Appendix C2

Paleontological Resources Assessment Report

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PALEONTOLOGY - ARCHAEOLOGY - HISTORY

PALEONTOLOGICAL RESOURCES IMPACT MITIGATION PROGRAM FOR THE HARVILL TRAILER STORAGE YARD PROJECT, RIVERSIDE COUNTY, CALIFORNIA

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Cogstone Project Number: 5281
Type of Study: Paleontological Resources Impact Mitigation Program
Localities: none within the project area
USGS Quadrangle: Perris (1979)
Area: 7.24 acres
Paleontological Fossil Yield Classifications:
PFYC 4, high sensitivity: early to middle Pleistocene very old alluvial fan deposits

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Federal Certifications WOSB, EDWOSB, SDB
State Certifications DBE, WBE, SBE, UDBE

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SUMMARY OF FINDINGS

This Paleontological Resources Impact Mitigation Program (PRIMP) provides a management plan for paleontological resources for the proposed Harvill Trailer Storage Yard Project (Project). The County of Riverside is the lead agency for this project. The Project involves the construction of a 15,000 square-foot maintenance building for a surface trailer storage yard with 145 trailer stalls and 38 vehicle parking stalls on a vacant site.

The Project is mapped entirely as early to middle Pleistocene very old alluvial fan deposits, which were deposited between 2.58 million years to 129,000 years ago. The results of the record search showed that no fossils were recovered from units found within the proposed project area or from within 1 mile of the proposed project. However, late Pleistocene fossils including remains of Pacific mastodon, horse, and bison have been recovered from roughly 2 miles east of the Project in the Perris Valley Flood Channel, from sediments mapped as identical to those within the Project boundaries. Additionally, late Pleistocene fossils have been found in association with the Diamond Valley Reservoir and San Diego Pipeline 6/ Salt Creek Channel projects in southern Hemet, California, approximately 15 miles southeast of the current project. Thousands of Pleistocene fossils were recovered, including Columbian mammoths, Pacific mastodons, ground sloths, sabre-toothed cats, dire wolves, short-faced bears, horses, stilt-legged llamas, camels, flat-headed peccaries, diminutive pronghorn, bison, and California turkey.

The early Pleistocene very old alluvial fan deposits are assigned a high sensitivity (PFYC 4) due to the abundance of fossils found from similar sediments near to the project.

The following Mitigation Measures are recommended for this project:

> **PAL-1:** On the first day of excavations, all field personnel shall be briefed regarding the types of fossils that could be found in the project area and the procedures to follow should paleontological resources be encountered. This training shall be conducted by a qualified professional paleontologist or his/her representative.
>
> **PAL-2:** The project is underlain by early to middle Pleistocene very old alluvial fan sediments, which require full-time monitoring. Paleontological monitoring shall entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor shall have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected. Monitoring efforts can be reduced or eliminated at the discretion of the project paleontologist if no fossil resources are encountered after 30 percent of the excavations are completed.
>
> **PAL-3:** Upon completion of fieldwork, all significant fossils collected shall be prepared in a properly equipped paleontology laboratory to a point of identification and readiness for curation. Preparation shall include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossil specimens shall be identified to the most precise taxonomic level

possible, cataloged, analyzed, and delivered to the Western Science Center for permanent curation and storage. The cost of curation is assessed by the repository and shall be responsibility of the land owner. At the conclusion of laboratory work and museum curation, a final Paleontological Monitoring Report (PMR) shall be prepared describing the results of the paleontological mitigation monitoring efforts associated with the project. The report shall include a summary of the field and laboratory methods, an overview of the project area geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report shall also be submitted to the Western Science Center.

INTRODUCTION

PURPOSE OF STUDY

This Paleontological Resources Impact Mitigation Program (PRIMP) provides a management plan for paleontological resources for the proposed Harvill Trailer Storage Yard Project (Project), City of Perris, Riverside County (County), California (Figures 1, 2). The County is the lead agency for this project under the California Environmental Quality Act (CEQA).

