Appendix E

Paleontological Resources Assessment

PALEOWEST

T: 909.283.7533
F: 602.254.6280
info@paleowest.com

REDLANDS, CALIFORNIA
301 9th Street, Suite 114
Redlands, CA 92374

January 5, 2023

Jessica Haughton
Synergy Consulting, CA
410 Patti Ann Woods Drive
Henderson, Nevada 89002
Transmitted via email to jhaughton@synergyconsultingca.com

RE: Paleontological Resource Assessment for the Inland Empire North Logistics Center Project, Town of Apple Valley, San Bernardino County, California

Dear Jessica Haughton,

At the request of Synergy Consulting CA, PaleoWest, LLC (PaleoWest) conducted a paleontological resource assessment for the Inland Empire North Logistics Center Project (Project) in the Town of Apple Valley, San Bernardino County, California. The goal of the assessment was to identify the geologic units that may be impacted by the development of the Project, determine the paleontological sensitivity of geologic units within the Project area, assess the potential for impacts to paleontological resources from the development of the Project, and recommend mitigation measures to avoid or mitigate impacts to scientifically significant paleontological resources, as necessary.

This paleontological resource assessment included a fossil locality records search conducted by the Natural History Museum of Los Angeles County (NHMLA). The records search was supplemented by a review of existing geologic maps and primary literature regarding fossiliferous geologic units within the proposed Project vicinity and region. This technical memorandum, which was written in accordance with the guidelines set forth by the Society of Vertebrate Paleontology (SVP) (2010), has been prepared to support environmental review under the California Environmental Quality Act (CEQA). It is the understanding of PaleoWest that the Town of Apple Valley is acting as the CEQA lead agency for the portion of the Project located within its jurisdiction; the city of Victorville is the CEQA lead agency for the portion of the Project within its jurisdiction

PROJECT LOCATION AND DESCRIPTION

The proposed Project involves the development of a warehouse complex. The Project area encompasses approximately 82 acres of vacant land within Assessor's Parcel Numbers (APNs) 0463-213-05, -07, -08, -09, -16, -33, -34, -35, and -36 in the town of Apple Valley in San Bernardino County, California (Figure 1). The Project area is bounded to the north by Cardova Road, to the west by Dachshund Avenue, to the south by Shepard Road, and to the east by Navajo Road. The Project area is within the southeastern quarter of Section 16 of Township (T) 6 North (N), Range (R) 3 West (W), San Bernardino Baseline and Meridian (SBBM), as depicted on the 1975 Apple Valley North, California 7.5-minute U.S. Geological Survey (USGS)

Figure 1. Project vicinity map.

