PALEONTOLOGICAL IDENTIFICATION REPORT/ PALEONTOLOGICAL EVALUATION REPORT

STATE ROUTE 99/120 INTERCHANGE CONNECTOR PROJECT

MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA

10-SJ-120, 10-SJ-99
EA 10-1E740
POST MILES: 3.10/6.20

Reviewed By: _____ Date: 3/7/18

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February 2018

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SUMMARY OF FINDINGS

The California Department of Transportation (Caltrans) District 10, with the cooperation of the City of Manteca and the San Joaquin Council of Governments, proposes the State Route 99/120 Interchange Connector Project (project) to reconstruct the existing State Route 99/State Route 120 interchange. This project will provide traffic congestion relief and improved operations of the interchange.

Because this project is within a State highway right-of-way and will be developed under the jurisdiction of Caltrans, in addition to all applicable State regulations regarding paleontological resources, the project is obligated to follow the guidelines specified in the Caltrans *Standard Environmental Reference*. The guidelines are designed to address impacts to paleontological resources prior to the beginning of construction and require that a Paleontological Identification Report/Paleontological Evaluation Report (PIR/PER) be prepared for this project. The purpose of the PIR/PER is to identify whether paleontological resources may be present within the project area and whether project activities may affect those resources. Preparation of the PIR/PER involved a literature review of pertinent geologic maps, geological and paleontological literature, and technical studies; a fossil locality search through the online collections database of the University of California Museum of Paleontology at the University of California, Berkeley; and a field survey of the project area.

There are two mapped geologic units within the project area: Holocene Dune Sand and the late Pleistocene Modesto Formation. In addition, although not mapped, Artificial Fill exists in some areas, especially near existing roadways or other areas that have experienced development. The Holocene Dune Sand is unlikely to contain scientifically significant fossils and is assigned a low paleontological sensitivity rating. The Modesto Formation has the potential to yield important paleontological resources and, therefore, has high paleontological sensitivity. Artificial Fill has no paleontological sensitivity.

Based on current project plans, the majority of excavation is limited to areas that have already been disturbed during development of the existing roadways. Although driving piles for the bridge footings may reach the high sensitivity Modesto Formation, this excavation method has a limited impact area; precludes access to the cutting face, which reduces the amount of contextual information that may be collected; limits the recovery of larger and more complete specimens; and, depending on the parameters of the operations, may pose safety issues that limit or prevent access to the spoils generated, if any. Therefore, development of this project is unlikely to impact scientifically significant paleontological resources, and no further paleontological studies, such as a Paleontological Mitigation Plan (PMP), are required for this project.

In the unlikely event paleontological resources are discovered during ground-disturbing activities, it is recommended that work in the immediate area of the discovery be halted until the find can be evaluated by a qualified paleontologist and, if necessary, collected from the field. If the find is determined to be significant and there is a potential to encounter sediments similar to those from which the fossil was recovered, it is recommended that the paleontologist prepare a PMP to guide paleontological mitigation for the remainder of the project. The PMP should follow the current guidelines of Caltrans.

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1.0 INTRODUCTION

1.1 INTRODUCTION

The California Department of Transportation (Caltrans) District 10, with the cooperation of the City of Manteca and the San Joaquin Council of Governments, proposes the State Route 99/120 Interchange Connector Project (project) to reconstruct the existing State Route 99 (SR-99)/State Route 120 (SR-120) interchange. This project will provide traffic congestion relief and improved operations of the interchange.

1.2 PROJECT LOCATION

The project area is located along SR-99 from Post Mile (PM) 3.1 to PM 6.2 and on SR-120 between PM R5.1 and PM T7.2 and includes the existing SR-99/120 Connector Interchange. It extends approximately from the SR-99/SR-120/East Yosemite Avenue interchange at the north end to the SR-99/South Olive Avenue interchange at the south end, and west along SR-120 to the SR-120/South Main Street interchange. The location and regional vicinity of the proposed project are illustrated on Figure 1 in Township 2 South, Range 7 East, Sections 3, 4, 5, 8, 9, 10, 11, 13, 14, and 15 on the *Manteca, California* 7.5-minute series United States Geological Survey (USGS) topographic map (USGS, 1994).

