Transmisivity
t= time (days)
r= disrance from pumping well (feet)
S= coefficient of storage (dimensionless)

ASSUMPTIONS

500	acre-feet per year
162,925,500	gallons per year
446,371.23	gallons per day
310.0	**gallons per minute**

500	constuction demand (12-months)
20	O&M demand (AFY)
980	total over 20 years (from when construction
49	AFY
1200	total over life of project (36 years)
30	AFY

O&M: Drawdown after 20-Years

Time (days)	Distance (ft)	Discharge (ft^3/day)	Transmisivity (ft^2/day)	Storativity	Drawdown (ft)	u
7300	25	4774	18000	0.001	0.421	0.0000
7300	50	4774	18000	0.001	0.392	0.0000
7300	100	4774	18000	0.001	0.363	0.0000
7300	250	4774	18000	0.001	0.324	0.0000
7300	500	4774	18000	0.001	0.295	0.0000
7300	5,280	4774	18000	0.001	0.195	0.0001
7300	16,368	4774	18000	0.001	0.148	0.0005

0.05

*Drawdown calculated using Cooper-Jacob approximation of the Theis non-equilibrium flow equation

$$s = \frac{2.3\,Q}{4\pi T} \log_{10} \frac{2.25\,Tt}{r^2 S}$$

Kruseman equation 3.7 page 65

$$u = \frac{r^2 S}{4Tt}$$

u valid if suffciently small (u < 0.05) Driscoll 2003.

s= drawdown
Q= ammortized pumping rate (cubic feet per day)
T= Transmisivity
t= time (days)
r= disrance from pumping well (feet)
S= coefficient of storage (dimensionless)

ASSUMPTIONS

40	acre-feet per year
13,034,040	gallons per year
35,709.70	gallons per day
24.8	**gallons per minute**

20	O&M demand (AFY)
800	total over 20 years (from when construction b
40	AFY
1200	total over life of project (35 years)
30	AFY

Appendix O

PG&E Best Management Practices

Table of Contents

General BMPs for All VM Activities
BMPs Generales Para Actividades de VM Page 2

Water Quality/Sediment Control BMPs
BMPs Relativas a la Calidad del Agua y al Control de Sedimentos Page 4

Environmental/Biological BMPs
BMPs Relativas al Medio Ambiente y a la Biología Page 6

Fire BMPs
BMPs Relativas a Incendios Page 10

Herbicide BMPs
BMPs Relativas a Herbicidas Page 12

Mechanical Clearing Operations BMPs
BMPs Relativas a Operaciones de Remoción Mecánica Page 14

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Guidance Document References:

TD-7102P-01, "Distribution Routine Patrol Procedure (DRPP)"

Level of Use:
❑Information
✓Reference
❑Continuous

ENGLISH	SPANISH
During the performance of Vegetation Management (VM) activities the following Best Management Practices (BMPs) must be implemented where practicable. BMPs are considered practicable where physically possible and not conflicting with other regulatory obligations or safety considerations (GO 95 Rule 35 and Public Resource Codes 4292 and 4293) or emergency response situations. These BMPs are designed to ensure that PG&E VM activities are performed in an environmentally sensitive manner to minimize environmental impacts.	Durante la ejecución de actividades relativas al Manejo de Vegetación (Vegetation Management, VM, por sus siglas en inglés) las siguientes Mejores Prácticas de Gestión (Best Management Practices, BPM, por sus siglas en inglés) deberán ser implementadas donde sea factible. Las BMPs son consideradas factibles donde resulte físicamente posible realizarlas y donde no exista conflicto con otras regulaciones o consideraciones relativas a la seguridad (GO 95 Rule 35 and Public Resource Codes 4292 and 4293) o con situaciones de respuesta a emergencias. Estas BMPs están diseñadas para asegurar que las actividades de manejo de vegetación por parte de PG&E sean ejecutadas respetando el medio ambiente de manera de minimizar el impacto ambiental.

