PALEONTOLOGICAL ASSESSMENT FOR THE HIGH DESERT GAS STATION PROJECT

YUCCA GROVE, SAN BERNARDINO COUNTY, CALIFORNIA

PROJ-2023-00036; APN 0570-061-26

Prepared for:

Lilburn Corporation
1905 Business Center Drive
San Bernardino, California 92408

Submitted to:

County of San Bernardino
385 North Arrowhead Avenue
San Bernardino, California 92415

Prepared by:

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July 25, 2024

BFSA Environmental Services
A Perennial Company

Paleontological Database Information

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Report Date:	July 25, 2024
Report Title:	Paleontological Assessment for the High Desert Gas Station Project, Yucca Grove, San Bernardino County, California (PROJ-2023-00036)
Prepared for:	Lilburn Corporation 1905 Business Center Drive San Bernardino, California 92408
Submitted to:	County of San Bernardino 385 North Arrowhead Avenue San Bernardino, California 92415
USGS Quadrangle:	Sections 10 and 11, Township 15 North, Range 11 East of the *Solomons Knob, California* (7.5-minute) USGS Quadrangle
Assessor's Parcel Number:	0570-061-26
Study Area:	8.2 acres
Key Words*:*	Paleontological assessment; Pleistocene alluvial deposits; low paleontological resource sensitivity; monitoring not recommended.

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I. INTRODUCTION AND LOCATION

This paleontological resource assessment has been completed for the High Desert Gas Station Project located southeast of the intersection of Halloran Summit Road and Interstate 15 in the Yucca Grove area of the eastern Mojave Desert region of San Bernardino County, California (Figures 1 and 2). The project is also known as the proposed Terrible Herbst Travel Center. The 8.2-acre project consists of one parcel (Assessor's Parcel Number [APN] 0570-061-26) and can be found within Sections 10 and 11, Township 15 North, Range 11 East on the United States Geological Survey (USGS) *Solomons Knob, California* (7.5-minute) Quadrangle (see Figure 2). The proposed project consists of the development of a gas station and convenience store within the subject property. Currently, an abandoned, dilapidated service station and single-family residence building, and an active cellphone tower with associated infrastructure occupy the parcel.

The proposed development includes the installation of four gasoline underground storage tanks (USTs), two diesel USTs, fuel dispenser islands, one 5,000-gallon commercial septic UST with primary and secondary leach fields, an above-ground 211,400-gallon water tank, an enclosure to contain a future water well and pump, and a six-foot-deep storm water detention basin that extends to 10 feet below the current surface. Approximately 15,000 cubic yards of earth are estimated for excavation at the project. While the sizes of the fuel USTs are not known at the time of this report, typical double-walled, fiberglass 15,000 to 20,000-gallon fuel USTs are approximately 10 feet wide (Xerxes Corporation 2012); an estimated 15- to 20-foot-deep pit (below final grade) would be excavated to receive USTs of this size.

As the lead agency, the County of San Bernardino has required the preparation of a paleontological assessment to evaluate the project's potential to yield paleontological resources (PROJ-2023-00036). The paleontological assessment of the project included a review of paleontological literature and fossil locality records in the area, a review of the underlying geology, and recommendations to mitigate impacts to potential paleontological resources, if necessary.

II. REGULATORY SETTING

The California Environmental Quality Act (CEQA), which is patterned after the National Environmental Policy Act, is the overriding environmental regulation that sets the requirement for protecting California's paleontological resources. CEQA mandates that governing permitting agencies (lead agencies) set their own guidelines for the protection of nonrenewable paleontological resources under their jurisdiction.

