APPENDIX G: PALEONTOLOGICAL RESOURCE ASSESSMENT

PALEOWEST

PALEONTOLOGICAL RESOURCE ASSESSMENT REPORT FOR THE OVERNIGHT SOLAR PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

Draft

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PALEONTOLOGICAL RESOURCE ASSESSMENT REPORT FOR THE OVERNIGHT SOLAR PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA

Prepared by:
Benjamin Scherzer, M.S.
Heather Clifford, M.S.

Prepared for:
Atlantica North America, LLC
1553 West Todd Drive, Suite 204
Tempe, Arizona 85283

Technical Report No.: 23-166

PaleoWest, LLC
55 East Huntington Drive
Suite 238
Arcadia, California 91006
626.408.8006

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MANAGEMENT SUMMARY

PaleoWest, LLC (PaleoWest), at the request of Atlantica North America, LLC, conducted a paleontological resource assessment of the Overnight Solar Project (Project). The proposed Project is approximately 10.5 miles west-northwest of Hinkley, California and would encompass approximately 825 acres. The proposed Project is a new 150-megawatt facility to be constructed on a parcel adjacent to the existing Mojave Solar Project. This report summarizes the methods and results of the paleontological resource assessment of the 825 acres of the Project that is under the jurisdiction of San Bernadino County and subject to the California Environmental Quality Act (CEQA).

This study consisted of a search of museum collections records maintained by the Natural History Museum of Los Angeles County, as well as a comprehensive literature and geologic map review, a field survey, and preparation of this technical report. The purpose of the literature review and museum records search was to identify the geologic unit(s) underlying the Project area, and to determine whether previously recorded paleontological localities occur either within the Project boundary, or elsewhere within the same geologic unit. Following the literature and museum search, a field survey was conducted to visually inspect the ground surface for exposed fossils and to evaluate geologic exposures for their potential to contain preserved fossil material at the subsurface. Using the results of the literature review, museum records search, and field survey, the paleontological resource potential of the Project area was determined in accordance with Society of Vertebrate Paleontology (SVP) guidelines.

Published geologic mapping indicates that the Project area is underlain by Holocene to late Pleistocene alluvium and artificial fill. No significant vertebrate fossil localities have been previously recorded directly within the Project area. At least nine significant vertebrate fossil localities have been previously documented in Pleistocene deposits in the vicinity, most from nearby lacustrine deposits at Harper Lake. These localities included mammoth (*Mammuthus*), horse (Equidae; *Equus*; *E. conversidens*), camelid (Camelidae), antelope (Antilocapridae), hare (Leporidae) (Bell, 2023), cyprinid minnow (*Gila*) (Reynolds and Reynolds, 1994), ostracod (*Limnocythere bradburyi, L. platyforma, L. ceriotuberosa, L. robustaand*) (Garcia et al., 2014; Meek, 1999), Peaclam (*Pisidium compressum*) (Bell, 2023), and California floater (*Anodonta californiensis*) (Meek, 1999; Reynolds and Reynolds, 1994). No paleontological resources were observed during the paleontological field survey.

Through a combination of records search, literature review, and field survey, it was determined that the Project area has a high paleontological sensitivity and the likelihood of impacting scientifically significant vertebrate fossils during Project construction is high. It is recommended that a qualified paleontologist be retained to develop and implement a Paleontological Resources Impact Mitigation Program (PRIMP) during Project construction, because significant fossil localities have been found in the Project vicinity. The PRIMP would include measures such as a pre-construction worker's training, construction monitoring, fossil recovery, final reporting, and museum curation. These measures have been proven to be effective in reducing or eliminating potentially adverse impacts to paleontological resources to a less than significant level pursuant to the requirements of CEQA.

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APPENDICES

Appendix A. Museum Record Search Results

1 INTRODUCTION

At the request of Atlantica North America, LLC, (Atlantica), PaleoWest, LLC (PaleoWest) conducted a paleontological resource desktop review, museum records search, and field survey to assess the paleontological sensitivity of geologic units underlying the Overnight Solar Project (Project), near Hinkley, San Bernardino County, California (Figure 1-1).

PaleoWest conducted a desktop review that included a review of published and unpublished paleontological literature, a search of museum records maintained by the Natural History Museum of Los Angeles County (NHMLAC), and conducted a pedestrian paleontological survey. Using the results of the desktop review and field survey, PaleoWest evaluated the paleontological sensitivity of the geologic units underlying the Project area in accordance with Society of Vertebrate Paleontology (SVP) guidelines (2010). This technical report serves to summarize the findings of the desktop review, museum records search, and field survey, and has been prepared to support environmental review under the California Environmental Quality Act (CEQA).

1.1 PROJECT LOCATION AND DESCRIPTION

The proposed Project area is approximately 10.5 miles (mi) west-northwest of Hinkley in San Bernardino County, California. The Project includes portions of Sections 25 and 36 in Township (T) 11 North (N), Range (R) 4 West (W) on the Lockhart, California, 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle (Figure 1-2). The proposed Project is a new facility to be constructed on an approximately 825-acre parcel in unincorporated San Bernardino County within the community of Lockhart, adjacent to the existing Mojave Solar Project (MSP) under the exclusive control of ASHUSA, Inc.

The Project would interconnect at the Sandlot Substation via the Alba-Sandlot 220-kilovolt (kV) Transmission Line. The Project's design includes different variations of a 150-megawatt (MW) photovoltaic (PV) system that are alternating current (AC) or direct current (DC), coupled with a 150-MW, up to 8-hour Battery Energy Storage System (BESS). The configuration of the PV system includes single axis trackers, bifacial PV modules, and central inverters. The PV system could be coupled with the BESS and configured to allow for an add-on of up to 8 hours of battery capacity. The Project is anticipated to include a control building to contain protective relays and communications infrastructure, and an operations and maintenance building to house technicians, documents, and equipment. A new gen-tie line is also planned for the approximately 1.1 mi to connect with an existing MSP's gen-tie location near the existing Alba Substation. From this point onwards, the existing 230-kV generation-tie transmission line would connect the Project to the existing 230-kV Sandlot Substation and the existing 230-kV Kramer-Coolwater Transmission Line, both owned by Southern California Edison (SCE). Anticipated depths for ground disturbance are up to 1 ft for concrete pads and grading. Pilons will be driven to a depth of 7 ft, but no drilling or excavation will be required.

Figure 1-1. Project vicinity map.