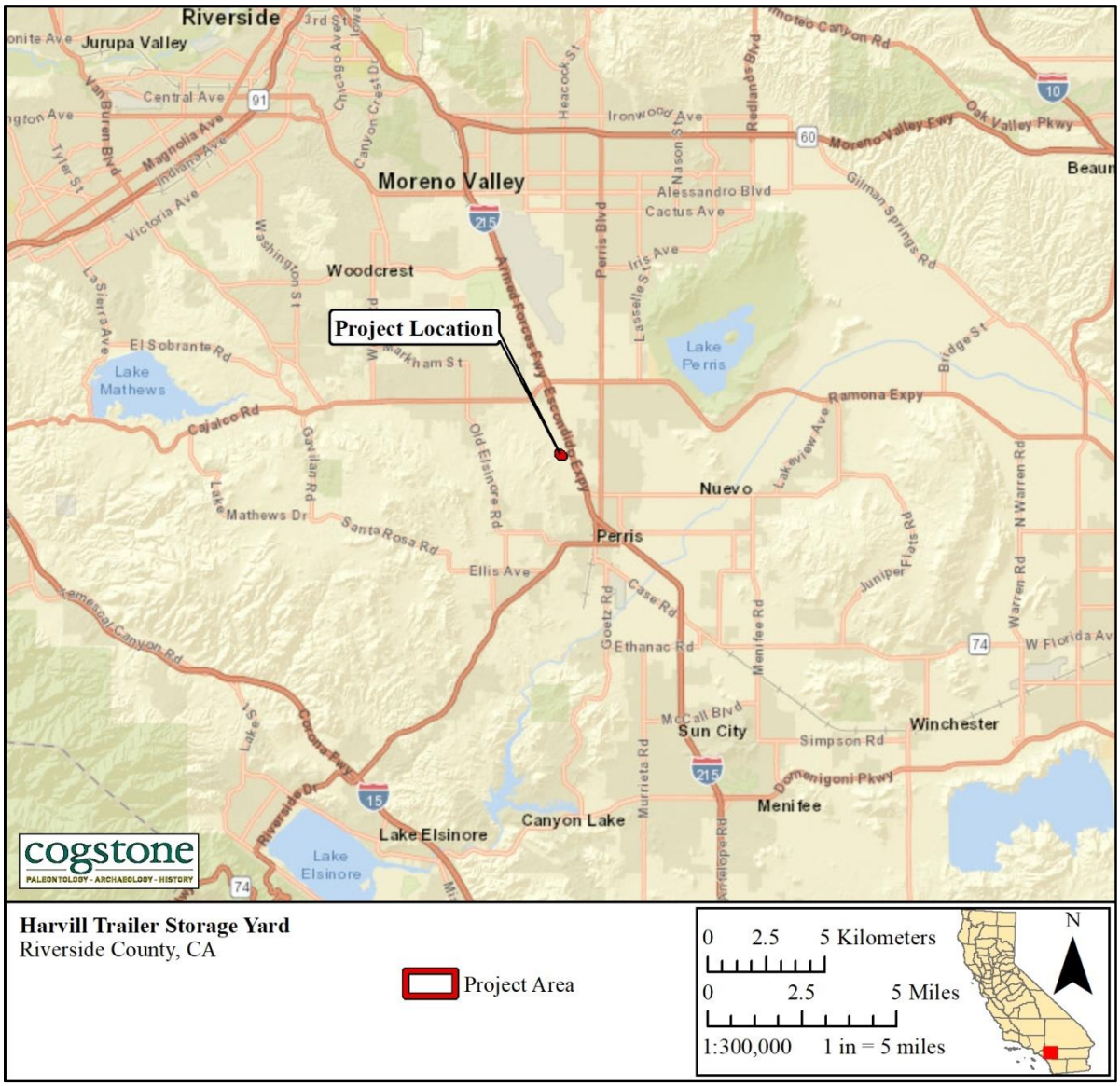

Figure 1. Project vicinity map

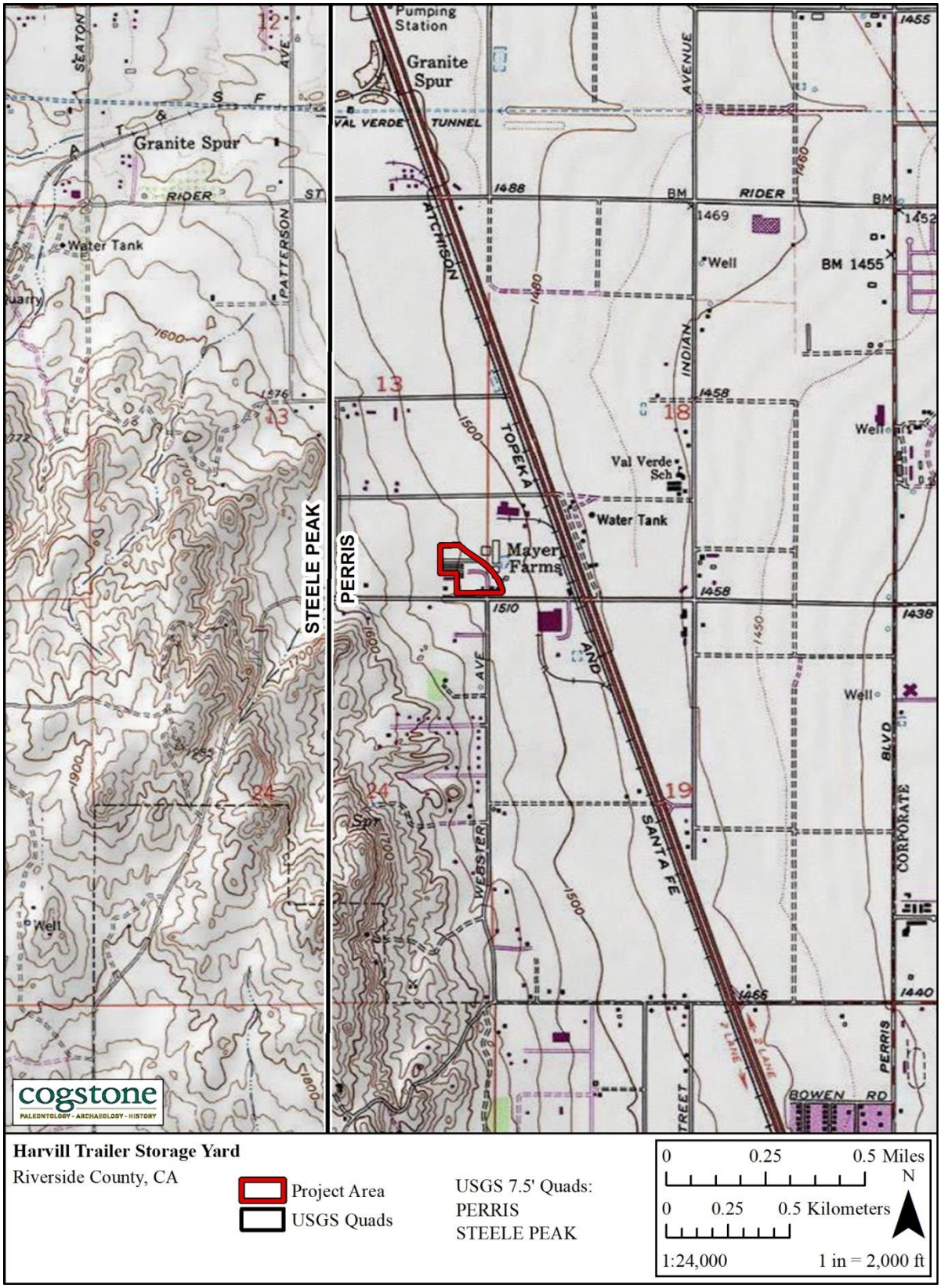

Figure 2. Project location

Figure 3. Project aerial map

PROJECT LOCATION AND DESCRIPTION

The project is located on approximately 7.24 acres within Assessor Parcel Numbers (APNs) 317-270-013-2 and 305-090-049-2 located on the northwest corner of the intersection of Orange Avenue and Harvill Avenue at 24016 Orange Avenue, in the City of Perris, Riverside County, California. Located within Township 4 South, Range 4 West, Section 13 and Township 4 South, Range 3 West, Section 18 on the United States Geological Survey (USGS) 7.5-minute Perris topographic quadrangle map, San Bernardino Base and Meridian (Figures 2, 3).

The Project involves the construction of a 15,000 square-foot maintenance building for a surface trailer storage yard with 145 trailer stalls and 38 vehicle parking stalls on a vacant site (Figures 4, 5).