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General BMPs for All VM Activities BMPs Generales Para Actividades de VM		
BMP #	**ENGLISH**	**SPANISH**
BMP 1	VM employees and contractors must conduct ongoing training of environmental laws and procedures. VM employees and Contractors performing vegetation management activities must comply with these laws and procedures to minimize or avoid effects on natural resources during work activities.	Los empleados y contratistas dedicados al manejo de la vegetación deben recibir capacitación continua sobre las leyes y los procedimientos relativos al medio ambiente. Las actividades de estos empleados y contratistas deben ajustarse a estas leyes y procedimientos para que durante la ejecución de los trabajos se minimicen o se eviten efectos sobre los recursos naturales.
BMP 2	On federal, state, local and tribal agency land the land managers should be notified of pending work as far in advance as possible.	Ya sea en tierras federales, estatales, locales o de agencias tribales, los responsables de la administración de las tierras deben ser notificados con la máxima anticipación posible.
BMP 3	Roads, erosion control measures, fences, and structures damaged as a result of vegetation management operations must be repaired and reported to the work group supervisor and the VM PG&E Representative. Gates must be left as they are found.	Los daños en caminos, elementos para control de erosión, cercos y estructuras ocasionados durante operaciones de manejo de la vegetación, deben ser reparados y reportados al supervisor del grupo de trabajo y al Representante de PG&E a cargo de VM. Los portones deben quedar tal como se encontraron.
BMP 4	Vehicles and equipment must use pavement, existing roads, and previously disturbed areas to the extent practicable.	En la medida de lo posible, los vehículos y equipos deben circular por el pavimento, caminos existentes y áreas que han sido utilizadas con anterioridad.
BMP 5	Motorized equipment must comply with Air Resources Board permitting requirements.	Los equipos motorizados deben cumplir con los requerimientos del Air Resources Board.

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General BMPs for All VM Activities BMPs Generales Para Actividades de VM		
BMP #	**ENGLISH**	**SPANISH**
BMP 6	Vehicle idling, noise, and odor must be minimized to the extent practicable when working near residences, public buildings, or commercial buildings. Within 100 feet of school facilities work vehicle must not stand idling for more than five minutes, unless necessary for work purposes. Diesel-fueled work vehicles must not stand idling for more than five minutes at any location, unless necessary for work purposes.	En los vehículos operando con el motor al ralentí, los ruidos y los olores deben minimizarse al punto de lo prácticamente posible cuando estén trabajando cerca de áreas residenciales, de edificios públicos y de edificios comerciales. Dentro de un radio de cien pies de cercanía a escuelas, los vehículos no deben permanecer con el motor al ralentí por más de cinco minutos, salvo que sea necesario por cuestiones relativas al trabajo realizado. Los vehículos con motores diesel no deben permanecer al ralentí por más de cinco minutos en ningún lugar, salvo que sea necesario por cuestiones operativas.
BMP 7	Contractors must have the ability to communicate quickly with their supervisor and/or PG&E by having a working cell phone or radio on the job site at all times, or by identifying the closest area of cell phone reception or closest public phone and familiarizing all employees with that location.	Los contratistas deben tener la posibilidad de poder comunicarse rápidamente con sus supervisores y/o con PG&E teniendo en el área de trabajo y en todo momento, un teléfono celular operativo o una radio; también deben identificar el área más cercana con buena recepción para teléfonos celulares o el teléfono público más próximo, y deben familiarizar a los empleados con dichas ubicaciones.

