PALEONTOLOGICAL RESOURCES
IMPACT MITIGATION PROGRAM

CAMARILLO ACADEMY HIGH SCHOOL + PERFORMING ARTS CENTER
(RANCHO CAMPANA HIGH SCHOOL)
OXNARD UNION HIGH SCHOOL DISTRICT
VENTURA COUNTY, CALIFORNIA

LSA

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LSA Associates, Inc. has been contracted by Oxnard Union High School District (OUHSD) to prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the Camarillo Academy High School and Performing Arts Center, located in an unincorporated area of the County of Ventura (County), just north of the city limits for the City of Camarillo, California. The OUHSD proposes to construct a new high school on an approximate 77.3-acre parcel of land. The new name of the school is Rancho Campana High School. According to the Paleontological Resources Assessment that was prepared for the project (Smith, 2012), sediments that may be encountered during the development of this project include Holocene Alluvial Fan Deposits on the surface, with the potential to encounter Older Alluvium from the Pleistocene and the Las Posas Formation at depth once excavation begins. Both the Pleistocene Alluvium and the Las Posas Formation have produced fossils in the region. Because of the potential to encounter paleontological resources during project-related excavation, the paleontological assessment recommended that a PRIMP be developed to guide the mitigation effort.

In order to mitigate potential adverse impacts to nonrenewable, paleontological resources in sediments with a High sensitivity rating, the mitigation included in this PRIMP should be implemented and followed. Briefly, the mitigation measures include:

- Attendance at the pregrade meeting by a qualified paleontologist or his/her representative. At this meeting, the paleontologist will explain the likelihood for encountering paleontological resources and the procedures that will be employed if resources are observed both when a paleontologist is on site and when one is not on site.

- During construction excavation, all grading activities that occur between the surface and a depth of 5 feet (ft) below the surface will not require paleontological monitoring. However, in the event that construction workers observe something they believe may be a paleontological resource, work in the immediate area should be halted and a qualified paleontologist should be contacted to assess the find for significance and collect it, if it is determined to be significant. If determined to be significant, the qualified paleontologist may recommend that monitoring occur at shallower depths.

- During construction excavation, a qualified vertebrate paleontological monitor shall be present on a full-time basis whenever excavation will occur below a depth of 10 ft within the on-site alluvial sediments, or within the sediments that have a High sensitivity rating, if sediments with a High sensitivity rating are encountered at shallower depths. Monitors shall also be present on a part-time, spot-check basis for all excavations that occur between 5 and 10 ft below the surface to determine whether sediments with a High paleontological sensitivity rating are present, unless sediments with a High paleontological sensitivity rating are encountered at shallower depths. Full-time monitoring in areas of High sensitivity may be reduced to a part-time basis if no resources are being discovered (monitoring reductions and when they occur shall be determined by the qualified paleontologist). The monitor shall inspect fresh cuts and/or spoil piles to recover paleontological resources. The monitor shall be empowered to temporarily divert construction equipment away from the immediate area of any discoveries. The monitor shall be equipped to...
rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the grading contractor shall consider using heavy equipment on site to assist in the removal and collection of large materials.

- Localized concentrations of small (or micro-) vertebrates may be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened through 1/8- to 1/20-inch mesh screens to determine whether microvertebrates are present. If microvertebrates are encountered, additional sediment samples (up to 3 cubic yards or 6,000 pounds) shall be collected and processed through 1/20-inch mesh, and sometimes 1/30-inch mesh screens, to recover additional fossils. The processing of large bulk samples is best accomplished at a designated location within the project limits that will be accessible throughout the duration of construction but will also be away from any proposed cut or fill areas. Processing is usually completed concurrently with construction, with the intent of having all processing completed before or just after project completion. A small corner of a staging or equipment parking area is an ideal location. If water is not available, the location should be accessible for a water truck to occasionally fill containers with water.

- Any collected specimens shall be identified to the lowest taxonomic level possible and curated into an accredited institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens on request. The draft curation agreement between the landowner and/or the qualified paleontologist and the curation facility should be in place with an approved curation facility prior to, or soon after, the initiation of any paleontological monitoring or mitigation activities.

- A report of findings will be prepared at the conclusion of the project discussing what was found and the significance of the finds. This report shall be submitted to the OUHSD, as well as to the museum repository, if any paleontological resources are collected.
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INTRODUCTION

LSA Associates, Inc. (LSA) was retained by the Oxnard Union High School District (OUHSD) to prepare a Paleontological Resources Impact Mitigation Program (PRIMP) for the Camarillo Academy High School and Performing Arts Center (CAHS+PAC) Project located in an unincorporated area of Ventura County, California, immediately north of the City of Camarillo.

The proposed project is located within a roughly, triangular-shaped 77.3-acre (ac) parcel. Earthwork associated with the current project includes approximately 2.5 feet (ft) of excavation in an approximately 28 ac area in the southeast section of the parcel. An area in the northeast corner of the parcel will be developed at a later date as a future school site.

The paleontological locality search, field survey, and assessment were conducted pursuant to the California Environmental Quality Act (CEQA) Guidelines, Appendix G, and the California Public Resources Code (PRC) 5097.5. The assessment documents the potential for paleontological resources older than 10,000 years to occur in the project area. In addition, work was conducted following the guidelines of the Society of Vertebrate Paleontology (SVP, 2010 and 1995). An impact to paleontological resources is considered significant if it can be reasonably argued that the project would directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

PROJECT LOCATION

The proposed project is located within Assessor’s Parcel Number (APN) 156-0-180-345. The property is currently in use as an agricultural field, growing seasonal vegetables. The project is bound on the north, west, and east by agricultural fields, and on the south by a hospital, houses, and a library. The project area is depicted on the United States Geological Survey (USGS) Camarillo, California 7.5-minute topographic quadrangle map (USGS, 1950) in an unsectioned portion of Township 2 North, Range 20 West; San Bernardino Baseline and Meridian (Figure 1). The PRIMP pertains to portions within the project area where ground-disturbing activities may occur.

GOALS

The goal of the PRIMP is to provide guidance for the monitoring, collection, and curation of paleontological resources that may be encountered during ground-disturbing activities associated with the development of the CAHS+PAC. The goals are as follows:

- Avoid destruction of scientifically important fossils
- Identify areas having scientifically important fossils
- Collect (remove) and preserve scientifically important fossils
- Allow and maintain access for scientific study of important fossils
LAS POSAS ROAD
LEWIS ROAD

LEGEND

Project Location
Detention Basin

Camarillo Academy High School + Performing Arts Center
Project Location Map

SOURCE: County of Ventura (2009); USGS 7.5' Quad., Camarillo, CA (1967)
I:\0SD1102\GIS\Prog_USGS.mxd (1/14/2013)
PURPOSE OF THE PALEONTOLOGICAL RESOURCES IMPACT MITIGATION PROGRAM

State of California

Under State law, paleontological resources are protected by CEQA. CEQA, Appendix G is a checklist with several choices given, including: Potentially Significant Impact, Less than Significant with Mitigation Incorporated, Less than Significant Impact, and No Impact. Specifically, in Appendix G, Section V(c), lead agencies are required to consider impacts to paleontological resources.

County of Ventura

The County General Plan (Ventura County, 2011a) sets forth the goals, policies, and programs the County uses to manage future growth and land uses. The General Plan, adopted by the Board of Supervisors, embodies the vision for the future of unincorporated Ventura County. Within the General Plan, there are several Goals, Programs, and Policies that deal specifically with paleontological resources. These include:

**Goals**

1. Identify, inventory, preserve, and protect the paleontological and cultural resources of Ventura County (including archaeological, historical, and Native American resources) for their scientific, educational, and cultural value.

2. Enhance cooperation with cities, special districts, other appropriate organizations, and private landowners in acknowledging and preserving the County’s paleontological and cultural resources.

**Policies**

1. *Discretionary developments* shall be assessed for potential paleontological and cultural resource impacts, except when exempt from such requirements by CEQA. Such assessments shall be incorporated into a Countywide paleontological and cultural resource database.

2. *Discretionary development* shall be designed or redesigned to avoid potential impacts to significant paleontological or cultural resources whenever possible. Unavoidable impacts, whenever possible, shall be reduced to a less than significant level and/or shall be mitigated by extracting maximum recoverable data. Determinations of impacts, significance, and mitigation shall be made by qualified archaeological (in consultation with recognized local Native American groups), historical, or paleontological consultants, depending on the type of resource in question.

3. Mitigation of significant impacts on cultural or paleontological resources shall follow the Guidelines of the State Office of Historic Preservation, and the State Native American Heritage Commission, and shall be performed in consultation with professionals in their respective areas of expertise.
Programs

1. The County Cultural Heritage Board will continue to assist the County of Ventura in identifying and preserving significant County architectural and historical landmarks.

2. The Planning Division will continue to compile and retain a list of qualified archaeological, historical, and paleontological consultants to provide additional information to complete Initial Studies and Environmental Analyses.

In summary, the County General Plan requires that prior to development, the subject property be inventoried for paleontological resources, and if necessary, that those resources be assessed for scientific and educational significance; and if significant resources are identified, that appropriate project-specific measures to avoid or otherwise mitigate adverse effects be developed.

City of Camarillo

The General Plan of the City (City of Camarillo, 2004) includes the Community goals, Objectives, Principles, and Standards for the development and use of the physical structures in the City. Although the General Plan contains protection for things such as agricultural and archaeological resources within the City, it contains no specific policies for the protection of paleontological resources. As such, no City-specific protections of paleontological resources will be required for this project.