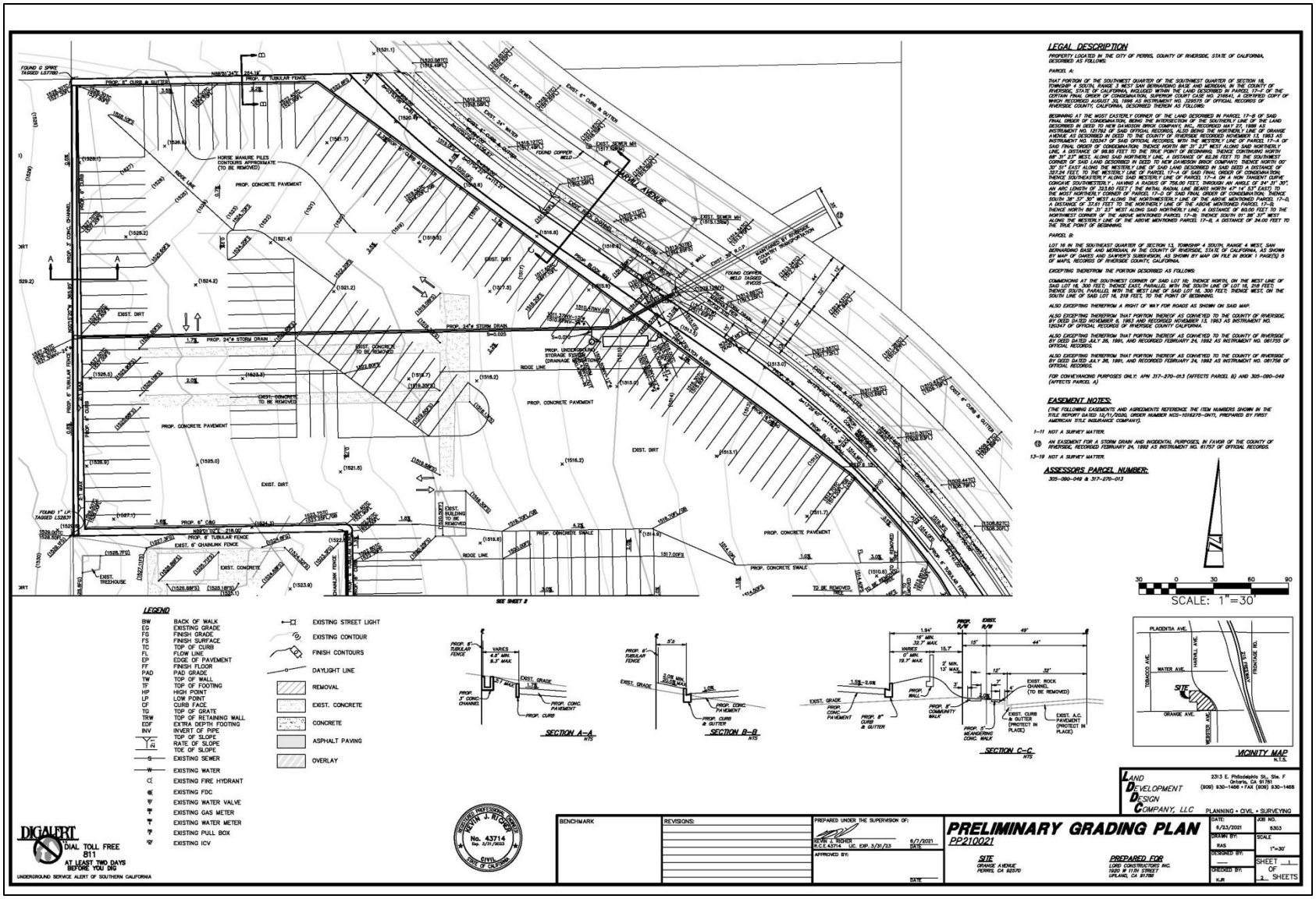

Figure 4. Grading plan (Page 1 of 2)

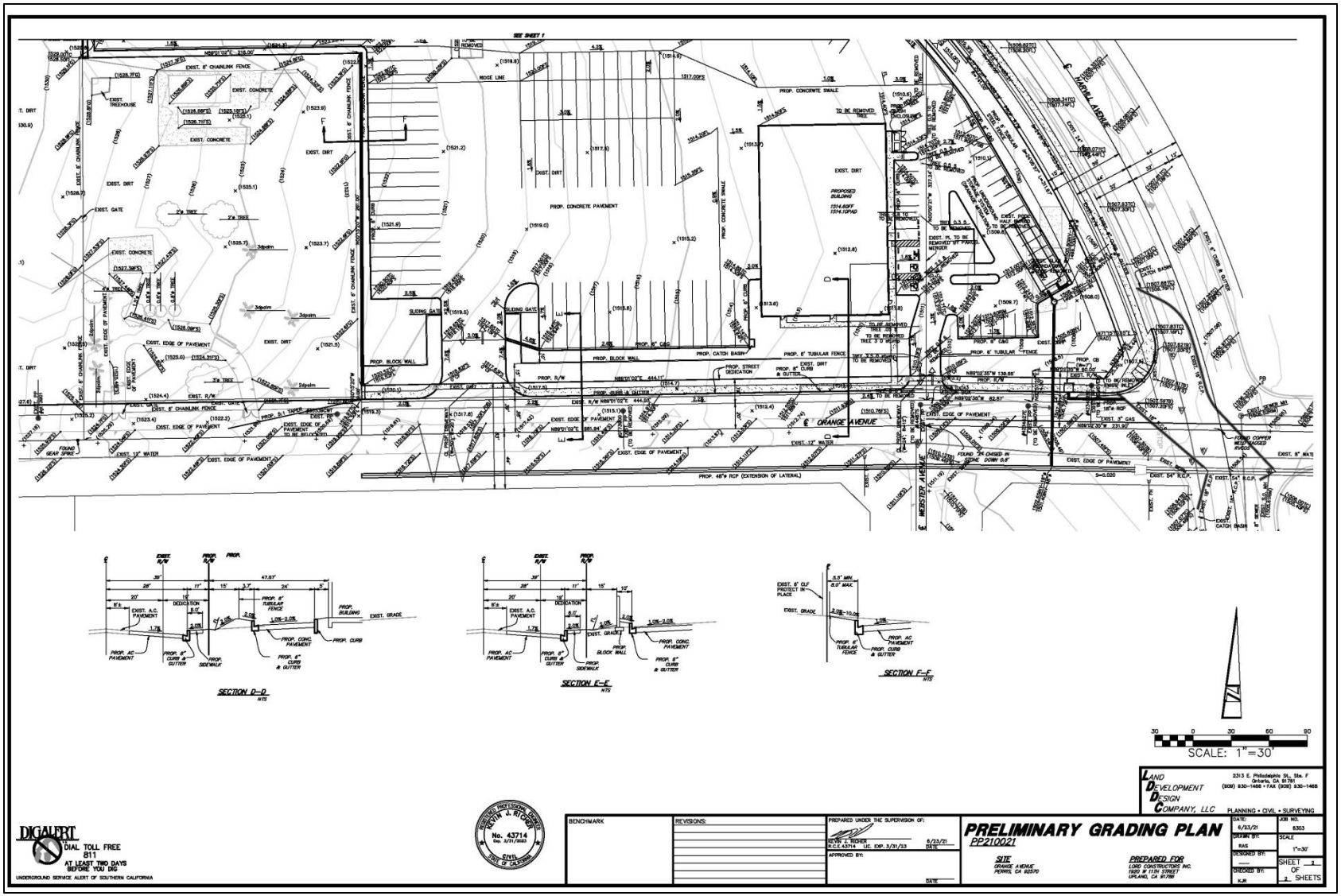

Figure 5. Grading plan (Page 2 of 2)

PROJECT PERSONNEL

Cogstone prepared this report. A short resume for the Principal Paleontologist and Co-Author is provided (Appendix A) and additional qualifications of key Cogstone staff are available at www.cogstone.com/Staff.

- Kim Scott served as the Principal Investigator for Paleontology for the project and co-authored this report. Ms. Scott has an M.S. in Biology with paleontology emphasis from California State University (CSU), San Bernardino, and has over 25 years of experience in California paleontology and geology.

- Kelly Vreeland co-authored this report. Ms. Vreeland has an M.S. in geology, with an emphasis in paleontology, from CSU Fullerton, as well as 10 years of experience in California paleontology and geology.

- Eric Scott provided QA/QC of the paleontology and geology sections of this report. Mr. Scott has an M.A. in Anthropology, with an emphasis in biological paleoanthropology, from the University of California, Los Angeles (UCLA), and more than 37 years of experience in California paleontology.

- Logan Freeberg conducted the record search and prepared the geographic information system (GIS) maps used throughout this report. Mr. Freeberg has a B.A. in anthropology from the University of California, Santa Barbara with a GIS Certificate from CSU Fullerton and has more than 15 years of experience in California archaeology.