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Water Quality/Sediment Control BMPs BMPs Relativas a la Calidad del Agua y al Control de Sedimentos		
BMP #	**ENGLISH**	**SPANISH**
BMP 8	Vehicles and heavy equipment must be refueled at least 100 feet away from riparian areas. Handheld tools must be refueled outside of riparian areas. The fueling operator must stay with the fueling operation at all times. Do not top off tanks.	Los vehículos y equipos pesados deben ser reabastecidos de combustible a una distancia mayor de 100 pies de áreas ribereñas. Las herramientas de mano deben ser reabastecidas de combustible fuera de áreas ribereñas. El operador de reabastecimiento de combustible debe permanecer en el área de reabastecimiento en forma permanente. No llene a tope los tanques de combustible.
BMP 9	Petroleum and herbicide spill containment and cleanup materials must be available at the job site. Spills must be immediately cleaned up and contaminated materials disposed of properly. Spills of any amount must be reported immediately to the supervisor and the VM PG&E Representative for appropriate management.	Materiales de limpieza específicos para derrames de petróleo y de herbicidas deben estar disponibles en el área de trabajo. Los derrames deben limpiarse en forma inmediata y los materiales contaminados deben ser desechados de la forma apropiada. Los derrames de cualquier cantidad deben ser reportados inmediatamente al supervisor y al representante de PG&E encargado de VM, para que los mismos sean tratados apropiadamente.
BMP 10	Immediately after vegetation management activities, if the amount of contiguous, bare soil exposed in one location exceeds 0.1 acres, erosion control measures must be implemented. These measures may include lop & scatter, broadcasting chipped material or compliance with other PG&E Erosion control measures.	Si inmediatamente después de un trabajo de control de vegetación, la cantidad contigua de suelo expuesto superase los 0.1 acres, se deben implementar medidas de control de erosión. Estas medidas podrían incluir "lop & scatter" (poda selectiva y esparsión de residuos), dispersión de material astillado o alguna otra medida de control de erosión aprobada por PG&E.

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Water Quality/Sediment Control BMPs BMPs Relativas a la Calidad del Agua y al Control de Sedimentos		
BMP #	**ENGLISH**	**SPANISH**
BMP 11	Vehicle use within riparian areas is limited to existing roads and dry crossings, and they must be checked and maintained daily to prevent leaks of materials that, if introduced to water, could be harmful to aquatic life.	El uso de vehículos dentro de áreas ribereñas está limitado a caminos existentes y cruces secos; éstos deben ser controlados y mantenidos diariamente para prevenir eventuales pérdidas de materiales en el agua, que podrían causar riesgo a la vida acuática.
BMP 12	Cleared or pruned vegetation and woody debris (including chips) must be disposed of in a manner to ensure that it does not enter surface water or a watercourse. All cleared vegetation and woody debris (including chips) must be removed from surface water or watercourses, and placed or secured where it cannot re-enter the watercourse.	Los restos de vegetación podada y los restos de madera (incluyendo trozos pequeños) deben ser eliminados de manera que no lleguen a la superficie del agua o que no entren en un curso de agua. Todo resto de vegetación podada y de madera (incluyendo trozos pequeños) debe ser removida de la superficie del agua o de cursos de agua y se los debe ubicar o confinar en lugares seguros donde no tengan la oportunidad de volver a entrar al curso de agua.

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Environmental/Biological BMPs BMPs Relativas al Medio Ambiente y a la Biología		
BMP #	**ENGLISH**	**SPANISH**
BMP 13	Vehicles should not exceed 15 mph on un-surfaced roads such as agricultural field roads and transmission right-of-way (ROW) access roads.	Los vehículos no deben exceder las 15 millas por hora en caminos no asfaltados tales como caminos en campos de agricultura y caminos con derecho a paso de acceso a líneas de transmisión (right-of-way, ROW por sus siglas en inglés).
BMP 14	Vehicles and heavy equipment must not be operated off roads within 25 feet of the edge of a vernal pool unless a biologist or natural resource professional evaluates and prescribes site specific AMMs.	Los vehículos y equipos pesados no deben ser operados fuera de rutas dentro de un radio de 25 pies del borde de un charco vernal, a menos que un biólogo o un profesional en recursos naturales evalúe y prescriba AMMs específicas para el lugar.
BMP 15	VM activities in Valley Elderberry Longhorn Beetle (VELB) habitat must follow PG&E VELB Utility Standard ENV-7001S and Utility Procedure ENV-7001P-01.	Las actividades de manejo de la vegetación en el hábitat del Escarabajo de cuernos largos del saúco del valle (Valley Elderberry Longhorn Beetle, VELB, por sus siglas en inglés) deben seguir la norma ENV-7001S y el procedimiento ENV-7001P-01.
BMP 16	VM activities impacting birds must follow Utility Procedure TD-7102P-27, to comply with the Migratory Bird Treaty Act.	Las actividades de manejo de vegetación que impactan a las aves deben seguir el Procedimiento de servicios públicos TD-7102P-27, para cumplir con la Ley del Tratado de Aves Migratorias.
BMP 17	Sudden Oak Death: VM activities in counties subject to the Sudden Oak Death quarantine must follow the guidance of the California Oak Mortality Task Force.	Muerte súbita del roble: las actividades de VM en los condados sujetos a la cuarentena por Muerte súbita del roble deben seguir la guía del Grupo de Trabajo de Mortalidad de California Oak.