ENVIRONMENTAL IMPACT REPORT

The Environmental Impact Report (EIR) that was prepared for the CAHS+PAC (LSA, 2013) contains one mitigation measure that pertains to paleontological resources:

Mitigation Measure 4.5.3: Paleontological Resource Impact Mitigation Program. Prior to any ground-disturbing activities, the Oxnard Union High School District (OUHSD) Project Manager will require the construction contractor to have a Paleontological Resource Impact Mitigation Program (PRIMP) prepared by a qualified paleontologist. The OUHSD Project Manager will require the construction contractor to initiate implementation of the PRIMP at the beginning of ground-disturbing activities.

The PRIMP will address and define the following specific activities and responsibilities:

- Full-time monitoring by a qualified paleontologist during all grading and excavation extending more than 10 feet (ft) below ground surface (bgs).
- Spot-check monitoring by a qualified paleontologist for all grading and excavation between 5 and 10 ft bgs to determine
whether older sediments with a potential to contain paleontological resources are present.

- Procedures for the paleontological monitor to temporarily redirect construction away from an area if paleontological resources are encountered during grading or excavation in order to assess the significance of the find under the California Environmental Quality Act (CEQA) Guidelines.

- Procedures in the event paleontological resources are encountered when a paleontological monitor is not on site, including halting work in the immediate area of the find, contacting the paleontological monitor to assess the find for significance, and collecting the find from the construction area if it is determined to be significant.

- Procedures for the paleontologist to make and implement recommendations as to whether or not monitoring should be required on a full-time basis beginning at a shallower depth in the event a significant find is located in sediments less than 10 ft bgs or if it is determined that older sediments with a potential to contain paleontological resources are present during spot-check monitoring.

- Procedures for the handling of collected resources, including preparation to the point of identification (to the lowest taxonomic level possible); cataloging the resources; and curation of the resources into the permanent collection of an accredited scientific institution.

- Content and preparation of a final report to document the results of the monitoring program.

This PRIMP has been developed to comply with Mitigation Measure 4.5.3 and to guide the monitoring effort within the project.

PROJECT PERSONNEL

Brooks Smith

Brooks Smith is an Associate and has been with LSA for 21 years. Mr. Smith has a Bachelor of Science Degree in Earth Science from the University of California, Santa Cruz. He has extensive experience surveying for paleontological and archaeological resources, assisting with excavations on archaeological sites, collecting paleontological resources, salvaging large fossil specimens and bulk sediment samples, fossil identification and curation, and the preparation of paleontological assessment reports and final mitigation monitoring reports at the conclusion of construction projects. Mr. Smith has worked on many different projects, including utility companies (San Diego Gas and Electric, The Gas Company, and Southern California Edison Company), oil companies (Chevron Pipeline, Plains All American Pipeline, Mobil Pipeline, and TRC), the California Department of Transportation (Caltrans), and private developers. Some projects required obtaining special permits.
and agency coordination because the projects were located on lands managed by the U. S. Department of Interior, Bureau of Land Management (BLM) or the U. S. Department of Agriculture, Forest Service (Forest Service). Mr. Smith’s resume is attached as Appendix A.
SIGNIFICANCE AND SENSITIVITY

SIGNIFICANCE
The SVP provides the following definitions of significance:

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

- **A Significant Fossiliferous Deposit** is a rock unit or formation that contains significant nonrenewable paleontological resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals; e.g., trackways or nests and middens that provide datable material and climatic information). Paleontological resources are considered to be older than recorded history and/or older than 5,000 years before the present (SVP, 1995).

Generally, scientifically significant paleontological resources are identified sites or geological deposits containing individual fossils or assemblages of fossils that are unique or unusual, diagnostically or stratigraphically important, and add to the existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally (SVP, 1995). Particularly important are fossils found in situ (undisturbed) in primary context (e.g., fossils that have not been subjected to disturbance subsequent to their burial and fossilization). As such, they aid in stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphic evolution, paleoclimatology, the relationships between aquatic and terrestrial species, and evolution in general. Terrestrial vertebrate fossils are often assigned greater significance than other fossils because they are rarer than other types of fossils. This is primarily due to the fact that the best conditions for fossil preservation include little or no disturbance after death and quick burial in oxygen-depleted, fine-grained sediments. While these conditions often exist in marine depositional settings, they are relatively rare in terrestrial depositional settings. This has ramifications on the amount of scientific study needed to adequately characterize an individual species and, therefore, affects how relative sensitivities are assigned to formations and rock units.

Although the project is not located within Orange County, Eisentraut and Cooper (2002) developed a useful analysis for judging whether fossils are scientifically significant that can be applied almost anywhere. In their Model Curation Program, fossils can be judged scientifically significant if they meet any of the following criteria within the following categories:
• **Taxonomy:** Assemblages that contain rare or unknown taxa such as defining new (previously unknown to science) species or represent a species that is the first or has very limited occurrence within the area or formation.

• **Evolution:** Fossils that represent important stages or links in evolutionary relationships or fill gaps or enhance underrepresented intervals in the stratigraphic record.

• **Biostratigraphy:** Fossils that are important for determining or confining relative geologic (stratigraphic) ages or for use in defining regional to interregional stratigraphic associations. These fossils are often known as biostratigraphic markers and represent plants or animals that existed for only a short and restricted period in the geologic past.

• **Paleoecology:** Fossils that are important for reconstructing ancient organism community structure and interpretation of ancient sedimentary environments. Depending on which fossils are found, much can be learned about the ancient environment from water depth, temperature, and salinity to what the substrate was like (muddy, sandy, or rocky) to even whether the area was in a high energy (e.g., beach) or low-energy (e.g., a bay) location. Even terrestrial animals can contain information about the ancient environment. For example, an abundance of grazing animals such as horse, bison, and mammoth suggest more of a grassland environment, while an abundance of browsing animals such as deer, mastodon, and camel suggest more of a brushy environment. Preserved parts of plants can also lend insight into what was growing in the area at a particular time. In addition, by studying the ratios of different species to each other’s population densities, relationships between predator and prey can be determined.

There is a complex but vital interrelationship among evolution, biostratigraphy, and paleoecology. Biostratigraphy (the record of fossil succession and progression) is the expression of evolution (change in populations of organisms through time), which in turn is driven by natural selection pressures exerted by changing environments (paleoecology).

• **Taphonomy:** Fossils that are exceptionally well or unusually/unique preserves or are relatively rare in the fossil record. This could include preservation of soft tissues such as hair, skin, or feathers from animals or the leaves/stems of plants that are not commonly fossilized.

**Summary of Significance**

All vertebrate fossils that can be related to a stratigraphic context are significant and are considered significant, nonrenewable, paleontological resources. Invertebrate and plant fossils as well as other environmental indicators associated with vertebrate fossils are considered significant. Certain invertebrate and plant fossils that are regionally rare or uncommon or help to define stratigraphy, age, or taxonomic relationships are considered significant.

**SENSITIVITY**

Planners and paleontologists have worked together to help preserve the County’s long fossil heritage. In response to CEQA, a system is used to determine the potential for the occurrence of fossils during the initial scoping phase of each project. When an earthmoving project begins, a standard PRIMP can be followed that will reduce impacts to the fossils to a less than significant level.
According to the SVP (2010), protection of paleontological resources includes: (a) assessment of the potential for the area to contain significant paleontological resources that could be directly or indirectly impacted, damaged, or destroyed by the proposed development; and (b) formulation and implementation of measures to mitigate these adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged fossils along with all contextual data in established institutions.

According to the SVP (2010), Paleontological Potential is the potential for the presence of significant nonrenewable paleontological resources. All sedimentary rocks, some volcanic rocks, and some metamorphic rocks have potential for the presence of significant nonrenewable paleontological resources, and review of available literature may further refine the potential of each rock unit, formation, or facies. The SVP has four categories of potential, or sensitivity: High, Low, No, and Undetermined. If a geographic area or geological unit is classed as having undetermined potential for paleontological resources, studies must be undertaken to determine if that rock unit has a sensitivity of either High, Low, or No. These categories are described in more detail below.

**High Potential**

Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a High potential for containing additional significant paleontological resources. Rock units classified as having High potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), some low-grade metamorphic rocks that contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, and fine-grained marine sandstones). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units that contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units that may contain new vertebrate deposits, traces, or trackways, are also classified as having High potential.

**Low Potential**

Reports in the paleontological literature or field surveys by a qualified paleontologist may allow determination that some rock units have a Low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus, only preserve fossils in rare circumstances; the presence of fossils is the exception, not the rule (e.g., basalt flows or recent colluvium). Rock units with Low potential typically will not require impact mitigation measures to protect fossils.
No Potential

Some rock units have no potential to contain significant paleontological resources (e.g., high-grade metamorphic rocks [such as gneisses and schists] and plutonic igneous rocks [such as granites and diorites]). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources.

Undetermined Potential

Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine whether these rock units have High or Low potential to contain significant paleontological resources. A field survey by a qualified professional to specifically determine the paleontological resource potential of these rock units is required before a PRIMP can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

If an area is determined to have a High potential for containing paleontologic resources, the SVP recommends that a program to mitigate impacts should be developed. In areas of High sensitivity, a pre-excavation survey prior to excavation is also recommended to locate surface concentrations of fossils that might need special salvage methods.