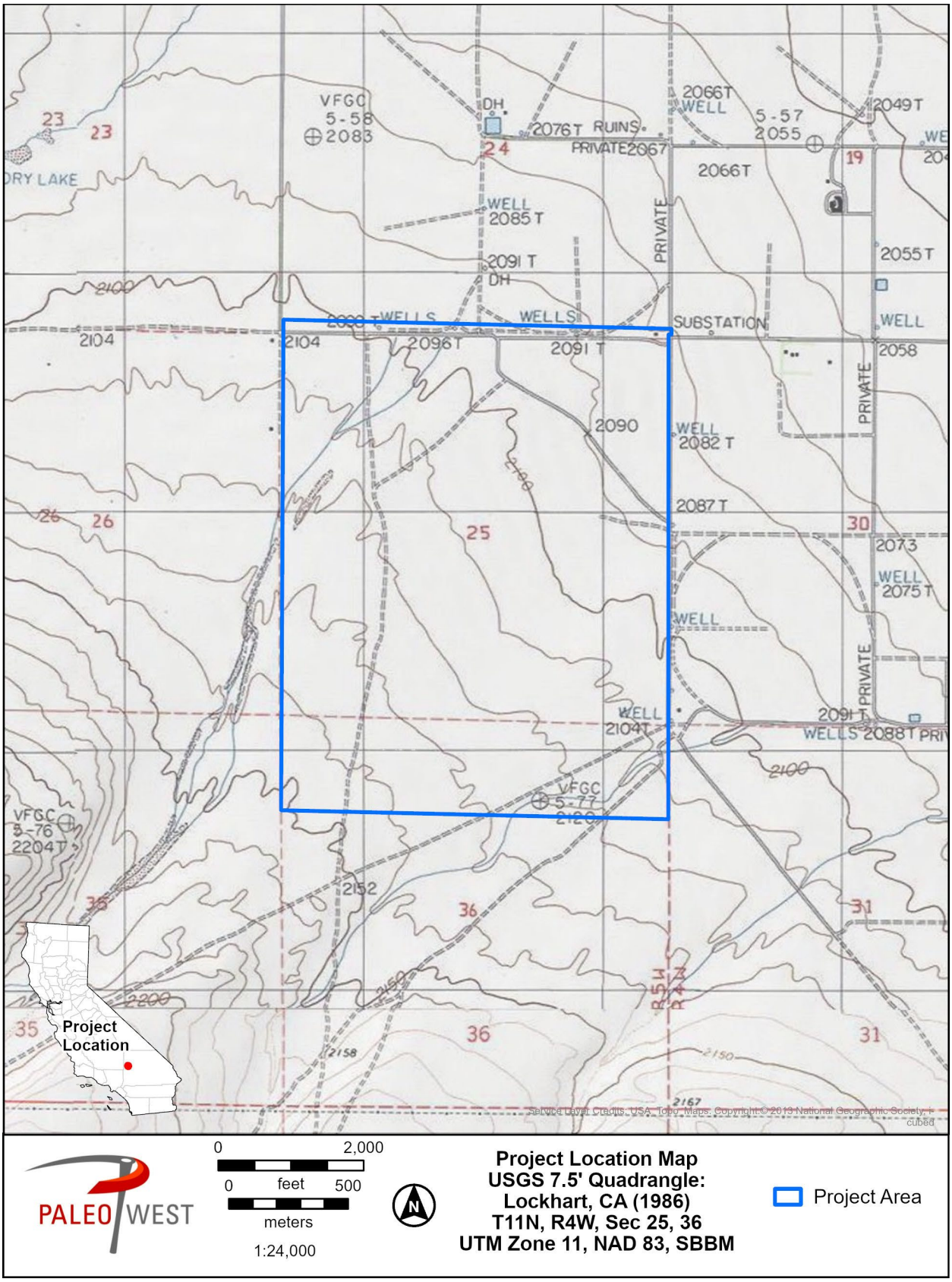

Figure 1-2. Project location map.

1.2 PURPOSE OF INVESTIGATION

The Project has been determined by San Bernardino County (County), acting as the CEQA lead agency, to require preparation of an environmental impact report (EIR) to evaluate the proposed impacts of the Project. This paleontological resource assessment has been prepared in accordance with the County's requirements for compliance with CEQA. The purpose of this investigation is to (1) identify the geologic units within the Project area and assess their paleontological resource potential, (2) determine whether the Project has the potential to adversely impact known scientifically significant paleontological resources, (3) provide Project-specific management recommendations for paleontological resources mitigation, as necessary, and (4) demonstrate CEQA compliance. All work was conducted in accordance with professional standards and guidelines set forth by the SVP (2010) and meets the requirements of CEQA and all other state and local laws and regulations described in Section 2.

1.3 REPORT ORGANIZATION

This report documents the results of PaleoWest's paleontological assessment of the Project area. Section 1 provides the management summary, introduces the scope of work, identifies the Project location, describes the Project, defines the purpose of the investigation, and identifies key personnel. Section 2 outlines the regulatory framework governing the Project and Section 3 defines the paleontological significance and sensitivity criteria used for this study. Section 4 presents the methods used to determine the paleontological sensitivity of the Project area. Sections 5 and 6 provide the results of the background literature and data review and paleontological field survey, and assigns paleontological resource potential classifications for the geologic unit(s) underlying the Project area based upon those findings. Section 7 summarizes conclusions, Section 8 provides management recommendations, and Section 9 lists the references cited (Table 1-1).

Table 1-1. Project Summary

Project Name	Overnight Solar Project
Project Description	The proposed Project is approximately 10.5 mi west-northwest of Hinkley in San Bernardino County. The Project includes Section 25 and the northern ¼ of Section 36 in T11N, R4W on the Lockhart, California, 7.5-minute USGS topographic quadrangle. The proposed Project is a new facility proposed to be constructed on an approximately 825-acre parcel adjacent to the existing MSP that is under the exclusive control of ASHUSA, Inc. The Project would interconnect at the Sandlot Substation via the Alba-Sandlot 220-kV Transmission Line. The Project's design includes different variations of a 150-MW PV system that are AC or DC, coupled with a 150-MW, up to 8-hour BESS. The configuration of the PV system includes single axis trackers, bifacial PV modules, and central inverters. The PV system could be coupled with the BESS and configured to allow for an add-on of up to 8 hours of battery capacity. Overnight Solar Project is anticipated to include a control building to contain protective relays and communications infrastructure, and an operations and maintenance building to house technicians, documents, and equipment. A new gen-tie line is also planned for the approximately 1.1 mi to connect with an existing MSP's gen-tie location near the existing Alba Substation. From this point onwards, existing 230-kV generation-tie transmission line would connect the Project to the existing 230-kV Sandlot Substation and the existing 230-kV Kramer-Coolwater Transmission Line, both owned by SCE.