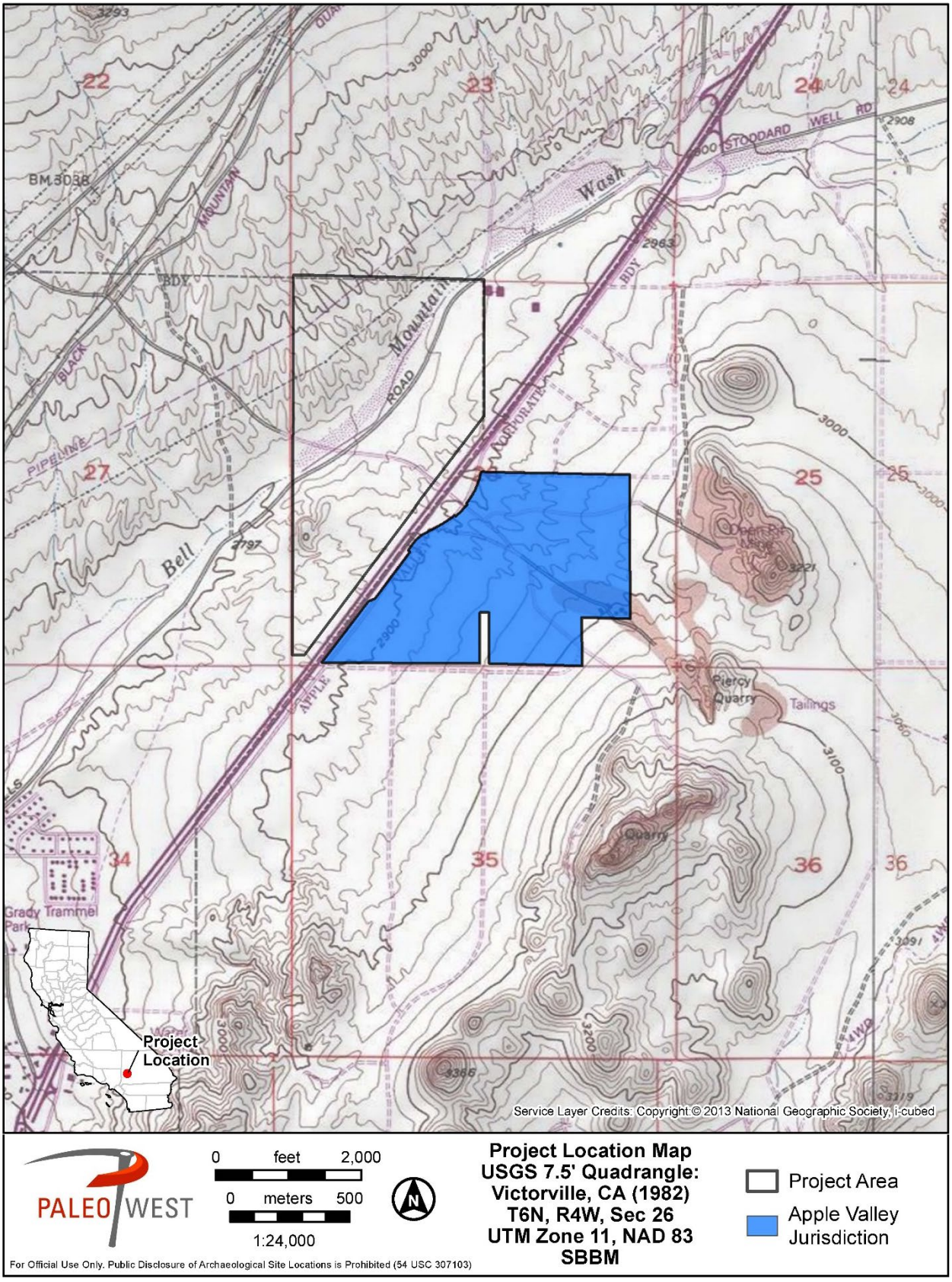


Figure 2. Project location map, , highlighting the portion of the Project in Apple Valley jurisdiction.

topographic quadrangle map (Figure 2). The elevation of the Project area ranges from approximately 3,060–3,080 feet (ft) above mean sea level (amsl).

REGULATORY CONTEXT

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.

STATE LAWS AND REGULATIONS

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 [j]). Appendix G in Section 15023 provides an Environmental Checklist of questions (Section 15023, Appendix G, Section XIV, Part A) 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 Society of Vertebrate Paleontology (SVP) has provided guidance specifically designed to support state and Federal environmental review. The SVP broadly defines significant paleontological resources as follows (SVP, 2010:11):

> "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)."

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or 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; however, 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.

California Public Resources Code

Section 5097.5 of the Public Resources Code (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 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

LOCAL

The Town of Apple Valley General Plan (Town of Apple Valley 2009), Chapter III: Environmental Resources, states the following:

> "The potential for geological formations to produce fossils is evaluated based on what fossil resources have been produced in the past at other nearby locations of similar geologic composition. There are substantial exposures of Mesozoic-age (65,000,000 to 245,000,000 years ago) rocks in more elevated portions of the Town that may contain no fossils. Shallow grading of younger Quaternary alluvium that occurs throughout most of the area is not likely to reveal significant fossil remains. Potential for the presence of significant non-renewable paleontological resources exists where surface or subsurface Pleistocene-age (1,808,000 to 11,550 years ago) soils occur in the planning area. High priority is also given to older sediments along the Mojave River and at unknown depth below the surface.
>
> Based on research of surface deposits, the soils in the planning area, which are relatively young, have a low potential for containing significant fossil remains. Surface deposits may in some areas constitute only a "veneer cover" that directly overlays older sediments; however, research indicates that no fossils have been reported in Town. Reports have, however, identified localities with fossil resources of an age that is similar soil deposits to those that occur in the Town and Sphere of Influence. In the overall, research indicates that there is a range of likelihood from low to high of encountering paleontological resources during future development projects; as discussed above, the potential depends on the location and sediments encountered."