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Environmental/Biological BMPs BMPs Relativas al Medio Ambiente y a la Biología		
BMP #	**ENGLISH**	**SPANISH**
BMP 18	Environmental screening for mowing locations, fee strip weed abatement, and for electric transmission ROW reclamation work must be conducted by the VM environmental group prior to work.	Los controles ambientales para zonas de segado, de control de maleza y para trabajos de restauración en zonas con derecho a paso en líneas de transmisión eléctricas (ROW), deben ser realizados por el grupo ambiental VM antes de iniciar el trabajo.
BMP 19	VM must verify that the environmental screening process for capital and other non-VM work was conducted by the work owner prior to VM starting vegetation management activities. VM personnel and contractors must implement the environmental protection measures prescribed for the work.	Antes de comenzar tareas de manejo de vegetación, VM debe verificar que el proceso de control ambiental para trabajos primordiales y otros no relacionados al control de vegetación, fue realizado por el dueño de la obra. El personal de VM y los contratistas deben implementar las medidas de protección ambiental recomendadas para la obra.

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Environmental/Biological BMPs BMPs Relativas al Medio Ambiente y a la Biología		
BMP #	**ENGLISH**	**SPANISH**
BMP 20	Cultural Resources: *Items identified through Patrols/Screenings*: When previously identified cultural resources are found (i.e., old bottles, cans, buildings), they must be left in place and undisturbed. If it is necessary to move or disturb them to complete the work, or if human remains are found, stop work and contact the VM PG&E Representative. *Unanticipated Discovery*: If any new cultural resources (e.g., structure features, bone, shell, artifacts, or architectural remains) are encountered and site disturbance cannot be avoided during work activities, or if human remains are suspected: • Stop all work within 100 feet of the discovery • Notify the VM PG&E representative who will contact the Cultural Resource Specialist • Secure location, but do not touch or remove remains and associated artifacts; • Do not remove associated spoils or pick through them; • Note the location and document all calls and events; • Keep the location confidential.	Recursos Culturales: *Elementos identificados a través de Patrullajes/Controles*: cuando se encuentren recursos culturales previamente identificados (por ejemplo botellas viejas, latas, edificaciones), se deben dejar en el lugar tal como se los encontraron. Si es necesario moverlos o alterarlos para completar el trabajo, o si restos humanos son encontrados, detenga el trabajo y contacte un Representante VM de PG&E. *Descubrimiento No Anticipado*: Si cualquier recurso cultural nuevo (por ejemplo restos de estructuras, huesos, conchas, artefactos o ruinas arquitectónicas) son descubiertos y la alteración del lugar no puede ser evitada durante el trabajo o ante la sospecha de presencia de restos humanos: • Detenga todo trabajo dentro de un radio de 100 pies del descubrimiento • Notifique al representante VM de PG&E quien contactará al especialista en recursos culturales • Proteja el área, pero no toque o remueva los restos o artefactos asociados; • No remueva el hallazgo ni lo revise; • Anote la ubicación y documente todas las llamadas y eventos; • Mantenga la ubicación confidencial.