Acreage Surveyed	825
PLSS Information	Sections 25 and 36, T11N, R5W
USGS 7.5' Topo Map(s)	1986 Lockhart, California USGS 7.5-minute quadrangle
Geologic Map(s)	Amoroso, L., and D.M. Miller, 2006, Preliminary surficial geologic map of the Cuddeback Lake 30' x 60' quadrangle, California: U.S. Geological Survey, Open-File Report OF-2006-1276, scale 1:100,000.
Surveyed Geologic Units	Made land or artificial fill (ml), Active alluvial fan deposit composed of grus (Qaag), Young alluvial fan deposit (Qya), Young mixed alluvial and eolian sand deposit (Qyae), and Young alluvial fan deposit composed of grus (Qyag).
Surveyor(s)	Benjamin Scherzer, M.S., Lanae Caldwell, B.A.
Survey Date(s)	March 20 and 21, 2023
Previously Documented Fossil Localities	Museum records search and literature search indicate at least nine fossil localities were previously documented in nearby Harper Dry Lake; no fossil localities have been previously documented within the Project area.
New Fossil Localities Documented During Survey	No fossil localities identified.

1.4 PERSONNEL

The pedestrian field survey was performed by PaleoWest's Senior Paleontologist Benjamin Scherzer, M.S., and Staff Paleontologist Lanae Caldwell, B.A. This report was prepared by Scherzer, with Quality Assurance review by Senior Paleontologist Heather Clifford, M.S., who also directed and supervised the survey.

2 REGULATORY FRAMEWORK

Paleontological resources (i.e., fossils) are considered nonrenewable scientific resources because once destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal, State, and local laws and regulations. Laws pertinent to this Project are discussed below.

2.1 STATE

2.1.1 California Environmental Quality Act

CEQA requires that public agencies and private interests identify the potential environmental consequences of their projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code [PRC] Section 5020.1 [b]). Appendix G in Section 15023 provides an Environmental Checklist of questions (PRC 15023, Appendix G, Section VII, Part f) that includes the following: "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?"

CEQA does not define "a unique paleontological resource or site." However, the SVP has provided guidance specifically designed to support state and federal environmental review. The SVP broadly defines significant paleontological resources as follows:

> Fossils and fossiliferous deposits consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years). (SVP, 2010, page 11)

Significant paleontological resources are determined to be fossils, or assemblages of fossils, that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology, paleoecology, paleophylogeography, or depositional histories. New or unique specimens can provide new insights into evolutionary history; moreover, additional specimens of even well represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiometric dating is possible. As such, common fossils (especially vertebrates) may be scientifically important, and therefore considered significant.

2.1.2 California Public Resources Code

Section 5097.5 of the PRC states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

As used in this PRC section, "public lands" means lands owned by, or under the jurisdiction of, the state or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, public agencies are required to comply with PRC Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

2.2 LOCAL

San Bernardino County has goals and policies related to paleontological resource issues in their Countywide Policy Plan (San Bernardino County, 2020). The following presents the countywide goal for paleontological resources and their associated policies and programs.

GOAL CR-2 Historic resources (buildings, structures, or archaeological resources) and paleontological resources that are protected and preserved for their cultural importance to local communities as well as their research and educational potential.

CR-2.1 **National and state historic resources.** We encourage the preservation of archaeological sites and structures of state or national significance in accordance with the Secretary of Interior's standards.

CR-2.2 **Local historic resources.** We encourage property owners to maintain the historic integrity of resources on their property by (listed in order of preference): preservation, adaptive reuse, or memorialization.

CR-2.3 **Paleontological and archaeological resources.** We strive to protect paleontological and archaeological resources from loss or destruction by requiring that new development include appropriate mitigation to preserve the quality and integrity of these resources. We require new development to avoid paleontological and archeological resources whenever possible. If avoidance is not possible, we require the salvage and preservation of paleontological and archeological resources.

CR-2.4 **Partnerships.** We encourage partnerships to champion and financially support the preservation and restoration of historic sites, structures, and districts.

CR-2.5 **Public awareness and education.** We increase public awareness and conduct education efforts about the unique historic, natural, tribal, and cultural resources in San Bernardino County through the County Museum and in collaboration with other entities and organizations.

2.3 DEFINITION OF PALEONTOLOGICAL RESOURCES AND SIGNIFICANCE CRITERIA

Paleontological resources are the evidence of once-living organisms preserved in the rock record. They include both the fossilized remains of ancient plants and animals, and the traces thereof (trackways, imprints, burrows, etc.). In general, fossils are greater than 5,000 years old (older than Middle Holocene) and are typically preserved in sedimentary rocks. Although rare, fossils can also be preserved in volcanic rocks and low-grade metamorphic rocks formed under certain conditions (SVP, 2010).

Significant paleontological resources are defined as "identifiable" vertebrate fossils, uncommon invertebrate, plant, and trace fossils that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, or biochronological data (SVP, 2010). These data are important because they are used to examine evolutionary relationships, provide insight into the development of and interaction between biological communities, establish time scales for geologic studies, and for many other scientific purposes (Scott and Springer, 2003; SVP, 2010).

3 PALEONTOLOGICAL SENSITIVITY AND SIGNIFICANCE CRITERIA

Paleontological resources are the remains of prehistoric animal and plant life and as such, they are nonrenewable resources. Any adverse impacts to paleontological resources have the potential to be significant under CEQA guidelines and may require mitigation. This assessment follows guidelines and significance criteria specified by the SVP Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources (SVP, 2010).

3.1 PROFESSIONAL STANDARDS AND SVP CATEGORIES OF PALEONTOLOGICAL RESOURCE SENSITIVITY

On non-federal lands, and in the absence of specific agency guidelines, most professional paleontologists in California adhere to SVP guidelines (2010). These guidelines establish detailed protocols for the assessment of the paleontological resource potential (i.e., "sensitivity") of a project area, and outline measures to follow to mitigate adverse impacts to known or unknown fossil resources during project development. To prevent project delays, SVP highly recommends that the owner or developer retain a qualified professional paleontologist in the advance planning phases of a project to conduct an assessment and to implement paleontological mitigation during construction, as necessary.