Summary of Sensitivity

A formation or rock unit has paleontological sensitivity or the potential for significant paleontological resources if it has previously produced, or has lithologies conducive to the preservation of, vertebrate fossils and associated or regionally uncommon invertebrate and plant fossils. All sedimentary rocks, except those younger than 5,000 to 10,000 years, and certain extrusive volcanic rocks and mildly metamorphosed rocks, are considered to have potential for paleontological resources.
GEOLOGY AND PALEONTOLOGY

Paleontological resources, or fossils, are the remains (e.g., bones, teeth, shells, leaves, or wood) and/or traces (e.g., tracks or burrows) of prehistoric animal and plant life. Generally, for something to be considered a fossil, it must be at least 11,700 years old, although the SVP (2010) sometimes considers anything more than 5,000 years old to be a fossil. Fossils provide evidence of ancient organisms and can document the patterns of organic evolution and extinction. In California, impacts to paleontological resources are addressed through the environmental review process pursuant to CEQA. In order to determine whether paleontological resources will be impacted, geologic maps are examined and research is undertaken to determine whether paleontological resources have been found in the same or similar sediments to those that outcrop within the project area.

GEOLOGIC SETTING

The project area is located within the northwestern portion of the Transverse Range Geomorphic Province of Southern California (California Geological Survey, 2002). The Transverse Range Geomorphic Province is characterized by steep mountains and valleys that trend in an east-west direction that is at an oblique angle to the northwest-southeast trend of the California coast, hence the name “Transverse.” This type of trend is extremely rare elsewhere in the United States. Compression along the San Andreas Fault is squeezing and rotating the Transverse Ranges, resulting in this area being one of the most rapidly rising regions on earth (California Geological Survey, 2002). Thick sequences of Cenozoic, organic-rich sedimentary rocks have been folded and faulted, resulting in the area being an important source for oil.

Specifically, the project is located in an alluvial valley between the Camarillo Hills to the west and the Las Posas Hills to the east. The western end of the Santa Monica Mountains is located just to the southeast. The project area is characterized by relatively low-lying topography with a gentle, less than 1 percent slope to the southwest, and an abundance of alluvial stream deposits from Arroyo Las Posas/Calleguas Creek. According to geologic mapping prepared by Tan, et al. (2004), there is one geologic unit that occurs within the project area: Holocene Alluvial Fan Deposits. In addition, Tan, et al. (2004), indicate that Pleistocene Alluvial Fan Deposits and the Pleistocene Las Posas Formation are located immediately to the north of the project area. Both of these Pleistocene units may exist at depth within the project area. The geotechnical investigations associated with this project (Koury Geotechnical Services, 2012) indicate that the project is underlain by alluvium to the deepest depth drilled (51.5 ft), and the Las Posas Formation was not encountered in any of the borings. However, some borings were shallower, and there may still be a possibility for this formation to be present at depth within the project. The geology of the project area and vicinity is depicted on Figure 2, and a brief description of each unit that may be encountered during project-related excavation is provided below.
FIGURE 2

Camarillo Academy High School + Performing Arts Center
Geology Map

Legend:
- Project Location
- (Qf) Very young Alluvial-fan deposits
- (Qw) Active wash deposits within major river channels
- (Qha) Holocene Alluvial deposits
- (Qht) Holocene Stream terrace deposits
- (Qhf) Holocene Alluvial-fan deposits
- (Qlp) Las Posas Formation
- Fault, approx. located, queried where uncertain
- Contact between map units

Holocene Alluvial Fan Deposits

Holocene Alluvial Fan Deposits are sometimes known as very young or active Alluvial Fan Deposits. These sediments are derived from local streams emerging from the hills and mountains and deposit their sediment load near the mouth of the canyon in an alluvial fan, or on the valley floor itself. In general, they range in age from decades to several thousand years. However, by definition, the Holocene spans the time period from 11,700 years ago to the present, so some may be as old as 11,700 years. These deposits consist of loosely consolidated mixtures of gravel, sand, silt, and clay, ranging from poorly sorted to well-sorted. The sand grains are composed of mainly quartz, but also feldspar, biotite, and other minerals. The sand grains are generally subangular to subrounded, while the gravels and cobbles are rounded to well-rounded. There are sometimes larger-sized boulders and cobbles, especially close to the mouths of canyons. Color is usually yellow-brown to gray-brown and is usually dependent on the nearby, or upstream, geology. According to Tan, et al. (2004), within the City area, these sediments consist of hyperconcentrated mudflows or braided stream flows, composed of moderately to poorly sorted and moderately to poorly bedded sandy clay with some silt and gravel.

Pleistocene Alluvial Fan Deposits

Pleistocene Alluvial Fan Deposits are also known as Old Alluvial Fan Deposits. They are similar to the Holocene Alluvial Fan Deposits described above, but are generally found on elevated terraces above the Holocene Alluvial Fan Deposits, or at depth beneath the Holocene Alluvial Fan Deposits. The Pleistocene Alluvial Fan Deposits located just to the west of the project, and likely at depth within the project, were deposited during the late Pleistocene (between 300,000 to 11,700 years ago) (Tan et al., 2004). They are composed of mixtures of gravel, sand, silt, and clay that is usually moderately to poorly sorted and bedded. These deposits are also slightly to moderately consolidated, and when exposed on the surface they have usually been dissected by erosional gulleys, and have some soil development. Colors can be variable, based on upstream geology, but are usually shades of reddish brown.

Las Posas Formation

The Las Posas Formation is a Pleistocene Formation that was deposited in a marine environment. It consists of approximately 1,500 +/- ft of loosely consolidated sands and conglomerates alternating with beds of silty sand and gravel (Wilmarth, 1931). In the Las Posas Hills, it consists of 75 ft of lightly colored conglomerates and yellow to tan fine- to medium-grained sands. It is considered to be equivalent to the highly fossiliferous San Pedro Sand that is exposed elsewhere along the California coast. Within the City area, Tan, et al. (2004) report that this formation consists of weakly consolidated sandstone, with some gravelly sand units and that this formation is very prone to landslides.

PALEONTOLOGY

Holocene Alluvial Fan Deposits

Although Holocene alluvium can contain remains of plants and animals, generally not enough time has passed for the remains to become fossilized. In addition, the remains are contemporaneous with modern species, and these remains are usually not considered to be significant. It should be noted that
although an area may be mapped with Holocene Alluvium on the surface, deposits of Pleistocene alluvium or older formations are often encountered as shallow as 5 to 10 ft below the surface, and these older sediments can and do contain fossils. Within the project area, these older sediments are likely at least 10 ft beneath the surface.

**Pleistocene Alluvial Fan Deposits**

Pleistocene Alluvium is defined as having been deposited during the Pleistocene (2.58 million to 11,700 years ago). Adjacent to the project area and at depth within the project area, these sediments are on the younger end of the spectrum, ranging in age from the middle to late Pleistocene (300,000 to 11,700 years ago). Within the project area, these middle to late Pleistocene alluvial sediments would likely not be encountered until a depth of 10 ft or more below the surface is reached. This depth is based on the discoveries of Pleistocene fossils at depth in areas mapped as Holocene Alluvium on the surface. Fossils are known in similar deposits from excavations for roads, housing developments, and quarries within the Southern California area (Jefferson, 1991a, 1991b; Reynolds and Reynolds, 1991; and Miller, 1971). Mammoths are the indicator fossil for the Pleistocene Epoch, which is divided into the older Irvingtonian North American Land Mammal Age (NALMA) that spans the period between 2.58 million and 300,000 years ago, and the Rancholabrean NALMA that spans the last 300,000 years of the Pleistocene. The indicator fossil for the Rancholabrean NALMA is *Bison* sp. Both NALMAs contain other fossils such as horse, coyote, rodent, bird, reptile, and fish that help describe climatic and habitat conditions during the last 2 million years. There is a potential for these types of fossils whenever Pleistocene alluvial sediments are exposed. At depth within the project, fossils from the Rancholabrean NALMA would be expected.

**Las Posas Formation**

This formation contains invertebrate fossils that indicate deposition in a cool water environment (Wilmarth, 1931). In addition, the Natural History Museum of Los Angeles County (LACM) knows of a fossil eagle ray (*Myllobatis* sp.) from this formation, and Jefferson (1991b) reports a fossil horse (*Equus* sp.) tooth from the Las Posas Hills located to the east and a fossil horse (*Equus* sp., cf *E. occidentalis*) tooth from the Camarillo Hills, located to the north and west.
PROPOSED MITIGATION PLAN

PERSONNEL
The mitigation and monitoring program should be implemented and directed by a qualified paleontologist. Unlike some other disciplines, neither the federal nor California State governments have mandated educational and/or experience requirements for paleontologists. However, the County of Ventura, within their Initial Study Assessment Guidelines (Ventura County, 2011b), has developed a set of criteria to define a qualified paleontologist. This document was also developed to assist in providing a uniform evaluation of significant effects. It should be noted that according to the forward in this document, these guidelines are not binding on any decision-maker and should not be substituted for the use of independent judgment to determine significance or the evaluation of evidence in the record. According to the Initial Study Assessment Guidelines (Ventura County, 2011b), a qualified paleontologist is:

Paleontological Consultants (Paleontologists):

- **Education:** Paleontological Consultants must hold a Bachelor of Science degree in Paleontology, Geology, or related discipline.
- **Experience:** A minimum of 5 years of experience performing paleontological, geological, or related studies is required.
- **Local and State Expertise:** Paleontological Consultants must provide evidence of expertise in local and regional vertebrate and invertebrate paleontology. Evidence of conducting fossil collection, curation, and reporting are necessary.
- **Professional Registration or Certification:** Verification of certification in the paleontological field by membership in a professional society is required.

MONITORING EFFORT

The paleontological sensitivities for each of the units that may be encountered during ground-disturbing activities within the study area are listed in Table A along with the initial recommended monitoring effort. This initial recommendation may be reduced or increased by the qualified paleontologist as the project progresses. A brief discussion of the sensitivity designations, including the types of resources that may be encountered, why they are significant, and the suggested monitoring methods, is also included below.