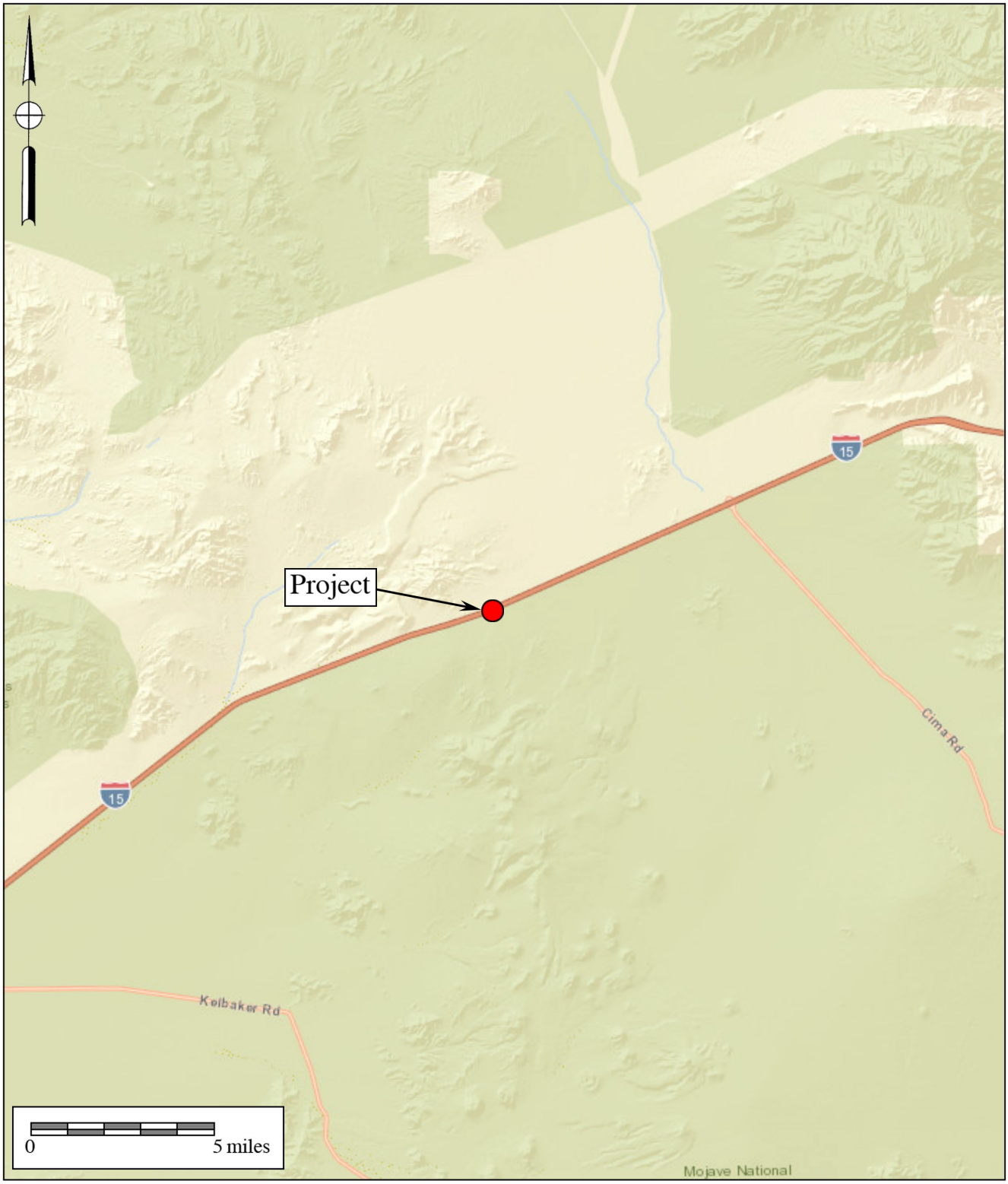

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Figure 1

General Location Map

The High Desert Gas Station Project

ESRI Street Map

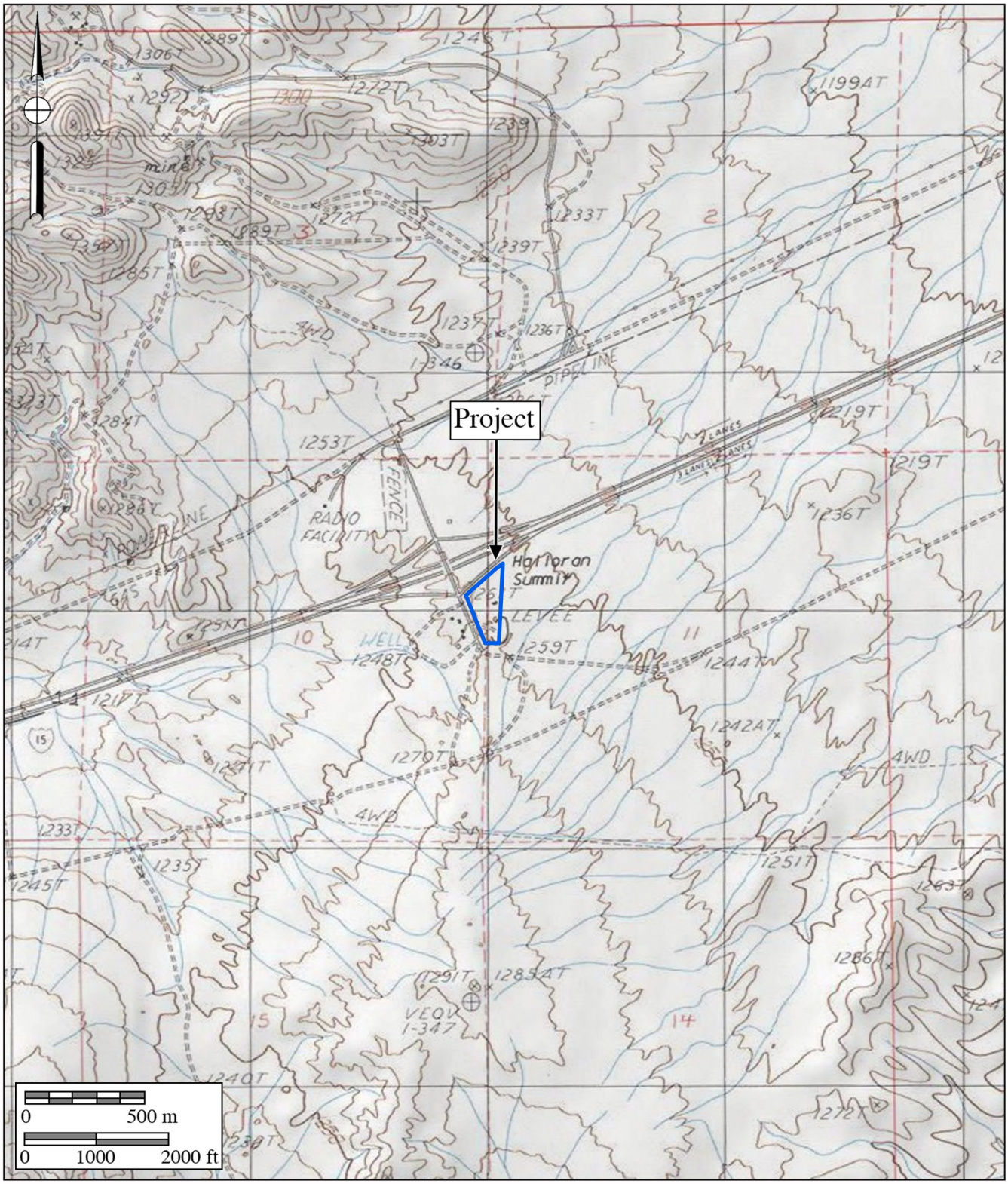

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Figure 2

Project Location Map

The High Desert Gas Station Project

USGS *Solomons Knob* Quadrangle (7.5-minute series)

State of California

Under "Guidelines for Implementation of the California Environmental Quality Act," as amended in December 2018 (California Code of Regulations [CCR] Title 14, Division 6, Chapter 3, Sections 15000 et seq.), procedures define the types of activities, persons, and public agencies required to comply with CEQA. Section 15063 of the CCR provides a process by which a lead agency may review a project's potential impact to the environment, whether the impacts are significant, and provide recommendations, if necessary.

In CEQA's Environmental Checklist Form, a question to respond to is, "Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" (Appendix G, Section VII, Part f). This is to ensure compliance with California Public Resources Code Section 5097.5, the law that protects nonrenewable resources including fossils, which is paraphrased below:

a) A person shall not 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, rock art, 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.
b) As used in this 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.
c) A violation of this section is a misdemeanor.