Using baseline information gathered during a paleontological resource assessment, the paleontological resource potential of the geologic unit(s) (or members thereof) underlying a project area can be assigned to one of four categories defined by SVP (2010). These categories include high, undetermined, low, and no potential. The criteria for each sensitivity classification and the corresponding mitigation recommendations are summarized in Table 3-1 below.

If a project area is determined to have high or undetermined potential for paleontological resources following the initial assessment, then SVP recommends that a Paleontological Resources Mitigation Plan (PRMP) be developed and implemented during the construction phase of a project. The mitigation plan describes, in detail, when and where paleontological monitoring will take place and establishes communication protocols to be followed if an unanticipated fossil discovery is made during project development. If significant fossil resources are known to occur within the boundary of the project and have not been collected, then the plan will outline the procedures to be followed prior to any ground-disturbing activities (i.e., preconstruction salvage efforts or avoidance measures, including fencing off a locality). Should microfossils be known to occur in the geologic unit(s) underlying the project area or suspected to occur, then the plan will describe the methods for matrix sampling and screening.

The PRMP should be prepared by a qualified professional paleontologist and developed using the results of the initial paleontological assessment and survey. Elements of the plan can be adjusted throughout the course of a project as new information is gathered and conditions change, so long as the lead agency is consulted and all parties are in agreement. For example, if after 50 percent of earth-disturbing activities have occurred in a particular unit or area, and no fossils have been discovered, then the Project Paleontologist can reduce or eliminate monitoring efforts in that unit or area.

Table 3-1. Paleontological Sensitivity Categories

Resource Potential*	Criteria	Mitigation Recommendations
High Potential (sensitivity)	Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or trackways are also classified as significant.	Typically, a field survey (dependent on field conditions) as well as onsite construction monitoring will be required. Any significant specimens discovered will need to be prepared, identified, and curated into a museum. A final report documenting the significance of the finds will also be required.
Low Potential (sensitivity)	Sedimentary rock units that are potentially fossiliferous but have not yielded fossils in the past or contain common and/or widespread invertebrate fossils of well documented and understood taphonomic, phylogenetic species and habitat ecology. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils prior to the start of construction. Generally, these units will be poorly represented by specimens in institutional collections and will not require protection or salvage operations. However, as excavation for construction gets underway it is possible that significant and unanticipated paleontological resources might be encountered and require a change of classification from Low to High Potential and, thus, require monitoring and mitigation if the resources are found to be significant.	Mitigation is not typically required.
Undetermined Potential (sensitivity)	Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.	A field survey is required to further assess the unit's paleontological potential.
No Potential	Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources.	No mitigation required.

*Adapted from SVP (2010).

4 METHODS

Paleontological resources are not found in "soil," but are contained within the geologic deposits or bedrock that underlie the soil layer. Therefore, to ascertain whether a particular study area has the potential to contain significant fossil resources at the subsurface, it is necessary to review relevant scientific literature and geologic mapping to determine the geology and stratigraphy of the area. Further, to delineate the boundaries of an area of

paleontological sensitivity, it is necessary to determine the extent of the entire geologic unit, as paleontological sensitivity is not limited to surface exposures of fossil material.

The paleontological scope of work included two components: completing the background literature and data review, and a pedestrian field survey. This section describes the methods used to complete the paleontological work.

4.1 BACKGROUND LITERATURE AND DATA REVIEW

The background literature and data review included the following: (1) A geologic map review to determine the mapped geologic units within the Project area, (2) a museum and agency record search to locate any previously documented fossil localities within the Project area or within a 1-mi radius, and (3) a literature search.

The USGS *Preliminary surficial geologic map of the Cuddeback Lake 30' x 60' quadrangle* (1:100,000 scale; Amoroso and Miller, 2006) was used as the geologic unit reference for the Project area. The record search was performed at the NHMLAC. Informal records searches were also conducted of the online University of California Museum of Paleontology collections (UCMP, 2023) and San Diego Natural History Museum collections (SDNHM, 2023). The online Paleobiology Database (PBDB, 2023), FAUNMAP (Graham and Lundelius, 2010), Integrated Digitized Biocollections (iDigBio, 2023), and other published and unpublished geological and paleontological literature of the area were also examined.

4.2 FIELD SURVEY

A pedestrian survey was conducted on March 20 and 21, 2023. The purpose of the field survey was to visually inspect the ground surface for exposed fossils, and to evaluate geologic exposures for their potential to contain buried fossils. Field data, including geology observations and paleontological localities, were collected and recorded using a digital camera, GPS unit with sub-meter accuracy, and a digital database loaded on tablet computers.

4.3 SUBMITTALS

An electronic copy of the final survey report will be submitted to San Bernardino County. PaleoWest will retain a permanent copy of all reports, notes, and data.

5 GEOLOGY AND PALEONTOLOGY OF THE PROJECT AREA

5.1 GEOLOGIC SETTING

The Project area is in the southwestern portion of the Mojave Desert geomorphic province. The Mojave Desert is a broad interior region of isolated mountain ranges separated by expanses of alluvial basins and desert plains. The Mojave Desert is in between two prominent faults, the Garlock fault to the northwest and the San Andreas fault to the southwest (California Geological Survey, 2002). The Mojave Desert was formed as a result of Proterozoic (2,500 million years ago [Ma] to 542 Ma) and Paleozoic (542–252 Ma) subsidence and sediment accumulation; Mesozoic (252–66 Ma) volcanism, plutonic intrusion, regional uplift, and metamorphism; and

ongoing Cenozoic (66 Ma–present) uplift, depression, erosion, volcanism, and crustal deformation associated with movement along the Garlock and San Andreas faults (Dibblee, 1967). The western Mojave Desert in the vicinity of the Project area is on an uplifted basement block of Proterozoic to Mesozoic crystalline bedrock, covered by a thin veneer of Cenozoic sedimentary rocks and Quaternary (2.6 Ma–present) alluvium, fluvial deposits from the Mojave River, and lacustrine deposits from ancient pluvial lakes and modern playas (Garfunkel, 1974).