The City of Victorville General Plan (City of Victorville 2018) establishes that Victorville shall have the characteristic of "[p]reservation of important archaeological, historical, and paleontological resources." In addition, it also states the following about the Planning Area, which includes the Project area:

> "All of the Planning Area, excepting those areas above the 2,985 foot contour or below the 2,727 foot contour, is located upon fossil bearing strata. The entire Planning Area is considered to be sensitive regarding paleontological resources due to the existence of recovery sites throughout."

In addition, Goal #5: Preservation of important cultural resources, of the General Plan establishes the following with the goal to "Protect identified archeological, paleontological resources, and historic resources in the Planning Area":

Objective 5.1: Preserve known and expected cultural resources.

Policy 5.1.1: Determine presence/ absence of and consider impacts to cultural resources in the review of public and private development and infrastructure projects.

Implementation Measure 5.1.1.4: Complete a Planning Area-wide assessment of the paleontological sensitivity based on a review of geologic formations and a review of paleontological records that identify those formations that have yielded or are expected to yield fossil materials of importance to the scientific community.

Policy 5.1.2: Prohibit destruction of cultural and paleontological materials that contain information of importance to our knowledge of the evolution of life forms and the history of human settlement in the Planning Area unless sufficient documentation of that information is accomplished and distributed to the appropriate scientific community. Require mitigation of any significant impacts that may be identified in the project or program-level cultural and paleontological assessments as a condition of project or program approval.

Implementation Measure 5.1.2.3: Require paleontological monitoring of land alteration projects involving excavation into native geologic materials known to have a high sensitivity for the presence of paleontological resources.

PALEONTOLOGICAL RESOURCE POTENTIAL

Absent specific agency guidelines, most professional paleontologists in California adhere to the guidelines set forth by SVP (2010) to determine the course of paleontological mitigation for a given project. These guidelines establish protocols for the assessment of the paleontological resource potential of underlying geologic units and outline measures to mitigate adverse impacts that could result from project development. 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). Although these standards were written specifically to protect vertebrate paleontological resources, all fields of paleontology have adopted the following guidelines:

HIGH POTENTIAL (SENSITIVITY)

Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered have a high potential for containing significant nonrenewable fossiliferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable.

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 a determination that some areas or units have low potential 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.

UNDETERMINED POTENTIAL (SENSITIVITY)

Specific areas underlain by sedimentary rock units for which little information is available 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.

NO POTENTIAL

Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources.

METHODS

To assess whether a particular area has the potential to contain significant fossil resources at the subsurface, it is necessary to review published geologic mapping to determine the geology and stratigraphy of the area. Geologic units are considered "sensitive" for paleontological resources if they are known to contain significant fossils anywhere in their extent. Therefore, a search of pertinent local and regional museum repositories for paleontological localities within and nearby the Project area is necessary to determine whether fossil localities have been previously discovered within a particular rock unit. For this Project, a formal museum records search was conducted at the NHMLA. Informal records searches were also conducted of the online University of California Museum of Paleontology Collections and San Diego Natural History Museum Collections, the online Paleobiology Database and FAUNMAP, and other published and unpublished geological and paleontological literature of the area.

RESOURCE CONTEXT

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 desert plains, bordered and controlled by two prominent faults, the Garlock fault to the northwest and the San Andreas fault to the southwest (California Geological Survey, 2002).

Locally, the Project area is in a valley basin surrounded by mountains of igneous intrusions, mostly emplaced in the Cretaceous Period (145 million years ago [Ma] to 66 Ma) (Dibblee, 1967). Sediments in the basin area are dominated by alluvial detritus from the surrounding mountains deposited in the Pleistocene (2.5 Ma to 11,700 years ago) and Holocene (11,700 years ago to today) Epochs (Dibblee, 1967), with local sediments reaching into the Miocene (23 to 5.3 Ma) and Pliocene (5.3 to 2.5 Ma) Epochs (Hernandez et al., 2007).

SITE SPECIFIC GEOLOGY AND PALEONTOLOGY

According to Hernandez et al., (2007), the Project is underlain by four geological units (Figure 3), described below with their paleontological potential:

Artificial fill and disturbed areas (af) (late Holocene)

In developed areas in the southeast portion of the Project area, surficial sediment has been intensely modified by human construction and grading activities (Hernandez et al., 2007) to an unspecified depth. Due to its modern age and human disturbance, artificial fill has no potential for paleontological resources.