County of San Bernardino

The County of San Bernardino 2007 Development Code has developed criteria for applying guidelines to preserve and protect nonrenewable paleontological resources (County of San Bernardino 2019). In Chapter 82.20, the "Paleontologic Resources (PR) Overlay" of the Development Code, purpose, location requirements, development standards, and paleontologist qualifications are described in Sections 82.20.010 through 82.20.040, respectively (County of San Bernardino 2019).

III. GEOLOGY

Geologic mapping by Miller (2012) places the project within late to middle Pleistocene-aged intermediate alluvial fan deposits composed of grus (or grüs) (salmon-colored areas labeled "Qiag" on Figure 3, after Miller 2012). These deposits are described as coarse-grained sand to granule-sized clasts from a granitic source that weathers to grus on a broadly undulating surface that is intermittently active. These deposits have poorly developed Av (near-surface desert soil) and Bt (translocated clay) soil horizons; a calcic soil horizon is present but is variably developed (Miller 2012).

A geotechnical investigation was recently performed for the project by GeoTek, Inc. (O'Neill and Stoker 2024). The investigation included borehole drilling to a depth of approximately 16 feet. The surface of the project consisted of disturbed soils and artificial fill from one to six feet thick, with the thickest of these deposits located along the east side of the project. Near-surface, undisturbed soils variably consisted of poorly graded sandy silts and silty sands with or without gravel and/or clays. Starting between seven and 11 feet deep, very dense, partially cemented sands and gravels dominate, to the total depth drilled. O'Neill and Stoker (2024) did not speculate on the geologic age of the sediments encountered, nor did they put forth recommended grading depths for the project.

IV. PALEONTOLOGICAL RESOURCES

Definition

Paleontological resources are the remains of prehistoric life that have been preserved in the geologic strata. These remains are called fossils and include bones, shells, teeth, and plant remains (including their impressions, casts, and molds) in the sedimentary matrix, as well as trace fossils such as footprints and burrows. Fossils are considered older than 5,000 years of age (Society of Vertebrate Paleontology [SVP] 2010) but may include younger remains (subfossils) when viewed in the context of local extinction of the organism or habitat, for example. Fossils are considered a nonrenewable resource under state and local guidelines (Section II).

Fossil Locality Records Search

A paleontological records search was performed for the project by the San Bernardino County Museum (SBCM; Kottkamp 2024; Appendix B) and indicates the nearest fossil localities are about 4.75 miles north of the project, consisting of rodent bones derived from "brown to liver colored paleosols interbedded with a greenish-gray silty arkose." Kottkamp (2024) stated that, "given the lithified arkose containing the fossiliferous paleosols at SBCM 1.8.8, this locality is probably significantly older than Qiag [of Miller 2012]." Kottkamp (2024) indicated that fossils are commonly found in Pleistocene-aged alluvial deposits throughout the southwest, including the Mojave Desert.