**Holocene Alluvial Fan Deposits**

Holocene Alluvium is too young to contain fossils. Within the project area this sediment likely extends to a depth of 5 to 10 ft below the surface. Although Holocene Alluvial Fan Deposits can contain remains of plants and animals, generally not enough time has passed for the remains
Table A: Paleontological Sensitivities of Geological Units within the Project Area and Recommended Monitoring Effort

<table>
<thead>
<tr>
<th>Formation/Unit</th>
<th>Sensitivity</th>
<th>Location within Project</th>
<th>Monitoring Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holocene Alluvial Fan Deposits</td>
<td>Low</td>
<td>Surface to 5 ft below surface</td>
<td>None</td>
</tr>
<tr>
<td>Holocene to Pleistocene Alluvial Fan Deposits</td>
<td>Low to High</td>
<td>Between 5 and 10 ft below the surface</td>
<td>Spot-check</td>
</tr>
<tr>
<td>Pleistocene Alluvial Fan Deposits</td>
<td>High</td>
<td>Deeper than 10 ft below the surface</td>
<td>Full-time</td>
</tr>
<tr>
<td>Las Posas Formation</td>
<td>High</td>
<td>Unknown, but potentially below surface in some areas</td>
<td>Full-time</td>
</tr>
</tbody>
</table>

ft = feet

become fossilized; in addition, the remains are contemporaneous with modern species, and these remains are usually not considered to be significant. It should be noted that although an area may be mapped with younger alluvium on the surface, deposits of older alluvium are often encountered as shallowly as 5 to 10 ft below the surface, and these older sediments can and do contain fossils (see Pleistocene Alluvium section below).

Monitoring will not be required in areas mapped as Holocene Alluvium for excavation to a depth of 5 ft, unless older sediments that have paleontological sensitivity are encountered at shallower depths. Once a depth of 5 ft is reached and extending up to a depth of 10 ft, monitoring shall occur on a spot-check basis to determine whether older sediments have been encountered. The spot-check basis may be limited to 1 to 2 hours over several days per week. If older sediments are encountered, or if fossil resources are observed, monitoring shall occur as discussed below by formation/unit.

**Pleistocene Alluvial Fan Deposits**

Pleistocene Alluvial Fan Deposits can contain Pleistocene vertebrate fossils that are scientifically significant because they add to an understanding of the diversity of life during Pleistocene times in Southern California. As such, these sediments have a High paleontological sensitivity rating.

Paleontological monitoring should occur on a full-time basis in these sediments. The exact depth at which these sediments will be reached is not known; however, based on fossil discoveries elsewhere, the depth may be from 5 to 10 ft below the surface; and it is extremely likely that these sediments will be encountered once a depth of 10 ft is reached. Monitors should look for both large and small vertebrate fossil remains. As the sediment is usually unconsolidated, it is a good candidate for spot screening for small vertebrate remains. If any small vertebrate remains are observed, a standard sample of up to 3 cubic yards (cy) or 6,000 pounds (lbs) should be collected from the sedimentary layer that is producing the fossils and processed through at least 1/20-inch mesh screens.

**Las Posas Formation**

The Las Posas Formation has the potential to contain invertebrate and vertebrate fossils that help to determine environmental conditions offshore during the Pleistocene. In addition, occasional terrestrial fossils are also found that help with reconstructing environmental conditions on land.
Like the Pleistocene Alluvial Fan Deposits described above, monitors should be looking for both large and small fossil remains; however, there is a more likely chance for invertebrate marine fossils in this formation based on the depositional environment. If the sediment is usually unconsolidated, it is a good candidate for spot screening for small vertebrate remains, such as the teeth of sharks and fish, as well as other animal teeth and bones. If any small vertebrate remains are observed, a standard sample of up to 3 cu yd or 6,000 lbs should be collected from the sedimentary layer that is producing the fossils and processed through at least 1/20-inch mesh screens. Not all invertebrate species need be collected, but at a minimum, a representative sample of invertebrates should be collected.

PRECONSTRUCTION SALVAGE

Preconstruction salvage is often undertaken in order to collect fossils from known localities prior to the beginning of construction so that there is little to no delay to grading when construction actually begins. This is good for both the resource and the project itself. If there are no known localities, a preconstruction survey is often undertaken in order to determine whether there are any unrecorded localities. This preconstruction survey is generally done prior to the beginning of grading to limit any delays to construction, but can also be done during the preconstruction meeting by the qualified paleontologist or representative. Based on the fact that the surface of the project is disturbed in the upper 12 to 18 inches, due to the area being plowed to this depth by agricultural activities in the past, and the fact that sensitive sediments will likely not be encountered until a depth of at least 5 ft, a preconstruction survey is not needed.

MONITORING METHODS

The numbers of monitors needed will depend on the number of spreads being excavated, the distance between each spread, and the sensitivity of the sediments in the areas being excavated. Generally, one monitor is needed for each spread located in sensitive sediments that is separated from another such spread by more than approximately 500 ft. Distances of more than approximately 500 ft make effective monitoring of two areas by one individual difficult. As the current project should not have a maximum distance of more than 500 ft, one monitor should be sufficient for this project. Monitors should have a minimum of 1 year experience in monitoring for, and collection of, paleontological resources and working around heavy equipment.

Monitors should observe all excavation in sediments identified as having High sensitivity as it occurs, examining the in situ sediments and the resulting backdirt for paleontological remains. In addition to visually examining the sediments, the monitors should spot-screen some matrix through 1/8-inch or 1/16-inch mesh screens for fossil materials. This allows remains that might otherwise be missed due to their small size to be observed. If small fossils are observed during screening, or observed during the course of regular monitoring, the monitors should have the authority to collect a standard sample of up to 3 cu yd or 6,000 lbs of matrix that can be screened in another location away from active grading operations (see the section on Bulk Samples, below).

During construction excavation, a qualified paleontological monitor shall initially be present on a full-time basis whenever excavation will occur within the sediments that have a High sensitivity rating and on a spot-check basis in sediments that have a Low sensitivity rating. It is not known at this
time whether there are areas within the project that contain Artificial Fill; as such, it will be assumed
that the Artificial Fill is only present in limited areas, and until determined otherwise, monitoring will
initially occur on a full-time basis. Full-time monitoring may be reduced to a part-time basis if no
resources are being discovered in sediments with a High sensitivity rating. Monitoring reductions and
when they occur will be determined by the qualified paleontologist as well as by consultation and
agreement between the paleontologist and the OUHSD.

If a paleontological resource is observed by the construction crew when the paleontological monitor
is not on site or is in a different area of the project, work in the area of the find should be rerouted
until the paleontological monitor or paleontologist is contacted to assess the find for significance and,
if necessary, collect it from the field. If the find is determined to be significant and is within an area
where monitoring has been reduced from full time to part time, it may be necessary for the
paleontologist to reassess the sensitivity and increase the monitoring from part time to full time.

If fossils are observed and collected, the localities need to be assigned field locality numbers. There
are several ways of assigning field locality numbers. One easy method consists of using the monitor’s
initials, the date of the find, and a number indicating whether the find is the first, second, or third,
etc., locality for that monitor on that day. For example, JAD-130815-02 would represent the second
locality found by John A. Doe on August 15, 2013. This method allows any notes the monitor
recorded in field books to be quickly and easily accessed. It also allows easy sorting of data within
spreadsheets and can be used to see what period during the excavation produced the majority of the
fossils.

To ensure the least amount of delay to grading activities, all monitors shall be equipped, either on
their person or in their vehicle, to quickly stabilize and collect fossil material. This shall include
equipment like a pick, shovel, rock hammer, dental picks, brushes, glue, hardeners, trowels, putty
knives, and plaster medical bandages. When resources are located in situ, monitors shall be prepared
and have the authority to halt or redirect the excavation work in the area of discovery until the find
can be assessed for significance, and if necessary, documented and collected from the field.

Procedures for rerouting equipment will need to be established with the qualified paleontologist and
the construction foreman. If the find is deemed significant, the monitors will need to note the location
with a global positioning system (GPS) unit. A simple handheld GPS unit is usually adequate. The
use of GPS units allows localities to quickly and accurately be recorded for use in spreadsheets, fossil
catalogs, or into geographic information system (GIS) programs for plotting the locations on a map.
Monitors must also be instructed to fill out a fossil locality sheet for each find. Fossil locality sheets
contain important information such as a field number of the locality, tentative identification of the
find, description of the sediments, formation name, location of the find within the project (e.g.,
project station number and distance from centerline or roadway shoulder), GPS information, and
elevation. Once the find is recorded, the monitor can then collect it from the field, and grading
activities may continue.

When an area is identified in which the grading equipment needs to be temporarily rerouted, the
monitors will need to set up an exclusion zone. Often this is accomplished with wooden lath and a
unique color flagging tape so that the construction crews know to stay out of this area. It is important
to use a unique color, or combination of colors, so as not to cause confusion with other tape colors
used on construction sites that may have other meanings. Another option is to use easily recognizable
yellow caution tape. Construction crews will need to be informed that they may not enter the exclusion zone until the monitors have completed the analysis and/or collection of the resource, or unless instructed to enter the area by the qualified paleontologist to assist with the collection.

When large specimens or large concentrations of specimens are encountered, a salvage team may need to be deployed to rapidly recover the specimens and to avoid construction delays. Salvaging often involves excavation around the fossil and wrapping the fossils and surrounding matrix in a “cast” or “jacket” made from plaster and burlap or plaster medical bandages. In this manner, the fossils can quickly and safely be removed from the field. The jacket can then be transported to a laboratory (lab) environment where the sediment surrounding the bone can be removed in a more controlled setting. If large fossils or large concentrations of fossils are encountered, the grading contractor shall consider using heavy equipment on site to assist in the removal and collection of the specimen. This may entail assisting with the removal of sediment from around the fossil and the lifting of heavy specimens onto a truck for removal from the project. This will ensure the timely salvage of the fossil material so that normal grading activities can proceed as soon as possible.