- Lindsey Nanry provided technical editing for this report.

BACKGROUND

GEOLOGICAL SETTING

This project is located within the Peninsular Range Geomorphic Province which extends from Mount San Jacinto in the north to Baja, California in the south and includes the Inland Empire, Los Angeles, Orange County, and San Diego areas of California. The Peninsular Ranges Geomorphic Province is located in the southwestern corner of California and is bounded by the Transverse Ranges Geomorphic Province to the north and the Colorado Desert Geomorphic Province to the east. This geomorphic province is characterized by elongated northwest-trending mountain ridges separated by sediment-floored valleys. Many faults to the west of the Salton

Trough section of the San Andreas Fault Zone, parallel this northwest-south east trending fault zone and have taken up some of the strain of the San Andreas. The San Jacinto Fault Zone at the base of the San Timoteo Badlands to the east of the Project is one such fault zone.

To the north of the project, the San Andreas Fault Zone travels up Cajon Pass where it forms the boundary between the Pacific Plate and the North American Plate. The Transverse Ranges include the San Bernardino and San Gabriel mountains along with the paralleling ranges and result from these two plates grinding past each other and "catching" along the bend in the San Andreas. The project is located on the Pacific Plate which is composed of numerous blocks that can move independently (Wagner 2002).

STRATIGRAPHY

The Project is mapped entirely as early to middle Pleistocene very old alluvial fan deposits, which were deposited between 2.58 million years to 129,000 years ago (Morton and Miller 2006). Alluvial fan deposits are deposited along the outer slopes of our valleys from local mountains via the mouths of canyons. These deposits have been uplifted or otherwise removed from the area of recent sedimentation. The sediments are described as moderately to well consolidated, orangish- to reddish-brown sands and silts with some gravels and conglomerates (Morton and Miller 2006).

RECORDS SEARCH

A museum records search was performed by the Western Science Center (Radford 2021; Appendix B). Additional searches were conducted by Cogstone personnel in online databases of the University of California Museum of Paleontology (UCMP 2021), the PaleoBiology database (PBDB 2021), and in published literature (Jefferson 1991a, 1991b; Dooley et al. 2019). The results of the record search showed that no fossils were recovered from the proposed Project area, or within a one mile radius. However, late Pleistocene fossils including remains of Pacific mastodon (†*Mammut pacificus*), horse (†*Equus* sp.), and bison (†*Bison* sp.) were recovered from roughly 2 miles east of the Project in the Perris Valley Flood Channel (Dooley et al., 2019), from within a foot of the surface in sediments mapped (Morton and Miller, 2006) as identical to those within the Project boundaries. Additionally, late Pleistocene fossils have been in association with the Diamond Valley Reservoir and San Diego Pipeline 6/ Salt Creek Channel projects in southern Hemet, California, approximately 15 miles southeast of the current project (Radford 2021, Radford 2020). Thousands of Pleistocene fossils including Pacific mastodon (†*Mammut pacificus*), Columbian mammoth (†*Mammuthus columbi*), multiple ground sloths (†*Megalonyx jeffersonii*, †*Nothrotheriops shastensis*, †*Paramylodon harlani*), sabre-toothed cat (†*Smilodon*

fatalis), dire wolf (†*Canis dirus*), short-faced bear (†*Arctodus* sp.), horses (†*Equus conversidens*, †*Equus occidentalis*), stilt-legged llama (†*Hemiauchenia macrocephala*), yesterday's camel (†*Camelops hesternu*s), flat-headed peccary (†*Platygonus compressus*), diminutive pronghorn (†*Capromeryx minor*), bison (†*Bison antiquus*, †*Bison latifrons*), and California turkey ([1]†*Meleagris californica*), were recovered from these projects (Springer et al. 2009, 2010; Table 1).

Table 1. Pleistocene fossils from the Diamond Valley Reservoir and San Diego Pipeline 6/Salt Creek Channel projects

Group	Common Name	Vertebrate Taxon
amphibians	salamander	Urodela
	western spadefoot toad	*Scaphiopus hammondii*
	likely western toad	*Anaxyrus* sp. cf. *A. boreas*
	likely California treefrog	*Pseudacris* sp. cf. *P. cadaverina*
reptiles	pond turtle	*Actinemys* sp.
	desert tortoise	‡*Gopherus agassizii*
	whiptailed lizard	*Aspidoscelis tigris*
	alligator lizard	*Elgaria* sp.
	collared lizard	*Crotaphytus collaris*
	coast horned lizard	*Phrynosoma coronatum*
	likely sagebrush lizard	*Sceloporus* sp. cf. *S. graciosus*
	western fence lizard	*Sceloporus occidentalis*
	side-blotched lizard	*Uta stansburiana*
	iguana	Iguanidae
	kingsnake	*Lampropeltis* sp.
	whipsnake	*Masticophis* sp.
	pine snake	*Pituophis melanoleucus*
	blackhead snake	*Tantilla* sp.
	garter snake	*Thamnophis* sp.
	likely sidewinder	*Crotalus* sp. cf. *C. cerastes*
	rattlesnake	*Crotalus* sp.
birds	duck	*Anas* sp.
	California turkey	†*Meleagris californica*
	golden eagle	*Aquila chrysaetos*
	likely Cooper's hawk	*Accipiter* sp. cf. *A. cooperi*
	falcon	*Falco* sp.
	shore bird	Scolopacidae
	likely short-eared owl	*Asio* sp. cf. *A. flammeus*
	northern flicker	*Colaptes auratus*
	Steller's jay	*Cyanocitta stelleri*
	common raven	*Corvus corax*
	raven	Corvidae

[1] † - the taxon is extinct, although there may be living relatives in same genus or family

Group	Common Name	Vertebrate Taxon
	swallow	cf. *Hirundo* sp.
	swallow	Hirundinidae
	likely American robin	cf. *Turdus migratorius*
	likely western meadowlark	cf. *Sturnella neglecta*
mammals	Jefferson's ground sloth	†*Megalonyx jeffersonii*
	Shasta's ground sloth	†*Nothrotheriops shastensis*
	Harlan's ground sloth	†*Paramylodon harlani*
	black-tailed jackrabbit	*Lepus californicus*
mammals	desert cottontail	*Sylvilagus audubonii*
	antelope ground squirrel	‡*Ammospermophilus* sp.
	California ground squirrel	*Otospermophilus beecheyi*
	ground squirrel	*Otospermophilus* sp.
	Beechey's ground squirrel	*Eutamius* sp.
	kangaroo rat	*Dipodomys* sp.
	pocket mouse	*Perognathus* sp.
	Botta's pocket gopher	*Thomomys bottae*
	California meadow vole	*Microtus californicus*
	dusky-footed wood rat	*Neotoma fuscipes*
	desert wood rat	*Neotoma lepida*
	likely canyon mouse	*Peromyscus* sp. cf. *P. crinitus*
	harvest mouse	*Reithrodontomys* sp.
	ornate shrew	*Sorex ornatus*
	broad-footed mole	*Scapanus latimanus*
	mouse-eared bat	*Myotis* sp.
	bobcat	*Lynx rufus*
	sabre-toothed cat	†*Smilodon fatalis*
	coyote	*Canis latrans*
	dire wolf	†*Canis dirus*
	grey fox	*Urocyon cinereoargenteus*
	likely short-faced bear	cf. †Arctodus sp.
	black bear	‡*Ursus americanus*
	skunk	*Mephitis* sp.
	long-tailed weasel	*Mustela frenata*
	badger	*Taxidea taxus*
	Mexican ass	†*Equus conversidens*
	western horse	†*Equus occidentalis*
	stilt-legged llama	†*Hemiauchenia macrocephala*
	yesterday's camel	†*Camelops hesternus*
	flat-headed peccary	†*Platygonus compressus*
	diminutive pronghorn	†*Capromeryx minor*
	pronghorn	‡*Antilocapra americana*
	mule deer	*Odocoileus hemionus*
	antique bison	†*Bison antiquus*
	long-horned bison	†*Bison latifrons*