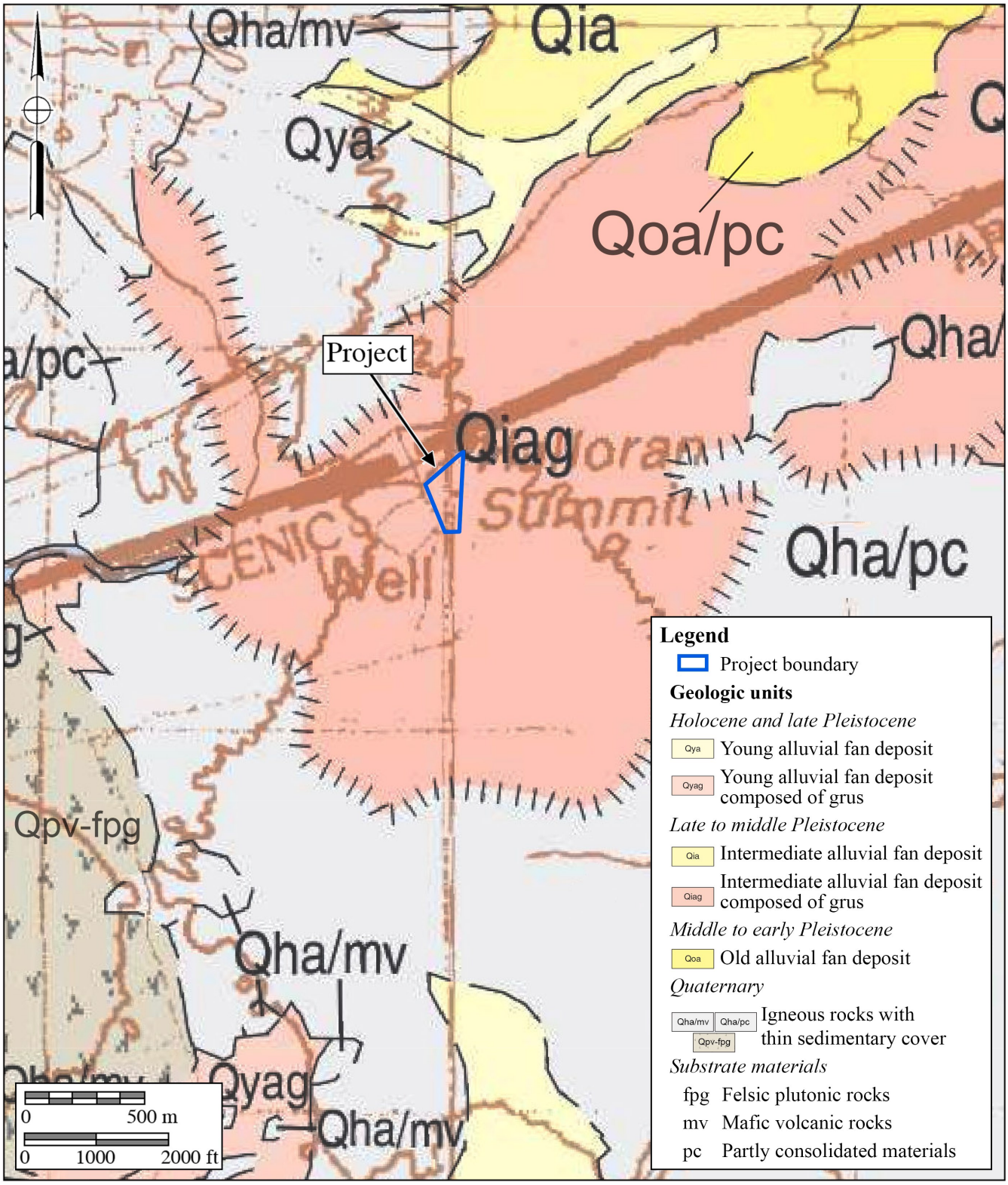

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Figure 3

Geologic Map

The High Desert Gas Station Project

Geology after Miller (2012)

East of the project along Interstate 15, late Pleistocene-aged freshwater mollusks and microfossils were found from fine-grained groundwater discharge deposits in the Valley Wells area off Cima Road (Pigati et al. 2011). Also found were the remains of large vertebrates such as mammoth (*Mammuthus*), horses (*Equus*), camels (*Camelops*, *Hemiauchenia*), an indeterminate antilocaprid (pronghorn antelope), and two carnivorans: a coyote-sized canid and a large felid (Springer et al. 2011). These fossils and deposits record wetter conditions where groundwater seeped to the surface in low-lying areas, creating a desert wetland supporting an ecosystem that no longer exists.

Project Survey

Personnel from BFSA Environmental Services, a Perennial Company (BFSA), under the direction of Principal Investigator Todd A. Wirths, conducted a pedestrian survey of the 8.2-acre project on June 26, 2024. The field methodology employed for the project included walking evenly spaced survey transects set approximately five to 10 meters apart while visually inspecting the ground surface. All potentially sensitive areas where paleontological resources might be located were closely inspected.