Monitors should also record their monitoring activities in a field book and/or on a daily monitoring form. The notes should record information such as the area where excavation is occurring, sediment type being excavated, number and types of equipment working, times and methods of monitoring, notes on any recovered fossils, and any other pertinent information on the project.

SAFETY MEASURES

All monitors, as well as any crew members required to assist with the salvage of large fossils or bulk samples, should follow the safety plan developed by the grading contractor. Of primary concern is Personal Protective Equipment (PPE). Regardless of the requirements developed by the grading contractor, all monitors should use PPEs such as work boots, long pants, an orange or bright yellow-green vest or shirt. Some project requirements may also include the use of additional PPEs (e.g., hard hats) and will likely be covered during the initial preconstruction meeting. In addition, eye and hearing protection as well as work gloves should be readily available for use by the monitors if the need arises.

Prior to the beginning of construction, the qualified paleontologist, or representative, shall lead a pregrade/preconstruction meeting to inform all workers and agencies involved of the monitoring plan. This will also help to inform the construction workers of the monitoring methods, and serve to alert the workers that monitors will be present on site and that the operators will need to be aware of them.

Monitors should have a minimum of at least 1 year of experience in working around heavy equipment. Communication procedures will need to be established between the monitors and the equipment operators so that each is aware of the other’s actions.

Tailgate meetings are also an important aspect of any safety training and are usually conducted by the grading contractor on a weekly basis. All monitors should attend these meetings, especially to remind the operators that monitors will be on the ground. In addition, monitors will be able to determine where construction excavation is planned for the week ahead and whether there are any changes to the movement of equipment patterns within the project.
BULK SAMPLES

If during monitoring, sediments containing concentrations of small bones and teeth are encountered, a salvage team should be sent to the area to collect a standard sample of up to 3 cy or 6,000 lbs. Depending on the location of the find (e.g., a limited exposure of fossil-bearing strata), less material may be collected. The matrix should then be transported to a designated wash area, preferably within the project area, and stockpiled either in trashcans or on the ground on heavy-duty plastic tarps. All collected matrix must be clearly labeled with its locality number to track where the sediment sample originated. The wash area that is chosen should be accessible throughout the duration of construction but will also be away from any proposed cut or fill areas. Processing is usually completed concurrently with construction, with the intent to have all processing completed before, or just after, project completion. A small corner of a staging or equipment parking area is an ideal location. If water is not available, the location should be accessible by a water truck to occasionally fill containers with water.

Once the matrix containing the concentrations of fossil material has been safely stockpiled, the following techniques can be employed to separate the fossils from the matrix:

- The matrix sample should be allowed to completely dry in the sun.
- The matrix and blocks of matrix can then be placed in buckets of water until the matrix disaggregates. Soaking time will vary depending on how indurated the matrix is and can be as short as 1 hour to as long as overnight.
- The matrix can then be placed in 20-mesh screens (1/20-inch) and agitated by hand in tubs of water to remove the matrix that was smaller than 20-mesh. If there are abundant large clasts in the matrix, it may be necessary to prescreen the matrix through 1/8- or 1/4-inch screens in order to separate out the larger clasts.
- Some material passing through the 20-mesh screen should be further washed through 30-mesh screens to determine whether smaller fossils are present. If determined to be present, all material should be screened through both the 20- and 30-mesh screens.
- When no further matrix passes through the screens, the residual matrix should be set aside to dry. Depending on the nature of the sediment being washed, the washing/drying process may need to be repeated four to five times until the matrix is reduced to only fossil material and resistant sediment clasts that cannot be further broken down.
- When fully dry after the final wash, the samples can be placed in bags, labeled with the locality number and screen size, and transported to the lab where they can be examined under a magnifying scope to separate the fossil material from the residual matrix.
- When samples from different localities are washed on the same day, care must be taken to ensure that all the screens, buckets, and other equipment are thoroughly cleaned between wash cycles to prevent contamination and that the samples from different localities are not mixed and washed at the same time.
PREPARATION OF GEOLOGIC STRATIGRAPHIC COLUMNS

A geologic stratigraphic column is a graphical interpretive sketch, in vertical view, of the on-site sediments. Geologic stratigraphic columns usually include detailed descriptions of each unique layer such as color, grain size, texture, sorting, and also information on the contact between the layers (e.g., angular, sharp, or gradational). In addition, the location of any collected fossil remains can be placed in the proper context so that interrelationships between fossils can be assessed. The description of the differing sediment layers along with the fossils that are found within each layer can be used to better understand or reconstruct the different environments that existed in the area in the past. Therefore, by interpreting the sequence of events that produced the strata and structures displayed in a stratigraphic column, it is possible to gain an insight into the geologic history of a region.

If possible, attempts should be made to create a geologic stratigraphic column, especially in areas where fossil localities are recorded. If geologic stratigraphic columns cannot easily be drawn, very detailed sedimentary descriptions should be made for each locality to help with paleoenvironmental reconstructions.

PREPARATION OF COLLECTED RESOURCES

Specimens should be prepared using standard paleontological techniques to a point of reasonable identification. Broken fossils can be repaired using cyanoacrylate glue (super glue) or white glue. Fragile fossils can be hardened using white glue thinned with water or polyvinyl buteral (butvar B-72) thinned with acetone or ethyl alcohol in a ratio of 10:1 or 8:1 (solvent: B-72). Excess matrix should be removed to better expose the fossil and reduce the storage volume. When the matrix is extremely hard and cemented, air chisels in various sizes can be used to more easily remove matrix from around the fossil. Wood chisels, awls, and dental picks can be used on the fossils encased in softer matrix.

Sometimes it is advantageous to save some sediment from around larger fossil specimens while they are being prepared and send it out for microfossil and microvertebrate analysis. This is done in an attempt to collect smaller fossils such as pollen, ostracods, foraminifera, and small vertebrate fossils, all of which can often be used to obtain clues to environmental factors such as what plants may have been growing nearby and water salinity. Microvertebrates can also help to narrow down age ranges for the deposit and are indicative of whether conditions were arid or marshy.

If any wash samples are processed, the residual matrix concentrate from the wash is best examined for microvertebrates with the use of a magnifying scope in the lab. Any observed fossil remains can be sorted out and set aside for later identification. Each microvertebrate should be placed in its own secure small capsule or vial, along with its catalog number and taxonomic identification (ID), if known. If the fossil ID is not yet known, this information can be filled in after it has been sent out for identification by an expert. If the microvertebrate is too fragmented to be identified and contains no diagnostic features, it can be combined with other fragmented bones and teeth from the same taxon, and, when cataloguing is done, simply labeled as “X” number of unidentifiable mammal/reptile/bird/fish bone/tooth fragments.
Taxonomic classification of fossil specimens should be based on external macromorphological attributes. Specimen identification can be accomplished through comparisons with known paleontological samples as well as modern counterparts. However, identification is best performed by individuals with experience in the fossils needing identification. This often entails enlisting the assistance of individuals at museums or universities for the identifications. Each fossil specimen should be classified to the lowest identifiable taxon possible and given a catalog number. Fossils that cannot be identified by any species-specific attributes should be assigned the most conservative taxonomic categories. Aggregates of unsorted matrix, where time prohibits complete sorting and identification, should be assigned a single catalog number to represent the mass sample.

**REPORT DOCUMENTATION**

At the completion of the project, the qualified paleontologist must prepare a report of findings to document the monitoring effort. This report should contain:

- A discussion of the monitoring and lab methods;
- A list and qualifications of the individuals involved in the monitoring, fossil preparation, identification, and curation;
- Results of the monitoring, including numbers of localities, numbers of specimens, and a list of specimens with both common and scientific names;
- Maps depicting where each locality was found;
- Graphics, such as geologic cross-sections;
- Illustrations and/or pictures of selected specimens, with pictures of selected localities in the field so that they can be easily identified if needed during future excavations;
- A discussion of the resources collected, how they fit into the overall geologic and paleontologic context, and how the specimens will add to the scientific knowledge of the area, including discussions on whether there are any specimens that are rare or unique and whether they are the first occurrence of the particular specimen for the age of the rock or the formation itself; and
- An itemized fossil catalog, usually included as an appendix.

If no resources are discovered, a simple letter report can be prepared documenting that the PRIMP was followed, when monitoring occurred, observations of sediments that were encountered, how deep excavation occurred, and that no resources were impacted by the development of the project.

**CURATION OF FOSSILS INTO A PERMANENT REPOSITORY**

Although legally all fossils collected during mitigation are the property of the landowner, the collection should be properly curated at an approved facility (e.g., a museum or university) that is preferably local to the project location and then preserved for future scientific studies above and beyond what is covered in the report of findings (although not at the expense of the landowner). A copy of the final report and a searchable master catalog database in a format such as Microsoft Excel or Access should be curated with the fossils.
The curation facility is usually identified by the qualified paleontologist prior to the beginning of construction, and at a minimum, a draft curation agreement between the landowner and/or paleontologist and the curation facility should be in place prior to or just after the beginning of construction. The curation agreement will spell out how the fossils should be curated, such as preparation methods, identification methods, assignment of catalog numbers, labeling and tagging methods, methods of packing, and estimated costs associated with storage at the facility (storage is usually based on a one-time fee and is based on the volume in cubic feet that the fossils occupy). The curation agreement will also guarantee that the paleontological specimens that are collected will have a permanent storage location upon completion of the project.