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Environmental/Biological BMPs BMPs Relativas al Medio Ambiente y a la Biología		
BMP #	**ENGLISH**	**SPANISH**
BMP 21	If a protected wildlife species is killed or injured as a result of current VM activities, the incident must be reported immediately to a supervisor and the VM PG&E Representative for appropriate management.	Si alguna especie protegida de vida salvaje es muerta o herida como resultado de alguna actividad VM, el incidente debe ser reportado en forma inmediata a un supervisor y al Representante VM de PG&E para que sea manejado apropiadamente.
BMP 22	Disturbance or removal of non-target vegetation within a work area should not exceed the minimum necessary to complete operations, subject to other public, health and safety directives governing the safe operations and maintenance of electric and gas facilities.	La perturbación o remoción de vegetación que no sea el objetivo de trabajo debe ser la mínima necesaria que permita completar las operaciones. Debe estar sujeta a directivas públicas, de salud y de seguridad que rijan operaciones y mantenimiento de plantas eléctricas y de gas.
BMP 23	During designated Fire Season motorized equipment must have federal or state approved spark arrestors; all vehicles must be equipped with firefighting tools as appropriate and in accordance with all applicable laws, rules, regulations, orders, and ordinances. When the fire adjective rating is Very High or Extreme no vehicular travel is permitted off cleared roads except in case of emergency.	Durante la Temporada de Incendios los equipos motorizados deben contar con sistemas de contención de chispas aprobados por el estado o por el gobierno federal; todos los vehículos deben contar con equipos extinguidores de fuego para la situación apropiada, debiendo cumplir los mismos con todas las leyes, regulaciones, reglas, órdenes y ordenanzas que les corresponda aplicar. Cuando el riesgo de incendio está en el nivel Muy Alto o Extremo, no se permite ninguna circulación vehicular fuera de los caminos habilitados excepto en casos de emergencia.

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Fire BMPs BMPs Relativas a Incendios		
BMP #	**ENGLISH**	**SPANISH**
BMP 24	During designated Fire Season the contractor must check and follow the requirements of the daily Project Activity Level (PAL) when working on USFS or other required properties, or the Fire Adjective Index rating in hazardous fire areas and SRAs. These are measures of fire weather conditions and may restrict activities otherwise permitted.	Durante la Temporada de Incendios el contratista debe verificar y seguir los requerimientos del Nivel diario de Actividad del Proyecto (Project Activity Level, PAL, por sus siglas en inglés) cuando esté trabajando en USFS u otras propiedades o debe seguir el Índice de Calificación de Riesgo de Incendio en áreas de alto riesgo y áreas de responsabilidad del estado (SRA, por sus siglas en inglés). Estas son medidas de condiciones de clima relativas a riesgo de incendios que podrían restringir actividades que normalmente serían permitidas.
BMP 25	During designated Fire Season in grass and wildland areas: • Smoking is not allowed while walking, working, or operating light or heavy equipment. • Smoking is allowed in a barren area, or within an area cleared to mineral soil at least three feet in diameter. During Fire Adjective Index ratings of Very High or Extreme smoking is not allowed at any time in grass and wildland areas.	Durante la Temporada de Incendios en áreas con pasto y terrenos vírgenes: • No está permitido fumar mientras se camina, trabaja u opera equipo liviano o pesado. • Fumar está permitido en áreas yermas o dentro de un área de por lo menos 3 pies de diámetro donde se ha removido vegetación hasta dejar solo suelo mineral. Cuando el Índice de Calificación de Riesgo de Incendios es Muy Alto o Extremo no está permitido fumar en ningún momento en áreas con pasto o en terrenos vírgenes.

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Fire BMPs BMPs Relativas a Incendios		
BMP #	**ENGLISH**	**SPANISH**
BMP 26	Hunting, firearms, portable stoves, open fires (such as barbecues) not required by the VM activity, and pets (except for safety in remote locations) are prohibited in VM work activity sites. All trash, food items and human-generated debris must be properly contained and/or removed from the site.	En áreas de trabajo de manejo de la vegetación, está prohibido cazar, usar armas de fuego, utilizar cocinas portátiles, realizar fuegos abiertos si no lo requiriese la actividad VM (barbacoas por ejemplo). También están prohibidos los animales domésticos, excepto que sean requeridos por razones de seguridad en ubicaciones remotas.
BMP 27	Woody debris created by chipping, lop and scatter, or brush mowing operations must be left at an average depth of less than 18 inches from the ground surface unless otherwise specified in an easement or land owner agreement.	Los restos de madera originados por triturado, por "lop & scatter" (poda selectiva y esparsión de residuos), o por operaciones de segado de arbustos deben ser dejados a una profundidad promedio de menos de 18 pulgadas de la superficie del suelo, excepto que se especifique de otra forma a través de una servidumbre o de un acuerdo con el dueño de la propiedad.