The project is characterized primarily as vacant desert terrain with vegetation consisting of Mojave and Creosote Bush scrub community plants including creosote bushes, yucca, and Joshua Trees. Within the northern half of the property, the dilapidated and abandoned remnants of the gas and service station building along with associated infrastructure, ancillary storage structure, and residence, were located. In addition, the northern half of the property is occupied by a cellular tower and associated infrastructure along with some remnant footings for an ancillary structure. Although the area surrounding the structures has been cleared of vegetation, the ground visibility in this area was limited due to the presence of gravel and hardscape. No paleontological resources, or evidence suggesting the presence of paleontological resources, were observed during the survey.

V. PALEONTOLOGICAL SENSITIVITY

Overview

The degree of paleontological sensitivity of any particular area is based on a number of factors, including the documented presence of fossiliferous resources on a site or in nearby areas, the presence of documented fossils within a particular geologic formation or lithostratigraphic unit, and whether or not the original depositional environment of the sediments is one that might have been conducive to the accumulation of organic remains that may have become fossilized over time. Holocene alluvium is generally considered to be geologically too young to contain significant nonrenewable paleontological resources (*i.e.,* fossils) and thus is typically assigned a low paleontological sensitivity. Pleistocene (over 11,700 years old) alluvial and alluvial fan deposits in the Mojave Desert and Inland Empire, however, are known to yield important terrestrial vertebrate fossils such as extinct mammoths, mastodons, giant ground sloths, extinct

species of horse, bison, camel, saber-toothed cats, and others (Jefferson 1991; Scott and Cox 2008; Kottkamp 2024) and are usually accorded a high paleontological resource sensitivity. Fossils from desert paleosols (ancient soils) have been documented from San Bernardino County (Stewart and Hakel 2016, 2017).

Professional Standards

The SVP (2010) has drafted guidelines that include four categories of paleontological sensitivity for geologic units (formations) that might be impacted by a proposed project, as listed below:

- *High Potential:* Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- *Undetermined Potential:* Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment, and that further study is needed to determine the potential of the rock unit.
- *Low Potential:* Rock units that are poorly represented by fossil specimens in institutional collections or based on a general scientific consensus that only preserve fossils in rare circumstances.
- *No Potential:* Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

Based on these criteria, the Pleistocene-aged intermediate alluvial fan deposits composed of grus may be considered to have a low potential. While these deposits are age-appropriate for yielding fossils, the absence of nearby localities and coarse-grained nature of the formation at the project would seem to offer few prospects for potential discoveries.

Mojave National Preserve Assessment

While the project parcel is private property and subject to County of San Bernardino and CEQA environmental measures, it is included on paleontological sensitivity mapping by the U.S. National Park's Mojave National Preserve, which occupies a huge area south of Interstate15. In their Paleontological Resource Inventory for the Mojave National Preserve, geologic formations are rated for their tendency to yield significant paleontological resources (Johnson et al. 2023), a tool which can be utilized to assist this assessment. In the report, the paleontological potentials of various geologic formations are rated as "yes," "maybe," or "no" (Johnson et al. 2023: Figure 32). The project parcel is mapped in an area indicated as "maybe;" no further guidance is offered, however.

County of San Bernardino Assessment

The County of San Bernardino applies its "[PR] Overlay" guideline to those areas where paleontological resources are known to occur or are likely to be present by using fossil location

criteria reported by the SBCM, the University of California Museum of Paleontology (Berkeley), the Los Angeles County Natural History Museum, or other institutions (County of San Bernardino 2019, Section 82.20.020). The following criteria are to be used to evaluate a project's compliance with the intent of the overlay in Section 82.20.030 (County of San Bernardino 2019):

a. **Field survey before grading.** In areas of potential but unknown sensitivity, field surveys before grading shall be required to establish the need for paleontologic monitoring.
b. **Monitoring during grading.** A project that requires grading plans and is located in an area of known fossil occurrence within the overlay, or that has been demonstrated to have fossils present in a field survey, shall have all grading monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Paleontologic monitors shall be equipped to salvage fossils as they are unearthed to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring is not necessary if the potentially-fossiliferous units described for the property in question are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.
c. **Recovered specimens.** Qualified paleontologic personnel shall prepare recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils is essential in order to fully mitigate adverse impacts to the resources.
d. **Identification and curation of specimens.** Qualified paleontologic personnel shall identify and curate specimens into the collections of the Division of Geological Sciences, San Bernardino County Museum, an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation and CEQA compliance. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until curation into an established museum repository has been fully completed and documented.
e. **Report of findings.** Qualified paleontologic personnel shall prepare a report of findings with an appended itemized of specimens. A preliminary report

shall be submitted and approved before granting of building permits, and a final report shall be submitted and approved before granting of occupancy permits. The report and inventory, when submitted to the appropriate lead agency along with confirmation of the curation of recovered specimens into the collections of the San Bernardino County Museum, will signify completion of the program to mitigate impacts to paleontologic resources.