The LACM in Los Angeles may be a viable option as a curation facility. Generally, as part of the curation agreement, the curation facility will require that certain methods and stipulations be followed to ensure that fossils are collected and preserved in a manner that meets curation requirements set by the facility.

It should be noted that processing fossils for curation into a facility generally requires work after the completion of grading, so it will be necessary for the qualified paleontologist to work closely with the OUHSD to ensure that appropriate funding remains active until the fossils are properly curated.
DECISION THRESHOLDS

DISCARDING OF SPECIMENS

Initially, all observed fossil specimens, especially vertebrate fossils, should be collected and brought to the lab. However, if it is readily apparent in the field that there are hundreds of the same species of invertebrates, the decision can be made by the monitor to collect only a representative sample of the invertebrate fossils. This will help to reduce the storage volume and reduce unneeded duplication. All vertebrate fossils should be collected because all are considered significant.

In addition, if a large fossil specimen, even a vertebrate specimen, is partially exposed but extends outside the project work area or deeper into the ground than proposed excavation will occur, the decision can be made to record as much information about the specimen as possible, including measurements, sketches, and photographs, and then leave the balance of the specimen in situ. However, before the decision is made to leave the specimen in place, a meeting should be held between the OUHSD, the qualified paleontologist, and any potential interested parties such as the curation facility to develop an appropriate treatment plan for the discovery. Topics of discussion may include the rarity of the find, how the find adds to the knowledge of the geologic past, added costs such as who will pay for the initial salvage and the returning of the area to its pre-salvage condition, associated lab and curation work, how long it may take to recover the specimen, and whether the salvage will completely stop construction within the project while it is occurring.

Once in the lab, and at the completion of the project, the decision can be made to discard invertebrate specimens (in addition to what the monitor discarded or did not collect while in the field) that have enough representatives in the collection. In addition, if numerous vertebrate fossils are not diagnostic because of their fragmentary nature, some of them may also be discarded. This is usually done to reduce the storage volume for the curation facility. Discarding does not have to necessarily entail placing the specimens in the trash. Often, the specimens can be used in fossil education programs at schools or museums, allowing children and adults to handle real fossils with no fear of a one-of-a-kind fossil being broken or damaged. If any fossils are discarded, they should be fully documented in a manner consistent with current professional standards.

REDUCTION OF MONITORING

Initially, monitoring will occur on a full-time basis in areas that have been identified as having a High paleontological sensitivity and on a spot-check basis in sediments identified as having a Low paleontological sensitivity for depths between 5 and 10 ft below the surface. No monitoring will be required for excavations between the surface and 5 ft below the surface unless sensitive sediments with High paleontological sensitivity are encountered at shallower depths. Although there is no set rule for the amount of time that defines a spot check, it is usually limited to 1 to 2 hours per week, and sometimes even less. Oftentimes, if full-time monitoring is occurring elsewhere on the job site, the spot check can be undertaken by the full-time monitor at the beginning or end of the day when no
equipment is operating, so that this monitor does not have to leave his or her full-time monitoring location, nor does another monitor need to visit the site.

If, during the course of the project, a particular sediment identified as having High paleontological sensitivity has not produced any fossil remains, the qualified paleontologist may decide that monitoring levels can be reduced to a part-time basis in that geologic formation or unit. However, any reduction in monitoring should be done through consultation and agreement with the OUHSD. There are no universally accepted criteria for deciding when monitoring levels need to be reduced or by how much; however, it is usually done in a graduated process. For instance, if no significant remains are found after monitoring full-time for a period of 4 weeks, monitoring may be reduced to 3/4 time for 2 weeks, and then to 1/2 time for 2 weeks, and finally to 1/4 time. Eventually, the qualified paleontologist may even decide that monitoring could be reduced to a spot-check basis of only a few hours per week. However, if any remains are discovered after monitoring levels have been reduced, the qualified paleontologist may decide to increase monitoring up to a full-time basis. For small projects where grading occurs for less than 4 weeks, monitoring levels may be able to be reassessed after a period of 2 weeks of full-time monitoring. For small projects lasting less than 2 weeks, monitoring is usually not reduced because not enough time will have passed for the qualified paleontologist to fully assess the geologic formations or units that are being excavated.
RECOMMENDATIONS

According to geologic mapping by Tan, et al. (2004), it is likely that sediments with a sensitivity rating of High for containing paleontological resources are within the subsurface of the project area. Excavation associated with the development of this project will include grading, overexcavation, construction of drainage facilities, and installation of wet and dry utilities, and could extend up to and over 10 ft beneath the surface. As previously discussed, the surface of the project is mapped as containing Holocene Alluvial Fan Deposits; these sediments have a Low paleontological sensitivity. However, it is likely that Pleistocene Alluvial Fan Deposits may be present at depths as shallow as 5 to 10 ft below the surface, and will very likely be encountered once a depth of 10 ft is reached. Although not mapped within the project, the Las Posas Formation (with a High sensitivity) is immediately adjacent to the project and could potentially be encountered at an unknown depth below the surface. Because of the potential to encounter sediments with a High paleontological sensitivity, this PRIMP was developed to guide the paleontological monitoring effort for the project. Briefly, the paleontological mitigation measures include:

- Attendance at the pregrade meeting by a qualified paleontologist or his/her representative. At this meeting, the paleontologist will explain the likelihood for encountering paleontological resources and the procedures that will be employed if resources are observed both when a paleontologist is on site and when one is not on site.

- During construction excavation, all grading activities that occur between the surface and a depth of 5 ft below the surface will not require paleontological monitoring. However, in the event that construction workers observe something they believe may be a paleontological resource, work in the immediate area should be halted, and a qualified Professional Paleontologist should be contacted to assess the find for significance and collect it if it is determined to be significant. If determined to be significant, the qualified Professional Paleontologist may recommend that monitoring occur at shallower depths.

- During construction excavation, a qualified vertebrate paleontological monitor shall be present on a full-time basis whenever excavation will occur below a depth of 10 ft within the on-site alluvial sediments, or within the sediments that have a High sensitivity rating, if sediments with a High sensitivity rating are encountered at shallower depths. Monitors shall also be present on a part-time, spot-check basis for all excavations that occur between 5 and 10 ft below the surface to determine whether sediments with a High paleontological sensitivity rating are present, unless sediments with a High paleontological sensitivity rating are encountered at shallower depths. Full-time monitoring in areas of High sensitivity may be reduced to a part-time basis if no resources are being discovered (monitoring reductions and when they occur shall be determined by the qualified paleontologist). The monitor shall inspect fresh cuts and/or spoil piles to recover paleontological resources. The monitor shall be empowered to temporarily divert construction equipment away from the immediate area of any discoveries. The monitor shall be equipped to rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the grading contractor shall consider using heavy equipment on site to assist in the removal and collection of large materials.
• Localized concentrations of small (or micro-) vertebrates may be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened through 1/8- to 1/20-inch mesh screens to determine whether microvertebrates are present. If microvertebrates are encountered, additional sediment samples (up to 3 cy or 6,000 lbs) shall be collected and processed through 1/20-inch mesh, and sometimes 1/30-inch mesh screens, to recover additional fossils. The processing of large bulk samples is best accomplished at a designated location within the project limits that will be accessible throughout the duration of construction but will also be away from any proposed cut or fill areas. Processing is usually completed concurrently with construction, with the intent of having all processing completed before or just after project completion. A small corner of a staging or equipment parking area is an ideal location. If water is not available, the location should be accessible for a water truck to occasionally fill containers with water.

• Any recovered specimens shall be prepared to the point of identification and permanent preservation. This includes the picking of any washed mass samples to recover small invertebrate and vertebrate fossils, the removal of surplus sediment from around larger specimens to reduce the volume of storage for the repository and the storage cost, and the addition of approved chemical hardeners/stabilizers to fragile specimens. This is best accomplished at a designated lab, usually off site, with access to fossil preparation tools, magnifying equipment, storage boxes and vials, and chemical hardeners. Processing of fossils through the lab is best accomplished concurrently with construction, especially if numerous fossils are being collected.

• Any collected specimens shall be identified to the lowest taxonomic level possible and curated into an accredited institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens on request. The draft curation agreement between the landowner and/or the paleontologist and the curation facility should be in place with an approved curation facility prior to, or soon after, the initiation of any paleontological monitoring or mitigation activities.

• A report of findings will be prepared at the conclusion of the project discussing what was found and the significance of the finds. This report shall be submitted to the OUHSD, as well as to the museum repository, if any paleontological resources are collected.
BIBLIOGRAPHY

California Geological Survey

City of Camarillo

Eisentraut, P., and J. Cooper
2002 *Development of a Model Curation Program for Orange County’s Archaeological and Paleontological Collections*. Prepared by California State University, Fullerton and submitted to the County of Orange PFRD/HPB.

Jefferson


LSA

Koury Geotechnical Services, Inc.

Miller
1971 *Pleistocene Vertebrates of the Los Angeles Basin and Vicinity (Exclusive of Rancho La Brea)*, Los Angeles County Museum of Natural History Bulletin, Science: No. 10.
Reynolds and Reynolds  

Smith, Brooks  

Society of Vertebrate Paleontology (SVP)  


Tan, Siang S., Kevin B. Clahan, and Christopher S. Hitchcock  

United States Geological Survey (USGS)  

Ventura County  
2011a  *Ventura County General Plan – Goals Policies and Programs*. Prepared with decisions and contributions from the Ventura County Board of Supervisors, Ventura County Planning Commission, Ventura County Planning Division, Resource Management Agency (RMA) GIS Mapping and Graphics Services, and the County of Ventura RMA – Planning Division. Last amended by the Ventura County Board of Supervisors, June 28, 2011.