The Project area is less than 1 mi north of the active right-lateral, northwest-trending Lenwood-Lockhart fault, and approximately 1 mi south of the shoreline of Harper Lake, a dry lake (playa) that occupies the endorheic Harper Basin (Amoroso and Miller, 2006). Ancient pluvial Harper Lake was part of the Pleistocene (2 .6 Ma–11,700 years ago) Mojave River drainage system; it had its high-stand at roughly 2,170 feet (ft) amsl, approximately 45,000 years ago, based on the ancient shoreline geomorphology in southeastern Harper Basin (Dibblee and Minch, 2008; Enzel et al., 2003; Garcia et al., 2013). The elevation of the Project area is approximately 2,120 ft amsl, roughly 50 ft below the Harper Lake high-stand. Although the Harper Lake deposits are not mapped on the ground surface in the Project area, the fine-grained mud deposits likely shallowly underlie or interfinger with surficial alluvial fan deposits derived from the nearby Kramer Hills and The Buttes (Amoroso and Miller, 2006).

5.2 SITE-SPECIFIC GEOLOGY AND PALEONTOLOGY

The geology of the Project area is mapped at a scale of 1:100,000 by Amoroso and Miller (2006) and is underlain by five geologic units. These geologic units and their paleontological sensitivity are discussed below and shown in Figure 5-1.

5.2.1 Made Land or Artificial Fill (ml)

Made land or artificial fill (ml) is composed of modern surficial material moved for mining, construction, and agriculture that has been extensively disturbed (Amoroso and Miller, 2006). This unit occurs as a prominent ridge extending due south in the northwest portion of the Project area, and along the access road on the north border.

5.2.2 Active Alluvial Fan Deposit Composed of Grus (Qaag)

Active alluvial fan deposit composed of grus (Qaag) is moderately to poorly sorted, poorly bedded to massive, loose to very weakly consolidated sand and fine gravel derived from nearby igneous bedrock sources in the latest Holocene (Amoroso and Miller, 2006). This unit occurs in combination with *Young alluvial fan deposit composed of grus* (Qyag) (below) in northeast-oriented washes in the northwest and southeast corners of the Project area.

5.2.3 Young Alluvial Fan Deposit (Qya)

Young alluvial fan deposit (Qya) is composed of moderately to poorly sorted, poorly bedded to massive, loose to poorly consolidated sand, silt, sandy gravel, and cobbles from the Holocene and latest Pleistocene (Amoroso and Miller, 2006). This unit underlies most of the northeastern half of the Project area.

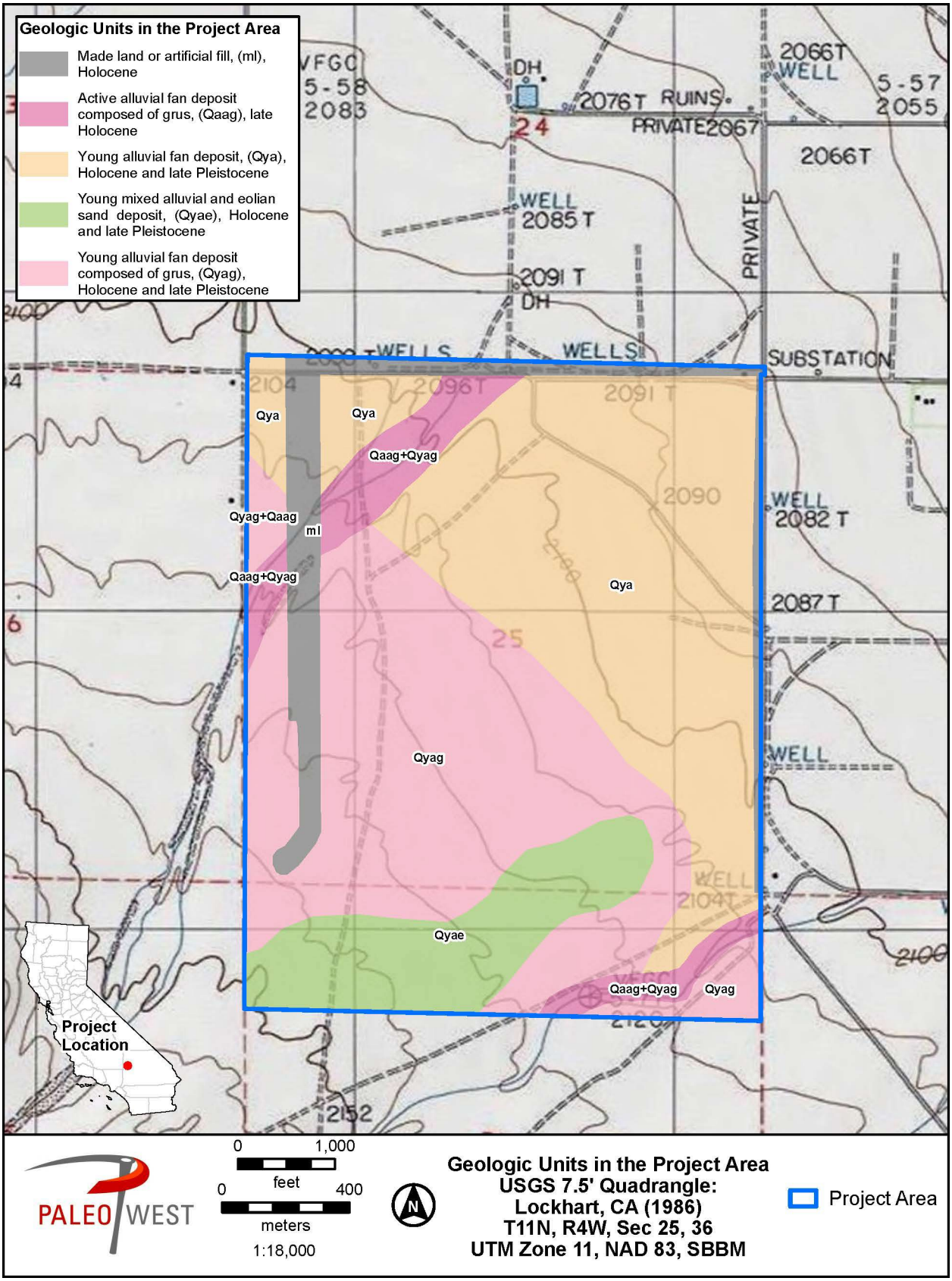

Figure 5-1. Geologic units in the Project area, modified from Amoroso and Miller (2006).

5.2.4 Young Mixed Alluvial and Eolian Sand Deposit (Qyae)

Young mixed alluvial and eolian sand deposit (Qyae) is composed of alluvial deposits (equivalent to Qaag and Qya alluvial fan deposits described above), combined with moderately to well sorted loose sand and silt from the Holocene and latest Pleistocene (Amoroso and Miller, 2006). This unit is present in the southwestern portion of the Project area.