Modern alluvial fan deposits (Qf) (Holocene)

Underlying southeast-trending drainages in the northern portion of the Project area are deposits of unconsolidated, poorly sorted, silty lithic-arkosic sand and angular to subangular gravel (Hernandez et al., 2007). Due to their recent age, Modern alluvial fan deposits have low to no potential for paleontological resources.

Old alluvial deposits (Qoa) (late Pleistocene)

Most of the Project area is underlain by moderately consolidated, fine- to medium-grained sand and fine-to-medium gravel from inactive alluvial fans (Hernandez et al., 2007). Elsewhere in San Bernardino County, Pleistocene deposits 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), and has a high potential for paleontological resources.

Granodiorite (Kgd) (Cretaceous)

The foothills in the southeastern edge of the Project area are composed of granodiorite and hornblende-granodiorite resulting from igneous intrusions in the Cretaceous Period (145 to 66 Ma) (Hernandez et al., 2008). Due to its igneous nature, granodiorite has no potential for paleontological resources.

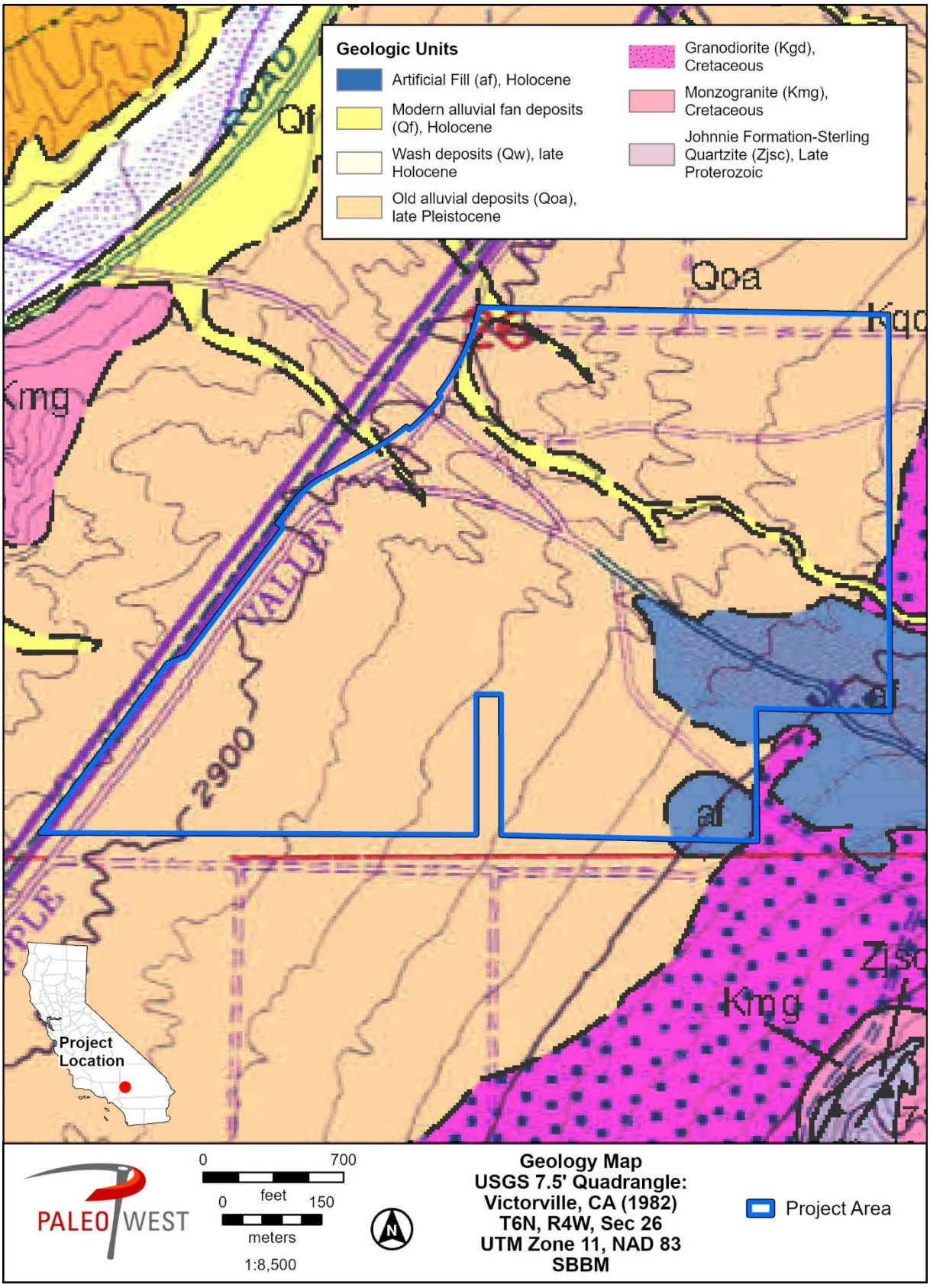


Figure 3. Geologic map of the Project area.

RECORDS SEARCH RESULTS

The NHMLA records search did not produce any fossil localities from within the Project area but did produce six localities in Pleistocene-age sediment within ten miles (Attachment A). Searches of online databases and other literature produced two additional fossil localities within three miles of the Project area (Graham and Lundelius, 2010; Jefferson, 1991,1991b; Miller, 1971; PBDB, 2022; SDNHM, 2022; UCMP, 2022) (Table 1).

Table 1. Pleistocene fossil Localities in Project Vicinity

Fossil Locality	Formation	Fossils Present	Depth (bgs)
LACM VP 3498[1]	Shoemaker Gravel Formation	Horse (*Equus*), deer (Cervidae), antelope (Antilocapridae)	Not specified
LACM VP 3352[1]	Shoemaker Gravel Formation	Horse (*Equus*)	Not specified
LACM VP 3353[1]	Shoemaker Gravel Formation	Horse (*Equus*)	Not specified
LACM VP 1224[1]	Shoemaker Gravel Formation	Camelid (Camelidae)	Not specified