Group	Common Name	Vertebrate Taxon
	Pacific mastodon	†*Mammut pacificus*
	Columbian mammoth	†*Mammuthus columbi*

Notes and Abbreviations:
† = the taxon is extinct, although there may be living relatives in same genus or family
‡ = animal extirpated
sp. = genus certain but species uncertain
cf. = compares favorably with or likely
From Springer et al. (2009, 2010)

PALEONTOLOGICAL SENSITIVITY

A multilevel ranking system was developed by professional resource managers within the Bureau of Land Management (BLM) as a practical tool to assess the sensitivity of sediments for fossils. The Potential Fossil Yield Classification (PFYC) system (BLM 2016; Appendix D) has a multi-level scale based upon demonstrated yield of fossils. The PFYC system provides additional guidance regarding assessment and management for different fossil yield rankings.

Fossil resources occur in geologic units (e.g., formations or members). The probability for finding significant fossils in a Project Area can be broadly predicted from previous records of fossils recovered from the geologic units present in and/or adjacent to the study area. The geological setting and the number of known fossil localities help determine the paleontological sensitivity according to PFYC criteria.

All alluvial deposits may increase or decrease in fossiliferous potential depending on how coarse the sediments are. Sediments that are close to their basement rock source are typically coarse; those farther from the basement rock source are finer. The chance of fossils being preserved greatly increases once the average size of the sediment particles is reduced to 5 mm or less in diameter. Moreover, fossil preservation also greatly increases with rapid burial in flood-plains, rivers, lakes, oceans, etc. Remains left on the ground surface become weathered by the sun or consumed by scavengers and bacterial activity, usually within 20 years or less. So the sands, silts, and clays of flood-plains, rivers, lakes, and oceans are the most likely sediments to contain fossils.

Using the PFYC system, geologic units are classified according to the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts within the known extent of the geological unit. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher PFYC value; instead, the relative abundance of localities is intended to be the major determinant for the value assignment.

The project is mapped entirely as early to middle Pleistocene very old alluvial fan deposits. A records search revealed that all of the fossils previously recovered within a 15 mile radius were more than five feet deep, in deposits mapped as Pleistocene at the surface. Sediments with a Holocene component produced fossils starting at eight feet deep. As such, the project sediments are assigned a high potential for fossils (PFYC 4) due to the abundance of fossils in these deposits.

DEFINITION OF SIGNIFICANCE FOR PALEONTOLOGICAL RESOURCES

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific significance of paleontological resources. Fossils are considered to be significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life;
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.
6. All identifiable vertebrate fossils are considered significant due to the rarity of their preservation.

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and invertebrate animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer, 2003; Scott et al., 2004).

PROPOSED MITIGATION

CONSTRUCTION MITIGATION MEASURES

The following Mitigation Measures are recommended for this project:

PAL-1: On the first day of excavations, all field personnel shall be briefed regarding the types of fossils that could be found in the project area and the procedures to follow

should paleontological resources be encountered. This training shall be conducted by a qualified professional paleontologist or his/her representative.

PAL-2: The project is underlain by early to middle Pleistocene very old alluvial fan sediments, which require full-time monitoring. Paleontological monitoring shall entail the visual inspection of excavated or graded areas and trench sidewalls. In the event that a paleontological resource is discovered, the monitor shall have the authority to temporarily divert the construction equipment around the find until it is assessed for scientific significance and collected. Monitoring efforts can be reduced or eliminated at the discretion of the project paleontologist if no fossil resources are encountered after 30 percent of the excavations are completed.

PAL-3: Upon completion of fieldwork, all significant fossils collected shall be prepared in a properly equipped paleontology laboratory to a point of identification and readiness for curation. Preparation shall include the careful removal of excess matrix from fossil materials and stabilizing and repairing specimens, as necessary. Following laboratory work, all fossil specimens shall be identified to the most precise taxonomic level possible, cataloged, analyzed, and delivered the Western Science Center for permanent curation and storage. The cost of curation is assessed by the repository and shall be responsibility of the land owner. At the conclusion of laboratory work and museum curation, a final Paleontological Monitoring Report (PMR) shall be prepared describing the results of the paleontological mitigation monitoring efforts associated with the project. The report shall include a summary of the field and laboratory methods, an overview of the project area geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. If the monitoring efforts produced fossils, then a copy of the report shall also be submitted to the Western Science Center.

SENSITIVE AREAS AND MONITORING DECISION THRESHOLDS

Native sediments of early to middle Pleistocene very old alluvial fan sediments shall be monitored full-time. If no fossil resources are encountered after 30 percent of the excavations are completed monitoring efforts can be reduced or eliminated at the discretion of the project Paleontologist. No monitoring is required for drilling or pile driving activities.

SCHEDULE

A preliminary schedule is provided and will be updated following the Preconstruction Meeting.

Deliverable/Milestone	Format	Date
Start Work		To Be Determined
Preconstruction Meeting		To Be Determined
Update all Plans	PDF	Within 5 days after Preconstruction Meeting
Paleontological Awareness Training	PDF	To Be Determined
Begin Construction Monitoring		To Be Determined
Draft PMR	PDF	Within 60 days of conclusion of lab work
Department Comments to Consultant	email	Within two weeks of submittal
Final PMR	PDF	Within two weeks of receipt of comments

MONITORING

PERSONNEL ORGANIZATION AND QUALIFICATIONS

The principal investigator for paleontology (Principal Paleontologist) will meet the qualifications outlined under Riverside County guidelines. The Principal Paleontologist will be responsible for implementing the mitigation plan and maintaining professional standards of work.

The Principal Paleontologist will designate the project team to include a qualified field supervisor and qualified monitors. Sample resumes demonstrating the qualifications of personnel are appended (Appendix A). Upon task order award, final resumes for all personnel will be submitted to both the Task Manager/Paleontology Coordinator and the County for approval before any work is performed under the Task Order.

CONSTRUCTION PHASE

Coordination and communication procedures and a contact list will be provided by the County. The Principal Paleontologist or field supervisor will attend the weekly look ahead meeting if requested by the Task Manager/Paleontology Coordinator.

The Task Manager/Paleontology Coordinator will provide the Paleontological Team with a schedule of ground-disturbing activities to be conducted within the project limits in writing at least 2 weeks prior to construction and update the schedules as needed. The Task Manager/Paleontology Coordinator will make arrangements for the Paleontological Team to be at the work sites in accordance with these requirements.