1.3 PROJECT DESCRIPTION

This project will construct an additional lane on two connector ramps (from eastbound SR-120 to southbound SR-99 and from northbound SR-99 to westbound SR-120), add auxiliary lanes on SR-99 and SR-120, and relocate the SR-99 Frontage Road. At Austin Road, the existing interchange ramps will be upgraded, the existing at-grade crossing of the Union Pacific Railroad (UPRR) tracks will be removed, the structure over SR-99 will be replaced, and a new connector road will be constructed to Moffat Boulevard. Development of this project will require the installation of new signing/signals/lighting improvements and the relocation of some existing utility poles, sewer lines, and water lines. The project will be importing fill, with no export.

Specifically, the proposed project includes the following elements that may be constructed in three phases, as described below.

1.3.1 Phase 1A

- Widen the eastbound SR-120 to southbound SR-99 connector ramp from one-lane to two-lanes;
- Remove the Austin Road overcrossing and replace with a longer structure spanning SR-99 and the UPRR tracks;
- Add a new connecting road from Austin Road to East Woodward Avenue and Moffat Boulevard
- Modify the existing UPRR gated crossing at East Woodward Avenue to conform to the new connector road;

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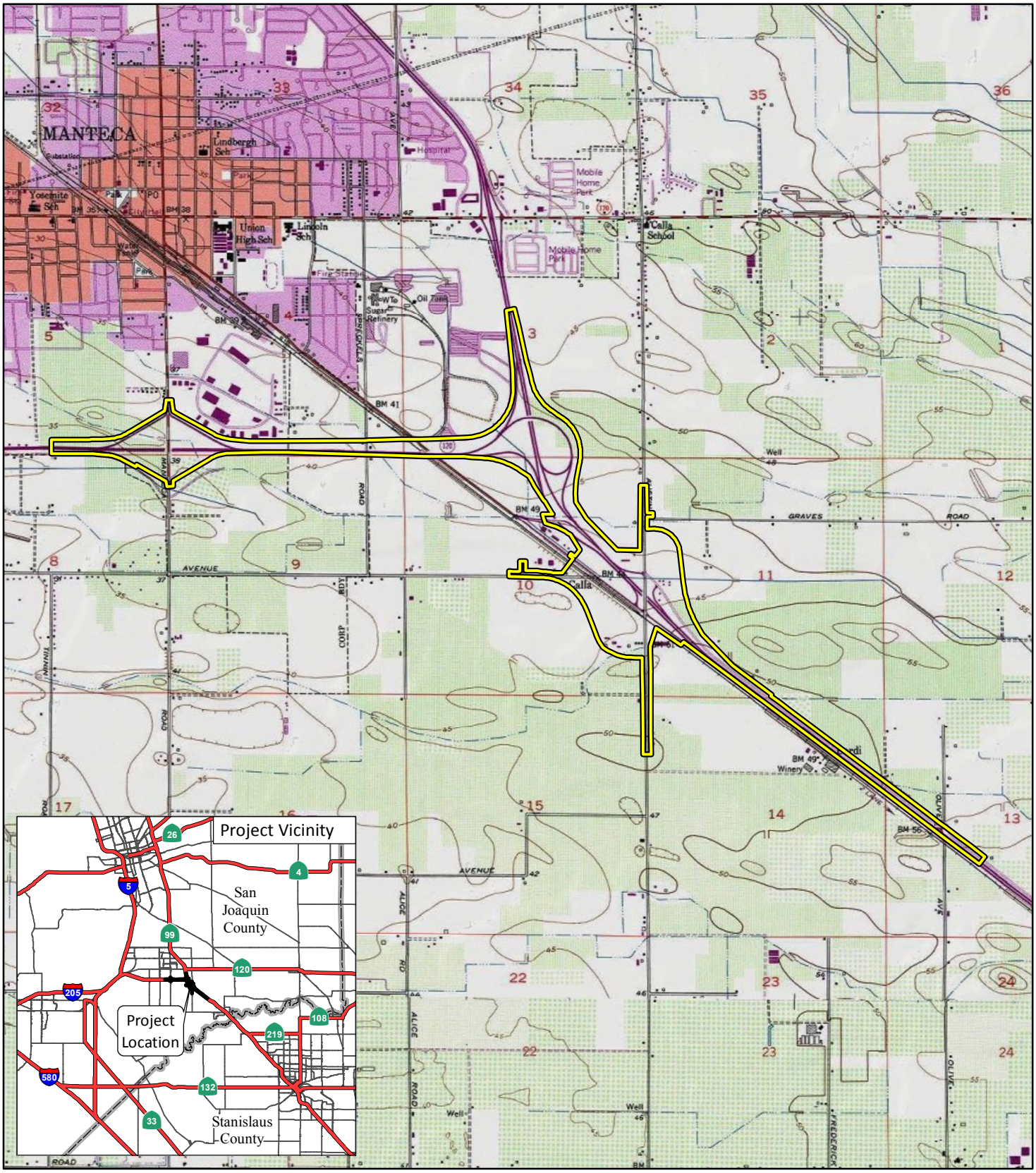