f. **Mitigation financial limits.** In no event shall the County require the applicant to pay more for mitigation as required by Subsections (b), (c), and (d), above within the site of the project than the following amounts:
   1. One-half of one percent of the projected cost of the project, if the project is a commercial or industrial project;
   2. Three-fourths of one percent of the projected cost of the project for a housing project consisting of one unit; and
   3. If a housing project consists of more than one unit, three-fourths of one percent of the projected cost of the first unit plus the sum of the following:
      A. $200 per unit for any of the next 99 units;
      B. $150 per unit for any of the next 400 units; and
      C. $100 per unit for units in excess of 500.

According to Section 82.20.040, a qualified paleontologist working within the County jurisdiction is required to meet the following criteria (County of San Bernardino 2019):

A. **Education**: An advanced degree (Masters or higher) in geology, paleontology, biology or related disciplines (exclusive of archaeology).
B. **Professional experience**: At least five years professional experience with paleontologic (not including cultural) resources, including the collection, identification and curation of the resources.

VI. CONCLUSIONS AND RECOMMENDATIONS

The geology at the project includes Pleistocene-aged, coarse-grained alluvial deposits mapped at the surface, composed of poorly graded, silty and clayey sands with variable amounts of gravel, that lie beneath artificial fill deposits. While Pleistocene-aged alluvial deposits in the Mojave Desert and San Bernardino County are known to produce significant vertebrate fossils, none are known for several miles away. Typically, terrestrial fossils accumulate in water ways and topographic lows in fine-grained sediments; the coarse-grained nature of the sediments that occur at the project usually have a low paleontological potential.

In conclusion, paleontological monitoring is not recommended for the project, based on the summary above. However, if paleontological resources are discovered during excavation

activities, a qualified paleontologist should be consulted to determine the significance of the discovery. If the discovery is determined to be significant by the qualified paleontologist, paleontological monitoring would be required in general accordance with the County of San Bernardino (2019).

A qualified paleontologist is defined as an individual with an M.S. or Ph.D. in paleontology or geology who has proven experience in paleontology and who is knowledgeable in professional paleontological procedures and techniques. Fieldwork may be conducted by a qualified paleontological monitor, defined as an individual who has experience in the collection and salvage of fossil materials. The paleontological monitor shall always work under the direction of a qualified paleontologist.

VII. CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief and have been compiled in accordance with CEQA criteria.

July 25, 2024

Todd A. Wirths, M.S.
Senior Paleontologist
California Professional Geologist No. 7588

Date

VIII. REFERENCES

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APPENDIX A

Qualifications of Key Personnel

Todd A. Wirths, MS, PG No. 7588

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BFSA Environmental Services
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Education

Master of Science, Geological Sciences, San Diego State University, California **1995**

Bachelor of Arts, Earth Sciences, University of California, Santa Cruz **1992**

Professional Certifications

California Professional Geologist #7588, 2003
Riverside County Approved Paleontologist
San Diego County Qualified Paleontologist
Orange County Certified Paleontologist
OSHA HAZWOPER 40-hour trained; current 8-hour annual refresher

Professional Memberships

Board member, San Diego Geological Society
San Diego Association of Geologists; past President (2012) and Vice President (2011)
South Coast Geological Society
Southern California Paleontological Society

Experience

Mr. Wirths has more than a dozen years of professional experience as a senior-level paleontologist throughout southern California. He is also a certified California Professional Geologist. At BFSA, Mr. Wirths conducts on-site paleontological monitoring, trains and supervises junior staff, and performs all research and reporting duties for locations throughout Los Angeles, Ventura, San Bernardino, Riverside, Orange, San Diego, and Imperial Counties. Mr. Wirths was formerly a senior project manager conducting environmental investigations and remediation projects for petroleum hydrocarbon-impacted sites across southern California.