COMMUNICATION

Procedures for communication will be worked out prior to construction in consultation with the Task Manager/Paleontology Coordinator. Monitors will act to protect potentially significant paleontological resources. The Paleontology Coordinator will make the final decisions regarding formal Suspend Work orders and disputes between parties. In general a Suspend Work order

would be for a single area of the project if it is necessary to excavate a large find. Typically the contractor can continue work in other areas as the fossil(s) are recovered.

SAFETY MEASURES

All paleontological staff must receive a comprehensive safety manual and Project Code of Safe Practices. Attendance at job site safety meetings is required for all monitoring personnel. Field personnel will wear clothing appropriate to the jobsite and are required to wear hard hats, safety vests, steel-toed boots, and hearing protection in active construction zones. Monitors will follow all rules and regulations of the appropriate Occupation and Safety Health Administration (OSHA; Cal OSHA in California) standards and will follow all safe practices required by the primary construction contractor (due to OSHA multiemployer responsibility regulations). If special conditions exist on the project, additional safety measures will be implemented. The paleontological monitor is responsible for maintaining close communication with the on-site earthmoving personnel in order to maintain a safe working environment.

TRAINING

All project personnel shall receive training prior to commencement of work. Specific training requirements are presented below as they apply to project personnel.

Paleontological Personnel

All paleontological personnel will receive a copy of this paleontological mitigation plan, daily forms and appropriate maps and will read and sign the Code of Safe Practices. All paleontological personnel will receive any mandated safety training and environmental awareness training before performing any work and will be informed that the District contractor has the final authority over all safety matters. The Code of Safe Practices will be implemented by all personnel. If special conditions exist on the project, additional safety measures will be implemented.

Construction Field Personnel WEAP Briefing

A member of the Paleontological Team will present the worker environmental awareness program training for paleontology. Attendance is mandatory for all earthmoving personnel and their supervisors. Attendance rosters will be submitted to verify training and hard-hat stickers issued. This allows quick visual assessment of which construction personnel have been trained and which need to be trained. As new construction personnel are added, the training will be presented for those personnel at the end of the morning safety meeting.

MONITOR'S AUTHORITY TO TEMPORARILY HALT PROJECT ACTIVITIES

Procedures allowing the monitors to either directly or indirectly temporarily divert equipment to inspect fossil finds will be detailed prior to award of contract and worked out beforehand at the preconstruction meeting with the Task Manager/Paleontology Coordinator. The Task

Manager/Paleontological Coordinator for the project will be responsible for final decisions regarding the issuance and duration of any formal Suspend Work orders.

MONITORING SCHEDULE, METHODS AND DOCUMENTATION

No monitoring is required for drilling or pile driving activities. Monitors will work closely with equipment operators to inspect fresh cuts. Methods will vary depending on the type of equipment but may include both observations from one side and following scraper passes. Monitors may also perform microscopic examination of exposed sediments for microfossils.

The paleontological monitor is responsible for maintaining close communication with the on-site earthmoving personnel in order to establish a safe working environment and to be fully appraised of the upcoming areas of impact and any schedule changes.

The paleontological monitor is responsible for completing daily documentation of presence and daily documentation of activities including the location of activities throughout the day, the observations of sediment type and distribution, observations regarding fossils, collection of fossils, and other information. The paleontological monitor is responsible for photographing activities, sediments, and paleontological resources for documentation purposes and for filling out a Photograph Record Sheet for each digital roll. All paperwork and photographs will be submitted to the Principal Paleontologist weekly. As needed, paperwork and photographs will be submitted to the Task Manager/Paleontology Coordinator. All documentation will be filed and maintained by the Principal Paleontologist and submitted to the repository along with any significant fossils upon completion of the project.

REPORTING

Upon conclusion of earthmoving, a final Paleontological Mitigation Report (PMR) will be prepared. The final report will include the inclusive dates of activity and personnel utilized including qualifications. It will summarize the paleontological mitigation effort and coverage using text and maps and will document paleontological localities discovered, paleontological resources identified, the interpretation of fossils, any non-compliance issues and their resolution, and will evaluate the adequacy of this paleontological resources management plan and make suggestions for improving paleontological resource monitoring procedures. All specialists' reports will be included as appendices. The report will be submitted to the Task Manager/Paleontology Coordinator for approval. Copies of the final report will go to the County, the repository if one is utilized, and other parties as requested.

DISCOVERY AND TREATMENT OF FOSSILS

FOSSIL DISCOVERY AND RECOVERY

Discovery of fossils potentially meeting significance criteria requires immediate notice to the Task Manager/Paleontology Coordinator for the project. County personnel will be party to all discussions regarding recovery, documentation, analysis and curation.

The treatment of observed fossils will depend on their type and circumstance. Generally, discovery of identifiable invertebrate fossils (shells, crustaceans, etc.) requires that a scientifically significant sample be collected for identification and analysis and that the locality be documented (see below). Similar procedures are followed for microvertebrates such as rodents. Current professional standards call for testing of 200 lb. samples (4-5 full 5 gallon buckets) from each locality followed by processing of up to 6000 lbs. of matrix if significant fossils are recovered by testing. Documentation of localities is required.

Observed vertebrate fossils must be evaluated to determine their condition. Generally the monitor will be able to quickly determine if the fossils are sufficiently well-preserved to meet preliminary significance criteria. If necessary, the monitor will cordon off the immediate area around the fossil to permit a safe work zone to recover the fossil and notify the construction foreman. The monitor will also immediately notify the field supervisor if assistance is needed and sufficient personnel to perform the work will be fielded. Documentation of localities is required.

Discovery of a bone bed or other type of fossil sites containing multiple large fossils may require a formal Stop Work order. The monitor will cordon off the area until evaluation occurs. The project principal paleontologist will consult with the Task Manager/Paleontology Coordinator regarding the amount of time necessary. Mitigation of this type of discovery requires a detailed field map, a sedimentary structure analysis, one or more stratigraphic columns, and data for taphonomic analysis.

Depending on the formations being impacted, additional samples collected may include specimens for dating analyses or materials for microfossil, botanical or pollen analyses. All fossils and sediment samples will be accompanied by a field tag with project and locality information including a unique field number.

LOCALITY DOCUMENTATION

Documentation of every fossil locality requires a standard set of data. This includes one or more coordinate readings using a resource grade high resolution Global Positioning System (GPS) device such as a Trimble GeoXH or better. Currently, the combination of Trimble GeoXH and most recent updates to the post-processing software permit an average accuracy of 4 inches. All field members of the Paleontological Team will be trained in the use of the resource grade GPS

prior to start of the project. The Paleontological Team will coordinate with the prime construction contractor to obtain accurate elevation readings. Lithology, paleoenvironmental information, and a true north reading are also required. Additional data collection may include one or more stratigraphic columns, sedimentary structure analysis, taphonomic analysis, photographs of the fossil *in situ*, specimens for dating analyses and materials for microfossil, botanical, or pollen analyses.