5.2.5 Young Alluvial Fan Deposit Composed of Grus (Qyag)

Young alluvial fan deposit composed of grus (Qyag) is moderately to poorly sorted, poorly bedded to massive, loose to very weekly consolidated sand and fine gravel derived from igneous bedrock sources from the Holocene and latest Pleistocene (Amoroso and Miller, 2006). This unit underlies most of the southwestern half of the Project and occurs in combination with *Active alluvial fan deposit composed of grus* (Qaag) in northeast-oriented washes in the northwest and southeast corners of the Project area.

Holocene deposits are typically too young to have accumulated or preserved enough biological material to qualify as paleontological resources; however, Holocene deposits can overlie Pleistocene deposits, which elsewhere in San Bernardino County have produced remains of a diverse terrestrial fauna, including ground sloth, deer, mammoth, camel, horse, bison, badger, mole, rabbit, gray fox, coyote, snake, and rodent (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991).

6 RESULTS

This section summarizes the results of the record search, pedestrian field survey, and paleontological sensitivity assessment of the Project area.

6.1 RECORD SEARCH RESULTS

The NHMLAC does not have any previously recorded vertebrate localities within the Project boundaries; however, the museum identifies six significant vertebrate localities nearby from Pleistocene sedimentary deposits (Bell, 2023). Additional records and literatures searches produced at least three additional localities in Pleistocene deposits from the nearby Harper Dry Lake (Garcia et al., 2014; Meek, 1999; Reynolds and Reynolds, 1994). The significant vertebrate fossil localities reported in the vicinity of the Project area are summarized below in Table 6-1. The detailed results of the record searches are included in Appendix A.

Table 6-1. Museum Fossil Localities Documented in Vicinity of the Project

Locality No.	Geologic Unit[1]	Age	Taxa	Depth
LACM VP CIT 513, 514[2]	Unknown sandstone	Pleistocene	Uncatalogued vertebrates	Surface
LACM VP CIT209[2]	Shoemaker Gravel Formation	Pleistocene	Mammoth (*Mammuthus*), horse (*Equus*)	Unknown
LACM IP 4736[2]	Unknown	Pleistocene	Peaclam (*Pisidium compressum*)	Unknown
LACM IP 445[2]	Unknown lacustrine	Pleistocene	Unspecified invertebrates	Unknown

Locality No.	Geologic Unit[1]	Age	Taxa	Depth
LACM VP 5853, 5854, 6263-6267[2]	Unknown mudstone	Pleistocene	Camel family (Camelidae), horse family (Equidae), antelope (Antilocapridae), hare (Leporidae)	Surface
LACM VP 3721[2]	Unknown	Pleistocene	Horse (*Equus conversidens*)	63 ft below ground surface (bgs)
Southern and southwestern Harper Basin[3]	Playa deposits	Pleistocene	California floater (*Anodonta californiensis*), cyprinid minnows (*Gila*)	Unknown
Harper Lake[4]	Playa deposits	Pleistocene	Ostracods (*Limnocythere bradburyi*, *L. platyforma*, *L. ceriotuberosa*, *L. robustaand*), California floater (*A. californiensis*)	Unknown
Mountain View Hill and Black Mountain Tomobolo[5]	Carbonate mud and fine sand (Playa deposits)	Pleistocene	Ostracod (*L. bradburyi*, *L. platyforma*, *L. ceriotuberosa*)	4 inches (in) to 6.75 ft bgs

[1]Amoroso and Miller, 2006.
[2]Bell, 2023.
[3]Reynolds and Reynolds, 1994.
[4]Meek, 1999.
[5]Garcia et al., 2014.

6.2 FIELD SURVEY RESULTS

The pedestrian survey was directed and supervised by Senior Paleontologist Heather Clifford. The survey was conducted on March 20 and 21, 2023 by Senior Paleontologist Benjamin Scherzer and Staff Paleontologist Lanae Caldwell. PaleoWest completed an intensive pedestrian survey of the entire Project area to observe the surface exposures of units depicted in published geologic maps and inspect the ground surface for evidence of paleontological resources. Tablets equipped with topographic maps, geologic maps, and paleontological sensitivity GIS data were used. Notes were taken on the lithology observed at the ground surface, and photographs were taken to document the survey.

Initial surveying started at the Project area's west end using 10-meter (m) north-south trending transects. When no paleontological resources were observed after 300 acres, the transects were increased to 50 m for the remainder of the survey. The ridge of *Made land or artificial fill* (ml) in the northwest portion of the Project area was not surveyed, due to its disturbed nature, but it appeared that disturbance associated with the ml did not extend below the natural ground surface. Vegetation was widespread, primarily as dense undergrowth throughout the Project area, making ground visibility approximately 50 percent (Figure 6-1).

The terrain in the Project area consists of a flat to gently sloping alluvial plane, occasionally cut by shallow (2–3 ft) washes. The Project area showed signs of extensive pasture use, including modern sheep bones, agricultural refuse, and remains of elevated water tanks. Ground surface lithology was a consistent thin layer of tan to orange, medium to coarse-grained sand overlying massive, light to medium brown silt and clay. Cutbanks in recent washes showed massive to

horizontally bedded, moderately consolidated, tan, medium-grained sand to pebbles (Figure 6-2).

No paleontological resources were observed during the survey. Although no significant fossils were found on the surface, it is likely that fine-grained fossil-bearing strata are present in deeper alluvial to lacustrine Pleistocene deposits and may be encountered at depth in the Project area (SWCA Environmental Consultants [SWCA], 2011).

6.3 DETERMINATION OF PALEONTOLOGICAL RESOURCE POTENTIAL WITHIN THE PROJECT AREA

This report uses the SVP (2010) paleontological sensitivity classification to assess paleontological sensitivity and the level of effort required to manage potential impacts to significant fossil resources. Using this system, the sensitivity of geologic units was determined based on the relative abundance, and risk of adverse impacts to, vertebrate fossils and significant invertebrates and plants. As a result of the paleontological resource record search and pedestrian field survey, paleontological sensitivity rankings were assigned for the geologic units within the Project area.

The ml has no paleontological sensitivity, due to its young age and disturbed nature; however, the ml was observed to be surficial and likely did not involve substantial subsurface disturbance. Holocene deposits of Qya, Qyae, Qyag, and Qaag similarly have a low paleontological sensitivity, but transition into older Pleistocene deposits at depth.

Figure 6-1. Overview of Project area from southeast corner, showing dense vegetation; facing west.