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Herbicide BMPs BMPs Relativas a Herbicidas		
BMP #	**ENGLISH**	**SPANISH**
BMP 28	A Licensed Pest Control Advisor must write prescriptions for all herbicide and tree growth regulator applications. Contractors must use a Qualified Applicator when applying herbicides and tree growth regulators for VM.	Todas las aplicaciones de herbicidas y reguladores del crecimiento de árboles deben ser prescriptas por un asesor Licenciado en Control de Pestes. Los contratistas deben usar un Aplicador Calificado cuando se apliquen herbicidas y reguladores de crecimientos de árboles, como parte de actividades VM.
BMP 29	Nozzle tip, pressure and sprayer configuration should be such to produce a coarser droplet to minimize drift.	La punta de la boquilla, la configuración del rociador y su presión deben ser tal que produzcan gotas de un tamaño suficientemente grande que minimicen el rocío a la deriva.
BMP 30	Pesticides must not be transported in the same compartment with persons, food, or feed. Pesticide containers must be secured to the vehicle during transportation in a manner that will prevent spilling into or off the vehicle.	Los pesticidas no deben ser transportados en el mismo compartimento que personas, comida o alimento para ganado. Durante su transporte, los contenedores de pesticidas deben estar firmemente sujetos al vehículo para prevenir derrames dentro o fuera del vehículo.
BMP 31	Selective application techniques should be used for VM ROW maintenance operations wherever practicable so that desirable vegetation is not adversely affected.	Cuando sea posible, técnicas de aplicación selectivas deberían ser utilizadas en operaciones de mantenimiento VM en caminos con derecho a paso (ROW) de forma tal que la vegetación deseada no sea adversamente afectada.
BMP 32	The contractor must have a written training program for employees who handle pesticides. The written program must describe the materials and the information that will be provided and used to train the employees.	EL contratista debe tener un programa de entrenamiento escrito para empleados acerca de cómo manipular pesticidas. El programa escrito debe describir los materiales y la información que será provista y utilizada para entrenar a los empleados.

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Herbicide BMPs BMPs Relativas a Herbicidas		
BMP #	**ENGLISH**	**SPANISH**
BMP 33	Training must be completed before an employee is allowed to handle any pesticide and must be continually updated to cover any new pesticides that will be handled. Training must be repeated at least annually thereafter.	El entrenamiento debe ser finalizado antes de que un empleado sea autorizado a la manipulación de pesticidas y se debe actualizar en forma continua para cubrir cualquier pesticida nuevo a ser utilizado. Se debe repetir el entrenamiento al menos una vez al año.
BMP 34	These special precautions must be observed during periods of inclement weather: • Applications must not be made in, immediately prior to, or immediately following rain when runoff could be expected. • Applications must not be made when wind and/or fog conditions have the potential to cause drift. • Basal bark applications must not be made when stems are wet with rain, snow or ice.	Las siguientes precauciones especiales deben ser tenidas en cuenta durante los periodos de clima riguroso: • Las aplicaciones no deben realizarse durante lluvias, o inmediatamente antes o inmediatamente después de las mismas, cuando escorrentías pueden esperarse. • Las aplicaciones no deben realizarse si las condiciones de viento o de niebla pudieran causar que el rocío quede a la deriva. • Las aplicaciones de corteza basal no deben realizarse cuando los tallos están húmedos por lluvia, nieve o hielo.
BMP 35	Herbicide Buffer Width from Stream, Wetland, or Other Sensitive Habitat Ancho de la zona de protección desde arroyos, pantanos u otros hábitats sensibles	Herbicide designation or usage Uso o designación del herbicida
	No buffer requirement No se requiere zona de protección	Approved for aquatic use Aprobado para uso acuático
	25 feet 25 pies	Not approved for aquatic use No aprobado para uso acuático
	200 feet 200 pies	Mixing, Loading, Cleaning Mezclado, Carga, Limpieza