LACM VP 7786[1]	Alluvium	Vole (*Microtus mexicanus*)	10 – 11
LACM VP CIT209[1]	Shoemaker Gravel Formation	Mammoth (*Mammuthus*), Horse (*Equus*)	Not specified
SCBCM 1.114.3: Leon, Victorville[2]	Noble's Old Alluvium or Shoemaker Gravels	Horse (*Equus*)	Not specified
Victorville[3]	Lacustrine and fluvial beds	Harlan's ground sloth (*Paramylodon harlani*), Short-faced bear (*Arctodus simus*), Southern mammoth (*Mammuthus meridionalis*), Horse (*Equus*), Giant camel (*Titanotylopus*), Western camel (*Camelops*), Stilt-legged camel (*Hemiauchenia*), Meadow vole (*Microtus*), rodentia	Not specified

Note: bgs=below ground surface.
[1] NHMLA Records Search Results
[2]Jefferson, 1991b
[3]Scott et al., 1997

FINDINGS

Based on the literature review and museum records search results, and in accordance with the SVP (2010) sensitivity scale, the Granodiorite (Kgd) has no paleontological sensitivity due to its igneous origin. The Artificial fill and disturbed areas (af) and Modern alluvial fan deposits (Qf) have low to no paleontological sensitivity at the surface due to their young age but may overlie Old alluvial deposits (Qoa) at depth (Table 2). Old alluvial deposits have a high paleontological sensitivity due to the presence of Pleistocene fossil localities in the vicinity. Therefore, further paleontological resource management is recommended during Project development.

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

Geologic Unit[1]	Age	Fossils Present[2]	Paleontological Sensitivity	Recommended Monitoring
Artificial fill and disturbed areas (af)	Late Holocene	None	None	None
Modern alluvial fan deposits (Qf)	Holocene	None	Low to High	Full-time below 10 ft bgs
Old alluvial deposits (Qoa)	Late Pleistocene	Horse, mammoth, camelid, deer, antelope, vole, Harlan's ground sloth, Short-faced bear, Southern mammoth, Horse, Giant camel, Western camel, Stilt-legged camel, Meadow vole, rodentia	High	Full-time at surface and at depth
Granodiorite (Kgd)	Cretaceous	None	None	None

[1] Hernandez et al., 2007.
[2] NHMLA Records Search Results; Jefferson, 1991b; Scott et al., 1997.