Figure 6-2. Stratigraphy exposed in cutbank of recent wash in northwest corner of the Project area, hat for scale.

Fossil localities documented in the vicinity of the Project area are from lacustrine deposits of Pleistocene Harper Lake (Amoroso and Miller, 2006; Bell, 2023; Garcia et al., 2014; Meek, 1999; Reynolds and Reynolds, 1994), with non-lacustrine fossil localities only documented at least 20 mi from the Project area (Bell, 2023). The Holocene alluvial units underlying the Project area are assigned a low paleontological sensitivity near the surface, but may transition with depth into older Pleistocene deposits, or given the proximity to Harper Lake and the Project's elevation below the lake's high-stand, may interfinger with underlying lacustrine deposits at depth. For example, at the adjacent Abengoa Solar Project, remains of freshwater invertebrates, terrestrial small vertebrates, and large mammals were encountered in a 5-ft-deep trench (SWCA, 2011). As a result, Qya, Qyae, Qyag, and Qaag should be assigned a high paleontological sensitivity below 5 ft. Similarly, the artificial fill mapped in ml should have no paleontological sensitivity near the surface, and a high sensitivity at 5 ft bgs (Table 6-2; Figure 6-3).

Table 6-2. Geologic Units in the Project and their Paleontological Sensitivity

Geologic Unit	Age	Fossils	Paleontological Sensitivity and Monitoring Recommendations[1]
Made land or artificial fill (ml)	Latest Holocene	None	None to 5 ft bgs, high 5 ft bgs; monitoring recommended below 5 ft.
Alluvial fan deposit composed of grus (Qaag)	Latest Holocene		Low to 5 ft bgs, high 5 ft bgs; monitoring recommended below 5 ft.
Young alluvial fan deposit (Qya)	Latest Pleistocene to Holocene	Mammoth (Mammuthus); horse (Equidae, *Equus*; *E. conversidens*), camel family (Camelidae), antelope (Antilocapridae), hare (Leporidae)	
Young mixed alluvial and eolian sand deposit (Qyae)	Latest Pleistocene to Holocene		
Young alluvial fan deposit composed of grus (Qyag)	Latest Pleistocene to Holocene		

[1]SVP, 2010.

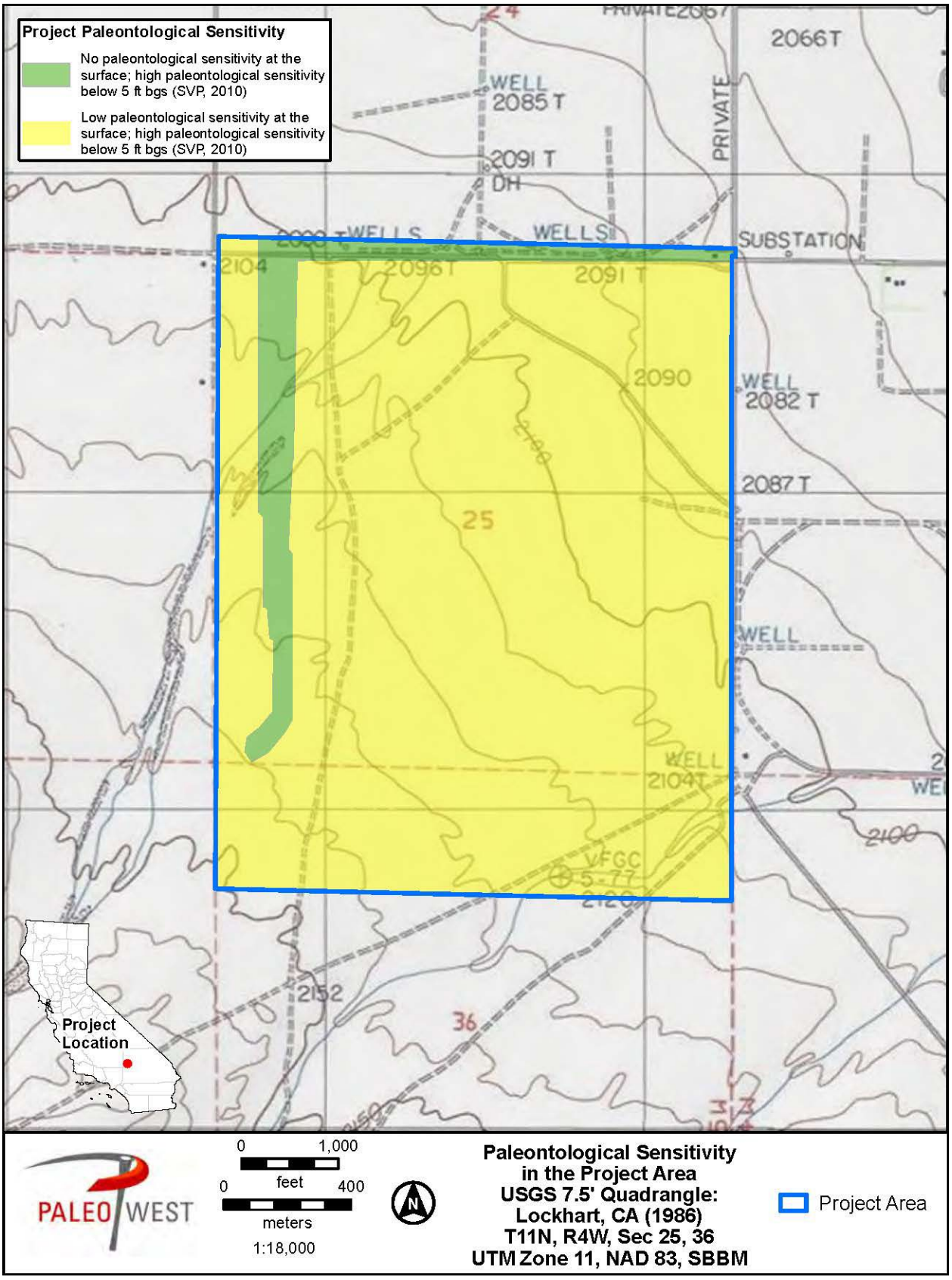

Figure 6-3. Paleontological sensitivity of the Project area, per SVP (2010).

7 CONCLUSIONS

This paleontological resource assessment is based on the results of a museum records search, review of available geologic and paleontological literature, and a pedestrian survey of the Project area.