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Mechanical Clearing Operations BMPs BMPs Relativas a Operaciones de Remoción Mecánica		
BMP #	**ENGLISH**	**SPANISH**
BMP 36	Mechanical clearing equipment must not be used to clear vegetation within 10 feet of towers, poles or guy wires. Only handheld tools such as chainsaws and weed eaters may be used in these areas.	No se debe usar equipos mecánicos de remoción de vegetación dentro de un radio de 10 pies de torres, de postes o de cables de amarre. Solo herramientas de mano como sierras a cadena y cortador de malezas, pueden ser utilizadas en estas áreas.
BMP 37	Contractor must flag guy wires 200 feet ahead of working an area, using bright colored flagging, and a minimum of three flags per wire.	El contratista debe señalizar los cables de amarre a 200 pies por delante del área de trabajo, usando señales de colores vivos, con un mínimo de tres señales por cable.
BMP 38	During fire season contractor must have a water source containing a minimum of 300 gallons of water and 250 feet of 1-inch hose on site at all times during operation. The water source must either be self-propelled or always attached to a vehicle capable of moving it to where it is needed. Where access/terrain allows, contractor's water source must always be within 500 feet of the mowing/cutting operation. Excess water must be disposed of in accordance with all laws and regulations.	Durante la temporada de incendio el contratista debe tener en el lugar de trabajo y en todo momento, una reserva de agua de por lo menos 300 galones y una manguera de 250 pies de longitud por 1 pulgada de diámetro. La fuente de agua debe poseer motorización propia o estar siempre acoplada a un vehículo capaz de trasladarse a donde sea necesario. Donde el acceso/terreno lo permita, la fuente de agua del contratista debe estar siempre dentro de un radio de 500 pies de la operación de siega/tala. El exceso de agua debe ser desechado de acuerdo a todas las leyes y regulaciones vigentes.
BMP 39	Mechanical clearing equipment must have at least one 5 lb. or more Class ABC fire extinguisher with current inspection tag mounted in the cab and accessible by the operator.	Los equipos de remoción mecánicos deben tener al menos un extintor de fuego Clase ABC de 5 libras o más con su correspondiente tarjeta de inspección vigente, y debe estar montado en la cabina de forma accesible al operador.

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Mechanical Clearing Operations BMPs BMPs Relativas a Operaciones de Remoción Mecánica		
BMP #	**ENGLISH**	**SPANISH**
BMP 40	During fire season or High Fire Hazard levels contractor must stay on site for a minimum of ½ hour after mechanical clearing operations end for the day to ensure fire safety. During extreme fire levels an additional support person must be dedicated to follow the equipment with a water type back pump and fire line tool. During extreme fire levels mechanical clearing will be limited to the hours of 5:00 AM to 12:30 PM.	Durante la temporada de incendios o de niveles de Peligro Alto de Incendio, el contratista debe permanecer en el lugar de trabajo por lo menos durante media hora después de haber efectuado la última operación de remoción mecánica del día para asegurarse que no existan riesgos de incendio. Cuando se alcancen niveles extremos de riesgo de incendio una persona de soporte adicional debe ser asignada para que siga a los equipos con una de bomba de agua tipo mochila y con herramientas para contención de fuego. Durante niveles de riesgo de incendio extremos, las operaciones de remoción deben limitarse al horario de 5:00 AM a 12:30 PM.
BMP 41	Watercourse protection zones must be marked with brightly colored flagging prior to the start of any mechanical clearing or timber operation. Water classes are defined by the California Forest Practice Rules: 14 CCR 916.5. The following watercourse protection zone widths must be maintained at all times, except on existing roadways: • Class I & II watercourses with a slope < 30%---No heavy equip. within 50 feet • Class I & II watercourses with a slope > 30%---No heavy equip. within 75 feet • Class III & IV watercourse---No heavy equip. within 25 feet Protection zones may be increased in areas with steep slopes or highly erodible soils.	Las zonas de protección de cursos de agua deben ser marcadas con señales de colores vivos previo al comienzo de cualquier operación de remoción mecánica y de talado. Los cursos de agua están definidos por le reglamento 14 CCR 916.5 de las Prácticas Forestales de California. Se deberán mantener en todo momento las siguientes dimensiones de zona de protección a cursos de agua: • Cursos de agua clase I y II con una pendiente <30%---Sin equipo pesado, dentro de 50 pies • Cursos de agua clase I y II con una pendiente >30%---in equipo pesado, dentro de 75 pies • Cursos de agua clase III y IV---Sin equipo pesado, dentro de 25 pies Las zonas de protección deben ser incrementadas en áreas con pendientes mayores o con suelos altamente erosionables.

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