LEGEND

Project Location

FIGURE 1

0 1500 3000

FEET

SOURCE: USGS 7.5' Quad - Manteca (1994)

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State Route 99/120 Interchange Connector

Project Location

10-SJ-99 & 10-SJ-120 PM 4.60/6.30

EA 10-1E740

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- Modify the existing northbound Austin Road exit ramp to conform to the higher overcrossing profile grade; and

- Temporarily close the Austin Road northbound entrance and southbound exit ramps on SR-99.

1.3.2 Phase 1B

- Widen the northbound SR-99 to westbound SR-120 connector ramp from one-lane to two-lanes;

- Convert the existing SR-99/SR-120 separation structure to two lanes and construct a new separation structure to serve the eastbound SR-120 to northbound SR-99 connector ramp; and

- Add an auxiliary lane in the existing median of eastbound SR-120 from Main Street to SR-99.

1.3.3 Phase 1C

- Restore the southbound exit ramp from SR-99 to Austin Road by constructing a grade separated braided ramp to eliminate the weaving with SR-120 merging traffic;

- Construct the entrance ramp from Austin Road to northbound SR-99 and to westbound SR-120 as a loop ramp that will provide separate traffic movements to SR-99 and SR-120;

- Relocate the northbound SR-99 exit ramp to Austin Road to accommodate the loop on-ramp;

- Relocate the SR-99 frontage road for approximately 0.8 miles;

- Add an auxiliary lane in each direction on SR-99 from SR-120 to approximately 1.7 miles south of the Austin Road overcrossing by shifting the median away from the UPRR right-of-way and relocating the frontage road; and

- Add an auxiliary lane in the existing median of eastbound SR-120 from Main Street to SR-99 to provide a dedicated lane to connect to the new SR-99/SR-120 separation structure.

1.4 EXCAVATION PARAMETERS

Current project design plans (personal communication, Mark Thomas and Company, February 2018) indicate that foundations will be steel or concrete driven piles approximately 2 feet (ft) in diameter and extending to a maximum depth of 50 ft. Excavation for structure footings will be up to 8 ft deep. Excavation for new drainage culverts would be up to 6 ft deep. Other roadway excavation will be up to 2 ft deep. No dewatering is expected as part of the project. Excavation for relocating some of the existing sewer lines and water lines is expected to extend to depths of less than 10 ft, while excavation for relocating the utility poles may involve drilling to depths of approximately 12 ft to 15 ft.

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2.0 REGULATORY ENVIRONMENT

The following discussion of applicable laws has been excerpted and reordered from the Caltrans online *Standard Environmental Reference* (SER), Environmental Handbook, Volume 1, Chapter 8 – Paleontology (Caltrans, 2016). This project is subject to State regulations and Caltrans guidelines regarding paleontological resources.

2.1 STATE REGULATIONS

Under State law, paleontological resources are protected by both the California Environmental Quality Act (CEQA) and Public Resources Code (PRC) Section 5097.5.

2.1.1 California Environmental Quality Act (Public Resources Code 21000 et seq.)

The purpose of CEQA is to provide a statewide policy of environmental protection. As part of this protection, State and local agencies are required to analyze, disclose, and, when feasible, mitigate the environmental impacts of, or find alternatives to, proposed projects.

The *State CEQA Guidelines* (California Code of Regulations Section 15000 et seq.) provide regulations for the implementation of CEQA and include more specific direction on the process of documenting, analyzing, disclosing, and mitigating the environmental impacts of a project. To assist in this process, Appendix N of the *State CEQA Guidelines* provides a sample checklist form that may be used to identify and explain the degree of impact a project will have on a variety of environmental aspects, including paleontological resources (Section V(c)).

As stated in Section 15002(b)(1–3) of the *State CEQA Guidelines*, CEQA applies to governmental action, including activities that are undertaken by, are financed by, or require approval from a governmental agency. Because this project is undertaken by governmental agencies, CEQA regulations apply.