RECOMMENDATIONS

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. Since this Project entails excavation for a warehouse complex, new ground disturbances are anticipated. The presence of Pleistocene deposits at the surface, and potentially at depth in the Project area, suggests that ground disturbance may result in significant impacts under CEQA to paleontological resources, such as destruction, damage, or loss of scientifically important paleontological resources. A qualified paleontologist should be retained to develop and implement the measures recommended below. These measures have been developed in accordance with SVP guidelines; if implemented, these measures will satisfy the requirements of CEQA.

WORKER'S ENVIRONMENTAL AWARENESS PROGRAM (WEAP)

Prior to the start of the proposed Project activities, 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, the role of the paleontological monitor, outline steps to follow if a fossil discovery is made, and provide contact information for the Project Paleontologist. The training will be developed by the Project Paleontologist and can be delivered concurrently with other training, including cultural, biological, safety, et cetera.

PALEONTOLOGICAL MITIGATION MONITORING

Prior to the commencement of ground disturbing activities, a professional paleontologist will be retained to prepare and implement a paleontological mitigation plan for the Project. The plan will describe the monitoring required during ground disturbing activities. Monitoring will entail the visual inspection of excavated or graded areas and trench sidewalls. If the Project Paleontologist determines full-time monitoring is no longer warranted based on the geologic conditions at depth, they may recommend that monitoring be reduced or cease entirely.

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:

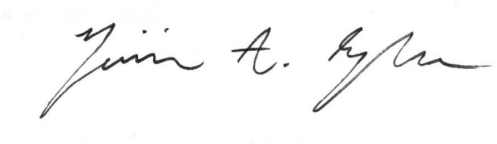
1. Salvage of Fossils. If fossils are discovered, all work in the immediate vicinity should be halted to allow the paleontological monitor and/or Project Paleontologist to evaluate the discovery and determine if the fossil may be considered significant. If the fossils are determined to be potentially significant, the Project Paleontologist (or paleontological monitor) should recover them following standard field procedures for collecting paleontological resources as outlined in the mitigation plan prepared for the Project. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt 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. The paleontological mitigation plan will identify the museum that has agreed to accept fossils that may be discovered during Project related excavations. Upon completion of fieldwork, all significant fossils collected will be prepared in a properly equipped laboratory to a point ready for curation. Preparation may include the removal of excess matrix from fossil materials and stabilizing or repairing specimens. During preparation and inventory, the fossils specimens will be identified to the lowest taxonomic level practical prior to curation at an accredited museum. The fossil specimens must be delivered to the accredited museum or repository no later than 90 days after all fieldwork is completed. The cost of curation will be assessed by the repository and will be the responsibility of the client.

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 a discussion of the location, duration, and methods of the monitoring, stratigraphic sections, any recovered fossils, and the scientific significance of those fossils, and where fossils were curated.

Thank you for contacting PaleoWest for this Project. If you have any questions, please do not hesitate to contact us.

Sincerely,



Benjamin Scherzer, M.S. | Senior Paleontologist
PALEOWEST

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Attachment A.
NHMLA 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

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Research & Collections

e-mail: paleorecords@nhm.org

December 11, 2022

PaleoWest
Attn: Benjamin Scherzer

re: Paleontological resources for the Carney Commerce Center Project, #22-0218

Dear Benjamin:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Carney Commerce Center project area as outlined on the portion of the Victorville USGS topographic quadrangle map that you sent to me via e-mail on December 1, 2022. 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 3498	West of Portland Cement Co. plant in bluffs on west side of Mojave River, midway between I-15 and Air Expressway Rd.	Shoemaker Gravel Formation	Horse (*Equus*); deer (Cervidae); antelope (Antilocapridae)	Unknown
LACM VP 3352	West bank of the Mojave River, north end of Victorville (more precise locality not available)	Shoemaker Gravel Formation	Horse (*Equus*)	Unknown
LACM VP 3353	Second Street at sand & gravel pit; near top of bluff, west bank of Mojave River	Shoemaker Gravel Formation	Horse (*Equus*)	Unknown
LACM VP 1224	North of Hesperia, near Dean Ave. & Dean Place	Shoemaker Gravel Fm	Camel family (Camelidae)	Unknown
LACM VP 7786	Southern California	Alluvium	Vole (*Microtus mexicanus*)	10-11 feet

	Logistics Airport	(Pleistocene, moderately indurated fine to medium grained silty sandstone)		bgs
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

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