2011b  *Ventura County Initial Study Assessment Guidelines*. Prepared by the County of Ventura. April 26, 2011.

Wilmarth, Grace  
APPENDIX A

BROOKS SMITH RESUME
PROFESSIONAL RESPONSIBILITIES

Mr. Smith is a project manager at LSA with 19 years of experience in paleontology. He is responsible for scheduling paleontological and archaeological monitors on both large- and small-scale projects, as well as acting as an intermediary between clients and agencies such as the United States Department of Interior, Bureau of Land Management (BLM), and the United States Department of Agriculture, Forest Service (Forest Service). Mr. Smith also prepares paleontological assessment reports, paleontological resources impact mitigation programs (PRIMPs), and monitoring reports following the completion of both cultural and paleontological mitigation monitoring.

While in the field, Mr. Smith acts as a Field Director or Co-Field Director during field surveys for paleontological and archaeological resources prior to grading activities. Mr. Smith also monitors for and collects cultural and scientific resources during grading activities; documents and tests archaeological sites; assists with the salvage of large fossil remains with the use of plaster casts; assists with large-scale wet and dry screening of sediments for fossils; collects and analyzes data from handheld global positioning system (GPS) units; and collects and analyzes geologic and geomorphic data for use in reports.

PROJECT EXPERIENCE

Coyote Canyon Landfill
Newport Beach, California
Mr. Smith provided paleontological mitigation monitoring during the time the Coyote Canyon Landfill was active. Mr. Smith collected resources, prepared resources to the point of identification, identified collected resources, and input the resources into the fossil catalog.

Frank R. Bowerman (FRB) Landfill
Orange County, California
Mr. Smith has provided paleontological resources monitoring on this project and assisted in the salvage of large-scale paleontological resources. Mr. Smith has prepared several year-end summary reports as well as 3-year summary reports documenting monitoring activities as well as finds. Mr. Smith also prepared a paleontological resources assessment for the landfill.

Prima Deshecha Landfill
San Juan Capistrano, California
Mr. Smith provided paleontological mitigation monitoring during excavation associated with landfill operations and collected paleontological resources as they were uncovered by the grading operations. Mr. Smith also assisted with cultural resources testing of several prehistoric sites that were within proposed expansion areas.
PROFESSIONAL EXPERIENCE


CERTIFICATIONS

40-Hour Hazardous Materials Handling and Response, current through October 2012

County of Orange, Certified Paleontologist

City of San Diego Qualified Paleontologist

PROFESSIONAL ORGANIZATIONS/MEMBERSHIPS

San Diego Association of Geologists

UCSC Alumni Association

Society of Vertebrate Paleontology

PROJECT EXPERIENCE (CONTINUED)

California Department of Transportation
Orange, Riverside, and San Bernardino Counties, California

Mr. Smith has prepared numerous Paleontological Investigation Reports (PIRs) and Paleontological Evaluation Reports (PERs) for the California Department of Transportation (Caltrans) following the guidelines in the Caltrans Standard Environmental Reference, Environmental Handbook, Volume 1, Chapter 8 – Paleontology. These reports are usually combined into a single document and involve geological formation studies, paleontological research at local museums, and field surveys to help determine whether proposed Caltrans projects will encounter paleontological resources during project development, and if so, whether those paleontological resources are significant. Mr. Smith has also prepared Paleontological Mitigation Plans (PMPs) for Caltrans that include developed paleontological mitigation procedures that must be in place during Caltrans road widening projects in order to protect the significant paleontological resources that have the potential to be encountered during grading.

The Bluffs Retail Center
Newport Beach, California

LSA was retained by the Irvine Company to provide cultural and paleontological resource mitigation monitoring during grading associated with the Bluffs Retail Center located in Newport Beach. Mr. Smith provided archaeological and paleontological monitoring for this project. Mr. Smith also assisted with the salvage of several fossil localities that contained significant fossil shark teeth. Mr. Smith was also the lead author for the final paleontological mitigation monitoring report.

Orchard at Saddleback, Phase I
Lake Forest, California

LSA was retained by W.A.L.F. LLC to provide cultural and paleontological resource mitigation monitoring during grading associated with the Phase I portion of the Orchard at Saddleback, located within the City of Lake Forest. Mr. Smith provided archaeological and paleontological monitoring during grading and was the lead author for the final paleontological mitigation monitoring report.

Orchard at Saddleback, Phase II
Lake Forest, California

LSA was retained by Wetrust America to provide cultural and paleontological resource mitigation monitoring during grading associated with the Phase II portion of the Orchard at Saddleback, located within the City of Lake Forest. Mr. Smith provided archaeological and paleontological monitoring during grading and was the lead author for the final paleontological mitigation monitoring report, as well as co-author for the cultural resources monitoring report.
PROJECT EXPERIENCE (CONTINUED)

Del Mar Fairgrounds
Del Mar, California
LSA was retained by the 22nd District Agricultural Association to provide technical studies needed to assist the 22nd District Agricultural Association during future expansion plans at the Fairgrounds. Mr. Smith authored the paleontological resources assessment report.

Laguna Canyon Road (State Route 133) Widening
Orange County, California
LSA was retained by Caltrans to provide cultural and paleontological resource mitigation monitoring along Laguna Canyon Road during its widening and realignment between State Route 73 (SR-73) and Old Laguna Canyon Road. Mr. Smith provided archaeological and paleontological monitoring for this project, as well as preparation of stratigraphic sections and identification of paleontological specimens. Mr. Smith also assisted on the excavation of archaeological site CA-ORA-1055 and was the lead author for the final paleontological mitigation monitoring report, as well as a contributing author for the final archaeological mitigation monitoring report.

Los Coches Creek Area Middle School
El Cajon, California
Mr. Smith performed a cultural resources survey of an 80-acre parcel as part of an assessment report prior to the construction of the school. During the survey, Mr. Smith recorded numerous undiscovered prehistoric and historic cultural resources.

Marine Corps Base Camp Pendleton
San Diego, California
LSA was contracted to conduct extensive testing of an ethnographically recorded village site. Mr. Smith provided cultural resource testing of Site CA-SDI-10156/H. LSA was contracted to provide cultural resource monitoring during removal of potentially hazardous soil in the Stewart Mesa area of the base. Mr. Smith delineated known cultural resource sites and provided monitoring during excavation.

Southern California Edison (SCE) On-Call
Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties, California
LSA performs archaeological resource assessments for SCE’s pole replacement program. Assessments include record searches for previously recorded resources and studies; field surveys around poles; recordation observed resources, if any; and recommendations. To date, over 1,000 poles have been assessed. Mr. Smith performed field surveys, recorded resources, and synthesized data.

State Route 73 Widening
Costa Mesa, California
LSA was contracted to provide paleontological monitoring during the widening of SR-73 between stations 74+00 and 82+00. The project area is located in the median of SR-73 within an approximately 0.5-mile stretch between the Birch Street overcrossing on the south and the northbound Bristol Street overcrossing on the north. Mr. Smith provided paleontological monitoring and fossil identification, and wrote the mitigation monitoring report.
PROJECT EXPERIENCE (CONTINUED)

San Joaquin Hills Transportation Corridor (State Route 73)
Orange County, California
LSA was contracted to provide paleontological mitigation monitoring for the San Joaquin Hills Transportation Corridor between El Toro Road in the south and Newport Coast Drive in the north. Mr. Smith provided paleontological resource monitoring (scheduling up to five monitors), fossil identification and curation, and assisted with writing the final mitigation monitoring report.

State Route 71 (SR-71) Widening
Chino, California
LSA was contracted to provide paleontological and cultural resource monitoring during the widening of SR-71. Mr. Smith provided paleontological and cultural resource monitoring, fossil identification, and curation of collected paleontological remains.

El Camino Real Widening North of Cougar Drive
Carlsbad, California
LSA provided paleontological resources mitigation monitoring during the widening of a portion of El Camino Real north of Cougar Drive in the City of Carlsbad from two lanes to three. The project involved removing a section of hill measuring approximately 100 feet long, 30 feet wide, and up to 15 feet high in the Cretaceous Point Loma Formation. LSA collected several fossil localities containing clams, snails, crabs, and plant material. Mr. Smith provided some of the monitoring for this project, and was the lead author for the mitigation monitoring report.

San Diego Gas & Electric (SDG&E) On-Call Environmental Services
California
LSA provides support documentation to SDG&E to satisfy Natural Communities Conservation Plan (NCCP), California Environmental Quality Act, California Public Utility Commission (CPUC), California Coastal Commission, United States Army Corps of Engineers (Corps), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board requirements. Mr. Smith mainly works on SDG&E projects that require cultural resource studies. Representative projects include the following:

- **Shadowridge-Meadowlark Tap: Rebuild TL 13811:** LSA provided a cultural resource assessment for an approximately 4-mile transmission line located in San Diego. The assessment included a cultural resources search through the South Coastal Information Center, and an intensive pedestrian survey for all proposed new pole locations and staging areas. Finally, LSA made recommendations for each separate pole location. Mr. Smith was involved in all aspects of the cultural resource assessment.