Based upon our past studies, many Pleistocene fossils are not datable even if the material is young enough; older fossiliferous formations are too old for radiocarbon dating. Other dating methods such as dating volcanic ashes or optical luminescence dating will be utilized if possible.

FOSSIL PREPARATION

Many fossils require only cleaning and stabilization through the use of hardeners. Others require stabilization in plaster jackets with subsequent gradual cleaning and hardening in the Lab. Sometimes larger fossils require a "cradle", usually a form-fitted plaster lined with acid-free cloth to provide support and prevent breakage during storage or transport. Fossils found in bedrock formations may require prolonged preparation using mechanical devices such as zip scribes.

Processing of matrix samples for microvertebrates varies according to the nature of the sediments. These may be washed using water, may require chemical agents to break apart the rock or may require floatation using heavy liquids. Generally, sediment will be transported to the lab for mechanical screen washing as on-site screen washing often is not permitted by the Stormwater Pollution Prevention Plan.

FOSSIL IDENTIFICATION

All fossils will be identified by experts. All identifications will be as specific as possible and include element, portion, side, sex, age, taphonomy and notes. Cataloging, including identification information, will be entered into a computer database. Each will be tracked using its field number and have an accompanying tag providing the provenience and identification information.

FOSSIL ANALYSES

The nature of analyses depends to a great extent on the number of fossils recovered and their condition and may include guild analysis (relative number of carnivores, herbivores and omnivores of various body weights in an ecosystem), demographic analysis (age and sex structure of populations), habitat analysis (do the animals represent grasslands, woodlands or deserts for example), paleoecology (use of microfossils, plants and/or pollen analysis to reconstruct the paleoenvironment) and comparative analysis (comparison to other faunas of the same time period regionally) are the most typical. Geological context analyses include stratigraphy of the fossil deposit, dating (to narrow the time range of the fossils), taphonomy

(history of alteration of the fossils by scavengers, water transport, etc.) and other ancillary studies.

CURATION

CURATION AND DISCARD PROTOCOL

Unidentifiable fossils will generally not meet significance criteria and should not be collected unless the amount and preservation is sufficient for dating purposes. For identifiable non-vertebrate fossils, significance will depend on meeting one of the *Definition of Significance for Paleontological Resources* criteria (criteria 1-5). Single non-vertebrate fossils are isolated finds that will not meet significance criteria unless they represent previously unknown species in the area or they provide information that assists with dating the local sedimentary sequence (criteria 2 and 5). This is because single fossils, such as a single clam shell, do not have sufficient data potential to evaluate evolutionary relationships, development of biological communities, interaction between paleobotanical and paleozoological biotas, or unusual or spectacular circumstances in the history of life (criteria 1, 3, and 4). All identifiable vertebrate fossils are considered significant due to the rarity of their preservation.

Fossils meeting significance criteria will be curated in perpetuity at an accredited repository along with all project data and a copy of the final report. Fossils are only to be removed from a collection at the discretion of the Principal Paleontologist or the repository. Typically, specimens may be discarded to educational uses if the fossil is not identifiable to at least family level, was not found *in situ,* or was part of a large collection of the same species from the same locality but was not well preserved.

REPOSITORY

The approved repository for any fossils collected during the duration of this project is the Western Science Center in Hemet, California. In the event of any significant fossil discovery, a Change Order will be submitted to pay for the cost of transporting, curating, and housing the collection.

PERMITS

No permits are anticipated to be required for the paleontological mitigation work.

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APPENDIX A: QUALIFICATIONS

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KIM SCOTT
Principal Investigator for Paleontology

EDUCATION

2013 M.S., Biology with a paleontology emphasis, California State University, San Bernardino
2000 B.S., Geology with paleontology emphasis, University of California, Los Angeles

TRAINING AND CERTIFICATIONS

Trained and certified in geomorphology techniques, National Park Service, National Center for Preservation Technology and Training

SUMMARY OF QUALIFICATIONS

Ms. Scott has 25 years of experience in California as a paleontologist and sedimentary geologist. Scott has worked extensively in the field surveying, monitoring, and salvaging fossils on hundreds of projects. In addition, she has special skills in jacketing large fossils, fossil preparation (cleaning and stabilization) and in the preparation of stratigraphic sections and other documentation for fossil localities. She frequently authors paleontological assessments, paleontological mitigation plans, and monitoring compliance reports to all agency requirements. She authors and conducts crew sensitivity training, serves as company safety officer, and has authored both the company safety and paleontology manuals.

SELECTED EXPERIENCE

Purple Line Extension (Westside Subway), Sections 1 and 2, Metropolitan Transit Authority (METRO), Los Angeles, CA. The project involves construction of seven stations from the existing Purple Line at Wilshire/Western Avenue along Wilshire Boulevard to the Veterans Administration Hospital in Westwood for 8.6 miles. Manages all paleontological services for Sections 1 and 2 of the subway project including budgets, WEAP training, monitoring, fossil recovery, lab work, analysis, and reporting. Sub to JV West (Stantec/Jacobs JV) (Section 1), AECOM (Section 2). Principal Investigator for Paleontology. 2014-*ongoing*

Bell Gardens Water Reservoir Project, City of Bell Gardens, Los Angeles County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources during improvements which included a new two-million-gallon reservoir, booster pump station, well to be drilled, and other components. Services included record searches, Sacred Lands File search from the Native American Heritage Commission, and an intensive-pedestrian survey of the 1.7-acre project area. Sub to Infrastructure Engineers. Principal Investigator for Paleontology. 2019-2020

Corona Affordable Housing Monitoring Project, City of Corona, Riverside County, CA. Cogstone conducted cultural and paleontological resources monitoring, analyzed recovered artifacts, and prepared a monitoring compliance report during grading for the development of affordable multi-family apartment buildings. Conducted lab work and artifact analysis. Sub to C&C Development. Principal Investigator for Paleontology. 2018-2019

Fire Station 172 Project, Rancho Cucamonga Fire Protection District, San Bernardino County, CA. Cogstone determined the potential effects of paleontological, archaeological, and historical resources on the proposed project. The project involved relocation of the Fire Station from 9612 San Bernardino Road to 8870 San Bernardino Road. Services included the management of record searches, a Sacred Lands File search, a pedestrian survey, and completion the cultural resources assessment report. Sub to Michael Baker International. Principal Investigator for Paleontology. 2018

San Bernardino Countywide On-Call Services, San Bernardino, CA. As prime contractor, Cogstone provided cultural, historical, and paleontological resource services for short term projects. Task services included cultural resources assessments and monitoring in compliance with CEQA, NEPA, Section 106 of the NHPA, and County regulations. Short-term projects included Pioneertown and other roads, Bear Springs, Aldorf Road, Elder Creek, NTH Bridges, Marshall Boulevard, Cajon Creek, Dola Bridge, Lanzit Ditch, and Luna Road. Principal Investigator for Paleontology. 2016-2017

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PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KELLY VREELAND
Paleontologist & Co-Author

EDUCATION

2014 M.S., Geology, California State University, Fullerton (CSUF)
2010 B.S., Geology, CSUF

SUMMARY OF QUALIFICATIONS

Ms. Vreeland is a Paleontologist with over 10 years of experience in field paleontology. Her field and laboratory experience includes fieldwork and research projects throughout California and Nevada, as well as conducting fieldwork and surficial geologic mapping in Montana. Ms. Vreeland has expertise in invertebrate paleontology and paleoecology. Ms. Vreeland is a member of the Geological Society of America, the Paleontological Society, the Society for Sedimentary Geology, and the Association for Women in Geoscience.