Selected Recent Reports

2019 *Paleontological Assessment for the 10575 Foothill Boulevard Project, City of Rancho Cucamonga, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Assessment for the MorningStar Marguerite Project, Mission Viejo, Orange County, California.* Prepared for T&B Planning. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Monitoring Report for the Nimitz Crossing Project, City of San Diego.* Prepared for Voltaire 24, LP. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2019 *Paleontological Resource Impact Mitigation Program (PRIMP) for the Jack Rabbit Trail Logistics Center Project, City of Beaumont, Riverside County, California.* Prepared for JRT BP 1, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Monitoring Report for the Oceanside Beachfront Resort Project, Oceanside, San California.* Prepared for S.D. Malkin Properties. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Nakase Project, Lake Forest, Orange County, San California.* Prepared for Glenn Lukos Associates, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Impact Mitigation Program for the Sunset Crossroads Project, Banning, Riverside County*. Prepared for NP Banning Industrial, LLC. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Ortega Plaza Project, Lake Elsinore, Riverside County*. Prepared for Empire Design Group. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Resource Record Search Update for the Green River Ranch III Project, Green River Ranch Specific Plan SP00-001, City of Corona, California*. Prepared for Western Realco. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

2020 *Paleontological Assessment for the Cypress/Slover Industrial Center Project, City of Fontana, San Bernardino County, California*. Prepared for T&B Planning, Inc. Report on file at Brian F. Smith and Associates, Inc., Poway, California.

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APPENDIX B

Paleontological Records Search

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www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum
Division of Earth Science

David Myers
Director

Scott Kottkamp
Curator of Earth Science

23 July 2024

BFSA Environmental Services
Attn: Todd Wirths
14010 Poway Rd.
Poway, CA 92064

PALEONTOLOGY RECORDS REVIEW for proposed site of High Desert Gas Station (Project No. 24-162), Halloran Summit Road, San Bernardino County, California

Dear Mr. Wirths,

The Division of Earth Science of the San Bernardino County Museum (SBCM) has completed a record search for the above-named project in San Bernardino County, California. The proposed project site (High Desert Gas Station) is on Halloran Summit Road as shown on the United States Geological Survey (USGS) 7.5-minute Solomons Knob, California, quadrangle.

Geologic mapping of that region done by Miller (2012) indicates that the entire project area is located atop middle to late Pleistocene age alluvial fan deposits composed of grus (Qiag). Qiag consists of coarse sand and gravel formed of eroded fragments of granitoid rock. Terrestrial macro- and microfossils are commonly found in Pleistocene age alluvium throughout the southwest of North America, including much of the Mojave Desert (Harris 2014; Morgan et al. 2022). Common taxa in such deposits include †*Mammut pacificus*, †*Mammuthus columbi*, Equidae, Camelidae, and diverse microfauna including bivalves, gastropods, fish, rodents, and rabbits.

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no paleontological resources have

been discovered within the proposed project site, nor within one mile of its perimeter. The nearest paleontological locality, SBCM 1.8.8, occurs 4.75 miles north of the project site. This locality is situated in brown to liver colored paleosols interbedded with a greenish-gray silty arkose. The precise age of the deposit is unknown – the next nearest SBCM vertebrate fossil localities, 7 miles west in the Shadow Mountains, date to the Clarendonian or early Hemphillian. Given the lithified arkose containing the fossiliferous paleosols at SBCM 1.8.8, this locality is probably significantly older than Qiag. Rodent bone fragments were recorded at SBCM 1.8.8.

This records search covers only the paleontological records of the San Bernardino County Museum. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey. Please note that multiple SBCM archeological and cultural localities occur in the vicinity of the project site – details about these sites are outside the scope of this paleontological record search.

Please do not hesitate to contact us with any further questions that you may have.

Sincerely,

Scott Kottkamp, Curator of Earth Science
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San Bernardino County Museum

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