- **Firestorm 2007 Environmental and Biological Monitoring:** LSA provided on-call support for monitoring services immediately following the October 2007 wildfires in San Diego, including documentation of access road regrading and erosion control consultation; data compilation, analysis, and interpretation; and data form entry for compliance with Corps Regional General Permit 63. Mr. Smith provided both cultural and biological surveys along several of the burned pole alignments.
PROJECT EXPERIENCE (CONTINUED)

Southern California Gas Company (SCG)
Los Angeles County, California
LSA was retained by SCG to provide cultural resource monitoring for its Line 85, Line 119, and Line 225 located in the Angeles National Forest (ANF) north of Castaic Lake. As these lines pass through the ANF and are located on land under the jurisdiction of the Forest Service, it was necessary for LSA to apply for an Archaeological Resources Protection Act (ARPA) Permit for each line. LSA’s role on these projects was to ensure that mitigation measures developed by the Forest Service to protect cultural resources were implemented and followed. These measures included: providing worker training for the identification and importance of cultural resources; protecting the National Register of Historic Places-listed Old Ridge Route, a historic road built in 1915 between Los Angeles and Bakersfield; monitoring for cultural resources during construction and having a monitor present at each work area; counting and documenting the numbers and types of vehicles traveling along the Old Ridge Route on a daily basis; and providing video documentation of the Old Ridge Route both before and after the project was completed. Mr. Smith was the project manager for these three SCG projects and scheduled up to three monitors per day at various locations, depending on daily construction needs; provided cumulative vehicle counts on a weekly basis to the ANF; and coordinated between the ANF archaeologist and SCG as needed. Mr. Smith also assisted in preparing reports at the completion of each project documenting the results of the monitoring.

South Orange County Infrastructure Improvement Project, State Route 241 (SR-241)
Orange and San Diego Counties, California
The Transportation Corridor Agencies (TCA) proposes extending existing SR-241 from its current terminus at Oso Parkway south to Interstate 5, just south of San Clemente. The project is located in portions of both southern Orange County and northern San Diego County. Mr. Smith assisted during surveying all the unsurveyed portions of the project, recording new cultural resources that were discovered and writing the survey reports and other cultural resource documents associated with this project. Mr. Smith also provided cultural resource clearance during the initial geotechnical investigations associated with the project to ensure no undiscovered cultural resources were impacted.

Plains All American Pipeline (PAAPL)
Los Angeles County, California
LSA was retained as a subconsultant to Stantec Consulting to provide cultural resource monitoring during repairs to several of PAAPL’s pipelines (including Line 2000 and Line 63), and during a geotechnical investigation to address landslide problems in the Angeles National Forest (ANF) north of Castaic Lake. As these projects are located on lands administered by the Forest Service, it was necessary for LSA to apply for an ARPA Permit for each project to protect cultural resources and ensure all protection measures required by the Forest Service were implemented and followed. These measures included: providing worker training for the identification and importance of cultural resources; protecting the National Register of Historic Places-listed ORR, a historic road built in 1915 between Los Angeles and Bakersfield; monitoring for cultural resources during construction and having a monitor present at each work area; counting and documenting the numbers and types of vehicles traveling along the ORR on a daily basis; and providing video documentation of the ORR both before and after each project’s completion. Mr. Smith was the project manager for projects and scheduled monitors, provided cumulative vehicle counts on a weekly basis to the Forest Service; provided coordination between the Forest Service archaeologist, PAAPL, and Stantec as needed; and assisted with the preparation of the final monitoring reports.
SELECTED REPORTS

Paleontological Resources Analysis for the SR-55/Newport Boulevard Improvement Project, City of Costa Mesa, County of Orange, California. LSA project number TRT1101A. September 2012.

Paleontological Resources Identification Report for the State Route 55 Improvement Project Between Interstate 405 and Interstate 5, Cities of Santa Ana, Irvine, and Tustin, County of Orange, California. Report prepared for the California Department of Transportation, District 12. LSA project number HDR1102. September 2012.

Paleontological Mitigation Plan for the State Route 73 Detention Basin Storm Water Mitigation and Slope Stability Project, Cities of Laguna Niguel, Aliso Viejo, Laguna Beach, Irvine, and Newport Beach, County of Orange, California. Report prepared for the California Department of Transportation, District 12. LSA project number CDT1120. August 2012.

Paleontology Memo for the Towne Center Residential Project, City of Lake Forest County of Orange, California. LSA project number CLF1201. July 2012.


Paleontological Resources Identification and Evaluation Report for the State Route 57/Lambert Road Interchange Improvement Project, City of Brea, County of Orange, California. Report prepared for the California Department of Transportation, District 12. LSA project number RBF1104. May 2012.


Paleontological Resources Impact Mitigation Plan for the South Coast Winery Report and Spa Hotel Expansion, Riverside County, California. Report prepared for South Coast Winery, Resort and Spa. LSA project number SGV1001. March 2012.

Paleontological Locality Search of the Proposed Valle Vista Channel Extension Project in the Community of Valle Vista, Riverside County, California. Letter report prepared for the Riverside Flood Control and Water Conservation District. LSA project number RCF1102. February 2012.

Paleontological Resources Assessment for the Taft Recycling and Sanitary Landfill, Kern County California. Report prepared for the Kern County Waste Management Department. LSA project number KCY1102. February 2012.

Paleontological Resources Assessment for the Cottonwood Avenue Building Expansion Project, City of Riverside, Riverside County, California. Report prepared for PanCal Sycamore Canyon 257 LLC. LSA project number PNC1101. February 2012.
SELECTED REPORTS (CONTINUED)

Paleontological Mitigation Plan for the I-10/Tippecanoe Avenue Interchange Improvement Project, Phase 2, Cities of Loma Linda and San Bernardino, San Bernardino County, California. Report prepared for the California Department of Transportation, District 8. LSA project number RMN0802A. February 2012.


Paleontological Mitigation Plan for the Tippecanoe Avenue Interchange Improvement Project, Phase 1, Cities of Loma Linda and San Bernardino, San Bernardino County, California. Report prepared for the California Department of Transportation, District 8. LSA project number RMN0802A. November 2011.

Paleontological Assessment for the Vancouver Street Sewer Extension Project, City of Carlsbad, San Diego County, California. Letter report prepared for the City of Carlsbad. LSA project number HCR1103A. November 2011.

Paleontological Analysis for the State Route 125/State Route 94 Interchange Branch Connector Project, San Diego County, California. LSA project number TYL1003. October 2011.

Supplemental Paleontological Resources Identification and Evaluation Report for the Mid County Parkway Project, Riverside County, California. Report prepared for the California Department of Transportation, District 8. LSA project number JCV531. September 2011.


SELECTED REPORTS (CONTINUED)


Paleontological Resources Assessment for the Perris Boulevard Widening Project, City of Perris, Riverside County, California. Letter report prepared for Mr. Kenneth Phung. LSA project number TLK1001. February 2011.

Paleontological Resources Assessment for the Perris Boulevard Widening Project, City of Perris, County of Riverside, California. Letter report prepared for the City of Perris. LSA project number TLK1001. February 2011.

Paleontological Resources Identification and Evaluation Report for the Shoemaker Bridge Replacement Project, City of Long Beach, Los Angeles County, California. Report prepared for the California Department of Transportation, District 7. LSA project number URS1002. February 2011.
SELECTED REPORTS (CONTINUED)


Paleontological Assessment for the Five Winds Ranch Project, City of Yucaipa, San Bernardino County, California. Letter report prepared for the City of Yucaipa Public Works Department. LSA project number YCA1002. November 2010.


Paleontological Assessment for the 5-Winds Ranch, City of Yucaipa, California. Letter Report prepared for the Public Works Department, City of Yucaipa. LSA project number YCA1102. October 2010.


Results of Cultural Resources Monitoring for the Southern California Gas Company Ivy Street Bridge Pipeline Boring Project, City of Murrieta, County of Riverside, California. (co-authored with Terri Fulton). Prepared for San Diego Gas and Electric Company. LSA project number SCG0602k. September 2010.


Paleontological Mitigation Plan for State Route 91 Widening Project Between State Route 55 and State Route 24, Cities of Anaheim and Yorba Linda, Orange County, California. District 12-ORA-91, PM 9.1 to 15.1. Prepared for the California Department of Transportation, District 12. LSA project number CDT1001. May 2010.
SELECTED REPORTS (CONTINUED)

Cultural Resources Monitoring for the Southern California Gas Company Trabuco Creek Bridge Betterment Project (eTS8327), City of San Juan Capistrano, Orange County, California. Letter Report prepared for the City of San Juan Capistrano on behalf of Southern California Gas Company. LSA project number SCG0902. March 2010.


Draft Paleontological Identification and Evaluation Report for State Route 91 Westbound Widening (Northbound State Route 55 to the Westbound State Route 91 Connector through the Tustin Avenue Interchange), City of Anaheim, Orange County, California. Prepared for the California Department of Transportation, District 12. LSA project number CDT0806B. January 2010.


Cultural Resource Monitoring for the Del Obispo Street Undergrounding of Overhead Utilities and Widening, City of San Juan Capistrano, Orange County, California. (With Deborah McLean as primary author.) Prepared for the City of San Juan Capistrano. LSA project number CSJ0803. September 2009.
SELECTED REPORTS (CONTINUED)


Paleontological Mitigation Plan State Route 91 Eastbound Lane Addition Project Between State Route 241 and State Route 71, Orange County, California, and Riverside County, California. Prepared for the California Department of Transportation, District 12. LSA project number CDT0805. May 2009.


Paleontological Identification and Evaluation Report for I-10/Tippecanoe Avenue Interchange Project, Cities of Loma Linda and San Bernardino, San Bernardino County, California. Prepared for the California Department of Transportation, District 8. LSA project number RMN0802. April 2009.


Paleontological Resources Assessment for the Hanford Municipal Airport Improvements Project, City of Hanford, Kings County, California. Prepared for Mead & Hunt, Inc. LSA project number MHN0801. February 2009.


REFERENCES

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