SELECTED EXPERIENCE

State Route 60 Truck Lanes Project, RCTC, Caltrans District 8, City of Banning, Riverside County, CA. RCTC in cooperation with Caltrans proposed to construct an eastbound truck-climbing lane and westbound truck-descending lane – along with inside and outside standard shoulders in both directions. The total length of the project is 4.51 miles. A combined Paleontological Identification Report and Paleontological Evaluation Report (PIR/PER) found a high likelihood for this project to impact paleontological resources. Mitigation measures included a Paleontological Mitigation Plan (PMP) which included requiring a paleontological Worker Environmental Awareness Program (WEAP) training, signed repository agreement with the San Bernardino County Museum, monitoring by a principal paleontologist, and defined standard field and laboratory methods. Cogstone is providing paleontological monitoring. At the end of construction, Cogstone will prepare a Paleontological Monitoring Report (PMR). Caltrans is the lead agency under NEPA and CEQA. Sub to ECORP. Supervisor. 2020-*ongoing*

University of California Natural Reserve System San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project, City of Irvine, Orange County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources for the proposed long-term water management improvements and habitat value of the Marsh Reserve. Services included pedestrian survey, records searches, Sacred Lands File search from the NAHC, background research, and reporting. Due to the proximity of the project to the San Diego Creek, the project required a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and Section 106 NHPA compliance. University of California acted as the lead CEQA agency and USACE acted as lead agency under NEPA. Sub to Moffat & Nichol. Paleontology Supervisor. 2020-2021

Los Angeles World Airports (LAWA) United Airlines East Maintenance Hangar and Ground Support Equipment Project, LAX, Los Angeles County, CA. Cogstone conducted cultural and paleontological monitoring during the proposed consolidation and modernization of existing facilities. The project intended to redevelop an approximately 35-acre site. Planned vertical impacts were up to 6 feet deep for footings, at least 10.5 feet for stormwater detention, and 50 to 70 feet deep for auguring. Upon completion of monitoring, Cogstone prepared a Cultural and Paleontological Resources Monitoring Compliance Report. The City of Los Angeles acted as lead agency for the project. Sub to CDM Smith. Paleontology Supervisor. 2020-2021

Jack Ranch San Luis Obispo Agricultural Cluster Project, City of San Luis Obispo, San Luis Obispo County, CA. Cogstone prepared a cultural and paleontological assessment to propose effective mitigation of potential adverse impacts to paleontological resources resulting from a proposed subdivision of a 299-acre property into 13 residential lots as well as a Conditional Use Permit to allow for a Major Agricultural Cluster project. Cogstone provided archaeological and paleontological monitoring and submitted a Cultural and Paleontological Resources Monitoring Compliance Report upon completion. Sub to Kirk Consulting. Paleontology Supervisor. 2020-2021

APPENDIX B: PALEONTOLOGICAL RECORDS SEARCH

WESTERN SCIENCE CENTER

Cogstone Resource Management, Inc.
Logan Freeberg
1518 W. Taft Avenue
Orange, CA 92865

March 25, 2021

Dear Mr. Freeberg,

This letter presents the results of a record search conducted for the Harvill Trailer Storage Yard Project in the city of Perris, Riverside County, California. The project site is located west of Harvill Avenue and north of Orange Avenue in Section 13 of Township 4 South and Range 4 West, and Section 18 of Township 4 South and Range 3 West on the *Perris, CA* USGS 7.5 minute topographic quadrangle.

The geologic unit underlying the project area is mapped entirely as alluvial fan deposits dating to the early Pleistocene epoch (Morton, Bovard, & Alvarez, 2003). Pleistocene alluvial units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or within a one mile radius, but does have numerous localities within similarly mapped alluvial sediments throughout the region. Pleistocene alluvial deposits in southern California are well documented and known to contain abundant fossil resources including those associated with Columbian mammoth (*Mammuthus columbi*), Pacific mastodon (*Mammut pacificus*), Sabertooth cat (*Smilodon fatalis*), Ancient horse (*Equus sp.*) and many other Pleistocene megafauna.

Any fossils recovered from the Harvill Trailer Storage Yard Project area would be scientifically significant. Excavation activity associated with development of the area has the potential to impact the paleontologically sensitive Pleistocene alluvial units and it is the recommendation of the Western Science Center that a paleontological resource mitigation plan be put in place to monitor, salvage, and curate any recovered fossils associated with the current study area.

If you have any questions, or would like further information, please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,

Darla Radford
Collections Manager

2345 Searl Parkway ♦ Hemet, CA 92543 ♦ phone 951.791.0033 ♦ fax 951.791.0032 ♦ WesternScienceCenter.org

APPENDIX C: PALEONTOLOGICAL SENSITIVITY RANKING CRITERIA

PFYC Description Summary (BLM 2016)	PFYC Rank
Very Low. The occurrence of significant fossils is non-existent or extremely rare. Includes igneous (excluding air-fall and reworked volcanic ash units), metamorphic, or Precambrian rocks. Assessment or mitigation of paleontological resources is usually unnecessary except in very rare or isolated circumstances that result in the unanticipated presence of fossils.	1
Low. Sedimentary geologic units that are unlikely to contain vertebrate or scientifically significant nonvertebrate fossils. Includes rock units less than 10,000 years old and sediments with significant physical and chemical changes (e.g., diagenetic alteration) which decrease the potential for fossil preservation. Assessment or mitigation of paleontological resources is not likely to be necessary.	2
Moderate. Units are known to contain vertebrate or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered and/ or of low abundance. Common invertebrate or plant fossils may be found and opportunities may exist for casual collecting. Paleontological mitigation strategies will be based on the nature of the proposed activity. Management considerations cover a broad range of options that may include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Surface-disturbing activities may require assessment by a qualified paleontologist to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources.	3
High. Geologic units containing a high occurrence of significant fossils. Fossils must be abundant per locality. Vertebrates or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Mitigation plans must consider the nature of the proposed disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access that could result in looting. Detailed field assessment is normally required and on-site monitoring or spot-checking may be necessary during land disturbing activities. In some cases avoidance of known paleontological resources may be necessary.	4
Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate or scientifically significant invertebrate or plant fossils. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities. Paleontological mitigation may be necessary before or during surface disturbing activities. The area should be assessed prior to land tenure adjustments. Pre-work surveys are usually needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.	5
Unknown. An assignment of "Unknown" may indicate the unit or area is poorly studied and field studies are needed to verify the presence or absence of paleontological resources. The unit may exhibit features or preservational conditions that suggest significant fossils could be present, but little information about the actual unit or area is known. Literature searches or consultation with professional colleagues may allow an unknown unit to be provisionally assigned to another Class, but the geological unit should be formally assigned to a Class after adequate survey and research is performed to make an informed determination.	U
Water or Ice. Typically used only for areas which have been covered thus preventing an examination of the underlying geology.	W, I