Artificial fill, ml, has no paleontological sensitivity, but may be underlain by Pleistocene geologic units with high paleontological sensitivity. The alluvial units, Qya, Qyae, Qyag, and Qaag have low sensitivity near the surface and high sensitivity below 5 ft bgs. This is due to the potential for fossiliferous Pleistocene deposits at depth. As a result, these units in the Project area may contain an unknown number of fossil resources, although their significance, abundance, and predictability of occurrence may vary due to lithology, grain size and depositional environment of the deeper members.

In general, the potential for a given project to result in negative impacts to paleontological resources is directly proportional to the amount of ground disturbance associated with the project; thus, the higher the amount of ground disturbances within geological deposits with a known paleontological sensitivity, the greater the potential for negative impacts to paleontological resources. Because this Project entails grading and excavations for the installation of a solar energy development, new ground disturbances are anticipated. Therefore, pursuant to County and CEQA requirements and in accordance with SVP (2010) standards, further paleontological resource management, including construction monitoring, is recommended. It is recommended that a qualified paleontologist be retained to develop and implement a PRIMP during Project construction. In addition, all construction workers and other on-site personnel shall receive environmental awareness training on paleontological resources. Detailed management recommendations are outlined in the following section.

8 MANAGEMENT RECOMMENDATIONS

These measures have been developed in accordance with SVP (2010) guidelines and would satisfy the requirements of CEQA and San Bernardino County (2015). They have been used by professional paleontologists throughout California and have been effective in reducing or eliminating adverse impacts to paleontological resources.

8.1 WORKER'S ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

Prior to the start of construction, all field personnel will receive a worker's environmental awareness training on paleontological resources. The training will provide a description of the laws and ordinances protecting fossil resources, the types of fossil resources that may be encountered in the Project area, and the role of the paleontological monitor; it also outlines steps to follow in the event that a fossil discovery is made and provides contact information for the Project Paleontologist. The training will be developed by the Project Paleontologist and can be delivered concurrent with other training, including cultural, biological, safety, et cetera.

8.2 PALEONTOLOGICAL MITIGATION MONITORING

Prior to the commencement of ground disturbing activities, a professional paleontologist will be retained to prepare and implement a PRIMP for the proposed Project. The PRIMP will describe the monitoring required during excavations. Paleontological resource monitoring is recommended for any ground-disturbing activities (e.g., grading, excavation, etc.) that will impact previously undisturbed Qya, Qyae, Qyag, and Qaag below 5 ft bgs, according to the criteria set forth by SVP (2010). In addition, ground disturbance below the artificial fill (ml) should be observed below 5 ft bgs to determine if underlying Pleistocene deposits are being disturbed and would require monitoring.

8.3 FOSSIL DISCOVERIES

If a paleontological resource is discovered, the monitor will have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and, if appropriate, collected. If the resource is determined to be of scientific significance, the Project Paleontologist shall complete the following:

1. Salvage of Fossils. If fossils are discovered, all work in the immediate vicinity should be halted to allow the paleontological monitor, and/or Project Paleontologist to evaluate the discovery and determine if the fossil may be considered significant. If the fossils are determined to be potentially significant, the Project Paleontologist (or paleontological monitor) should recover them, following standard field procedures for collecting paleontological resources, as outlined in the PRIMP prepared for the Project. Typically, fossils can be safely and quickly salvaged by a single paleontologist without disrupting construction activity. In some cases, larger fossils (such as complete skeletons or large mammal fossils) require more extensive excavation and longer salvage periods. In this case, the paleontologist should have the authority to temporarily direct, divert or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.
2. Fossil Preparation and Curation. Upon completion of laboratory preparation and fossil identification, all scientifically significant specimens recovered as a result of the Project will be delivered to the San Bernardino County Museum for permanent curation and storage. The fossil specimens will be accompanied by field notes, photographs, locality data, a signed deed of gift from the landowner, and a copy of the final technical report. The cost of delivery and curation is assessed by the repository and is the responsibility the landowner, who will provide confirmation to the County that such funding has been paid to the institution. Any non-significant fossils collected from the Project area will first be offered to the landowner, and if unwanted, be discarded or retained for educational purposes.

8.4 FINAL PALEONTOLOGICAL MITIGATION REPORT

Upon completion of ground disturbing activity (and curation of fossils if necessary) the Project Paleontologist should prepare a final mitigation and monitoring report outlining the results of the mitigation and monitoring program. The report should include discussion of the location, duration, and methods of the monitoring, as well as stratigraphic sections, any recovered fossils, the scientific significance of those fossils, and where fossils were curated.

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Appendix A.
Museum Record Search Results

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Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

March 12, 2023

PALEOWEST
Attn: Benjamin Scherzer

re: Paleontological resources for the Overnight Solar Project, #23-0087.

Dear Benjamin:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Overnight Solar Project area as outlined on the portion of the Lockhart, CA (1986) USGS topographic quadrangle map that you sent to me via e-mail on February 21, 2023. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP CIT 513, 514	Alvord Mountains; Alvord Mountain East quad	Unknown (Fine gray sandstones with rounded tuff fragments. Outcropping as a 3-4 ft.; north dipping member; in the continental series about 300' above the lava flows)	Uncatalogued vertebrates	Surface
LACM VP CIT209	10 mi N, 1 mi W of Victorville, Calif., bluffs on W side Mojave River	Shoemaker Gravel Formation	Mammoth (*Mammuthus*); Horse (*Equus*)	Unknown
LACM IP 4736	Harper Dry Lake	Unknown formation (Pleistocene)	Peaclam (*Pisidium compressum*)	Unknown
LACM IP 445	Lake Rogers; Edwards Air Force Base	unknown formation (upper Pleistocene lacustrine deposits)	Invertebrates (unspecified)	Unknown
LACM VP 5853, 5854, 6263 - 6267	East side of Mesquite Canyon road; 5 km north of intersection of Randsburg with Red	Undetermined Pleistocene formation (massive noduliferous [calcium carbonate] green silty mudstone)	Camel family (Camelidae), horse family (Equidae), antelope (Antilocapridae), hare	Surface

	Rock Road		(Leporidae)	
LACM VP 3721	Goler Gulch; near Randsburg; California	Unknown formation (Pleistocene)	Horse *(Equus conversidens)*	63 feet bgs

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

For General Inquiries:
T:886.563.2536
T: 602.254.6280
info@paleowest.com

Los Angeles, CA
626.408.8006
55 East Huntington Drive
Suite 238
Arcadia, California 91006
info@paleowest.com

www.paleowest.com