2.1.2 California Public Resources Code, Section 5097.5

This law protects historic, archaeological, and paleontological resources on public lands within California and establishes criminal and civil penalties for violations.

Specifically, PRC Section 5097.5 states:

> "(a) No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.
>
> (b) As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof."

Because this project involves public lands as defined in Section 5097.5(b), Caltrans and the local project proponent are required to comply with this regulation.

2.2 CALTRANS REQUIREMENTS

Because this project is within a State highway right-of-way and will be developed under the jurisdiction of Caltrans, it is obligated to follow the guidelines specified in the Caltrans SER. The guidelines are designed to address impacts to paleontological resources prior to the beginning of construction. For most projects, three documents may be required: a Paleontological Identification Report (PIR), a Paleontological Evaluation Report (PER), and a Paleontological Mitigation Plan (PMP). The PIR and PER are often combined into a single document, and are prepared prior to completion of the Project Approval/Environmental Document (PA/ED) phase. The PMP must be developed prior to the beginning of construction, either toward the end of the PA/ED phase or during the Plans, Specifications, and Estimates phase.

The purpose of the PIR is to identify whether paleontological resources may be present within the project area and whether project activities may impact those resources. The purpose of the PER is to determine Caltrans' legal responsibilities, the necessity for involving other agencies and stakeholders, whether the resource(s) can be avoided, and the significance of the resource. The purpose of the PMP is to develop mitigation for significant resources that may be impacted during project implementation. Occasionally, the PIR or a combined PIR/PER will determine that it is unlikely that the project will encounter significant resources during construction. In these cases, a PMP will not be required, and the reason will be specified in the PIR or PIR/PER.

3.0 SIGNIFICANCE

3.1 DEFINITION OF SIGNIFICANCE

The scientific significance or importance of a paleontological resource is based on various attributes of that resource. Definitions of significance from Caltrans are included below.

3.1.1 California Department of Transportation

According to Caltrans (2016), there are two generally recognized types of paleontological significance:

- **National:** A National Natural Landmark-eligible paleontological resource is an area of national significance (as defined under Code of Federal Regulations [CFR] Title 36, Part 62) that contains an outstanding example of fossil evidence of the development of life on earth. This is the only codified definition of paleontological significance.
- **Scientific:** Definitions of a scientifically significant paleontological resource can vary by jurisdictional agency and paleontological practitioner.

Generally, scientifically significant paleontological resources are identified sites or geological deposits containing individual fossils or assemblages of fossils that are unique or unusual, are diagnostically or stratigraphically important, and add to the existing body of knowledge in specific areas stratigraphically, taxonomically, or regionally. 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, geomorphologic evolution, paleoclimatology, the relationships between aquatic and terrestrial species, and evolution in general. Discovery of in situ fossil-bearing deposits is rare for many species, especially vertebrates. 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 settings, they are relatively rare in terrestrial settings. This has ramifications with regard to the amount of scientific study needed to characterize an individual species adequately and therefore affects how relative sensitivities are assigned to formations and rock units.

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4.0 SENSITIVITY

4.1 DEFINITION OF SENSITIVITY

Sensitivity is often stated as "potential" because decisions about how to manage paleontological resources must be based on "potential." The actual situation cannot be known until grading and excavation for the project is underway. Caltrans has a ranking system to describe paleontological sensitivity, as described in the following section.

4.1.1 California Department of Transportation

In accordance with the Caltrans SER guidelines for paleontology (Caltrans, 2016), the sensitivity of rock units and formations that may contain paleontological resources is assessed on the basis of high, low, or no potential for paleontological resources, as follows:

- **High Potential:** Rock units which, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils. These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing (1) abundant vertebrate fossils; (2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; (3) areas that may contain datable organic remains older than Recent, including *Neotoma* (sp.) middens; and/or (4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation during grading and excavation.

- **Low Potential:** This category includes sedimentary rock units that: (1) are potentially fossiliferous but have not yielded significant fossils in the past; (2) have not yet yielded fossils but possess a potential to contain fossil remains; or (3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized strata. Rock units designated as low potential generally do not require monitoring and mitigation during grading and excavation. However, as excavation for construction gets underway, it is possible that new and unanticipated paleontological resources might be encountered. If this occurs, a Construction Change Order (CCO) must be prepared to have a qualified Principal Paleontologist evaluate the resource. If the resource is determined to be significant, monitoring and mitigation are required during grading and excavation from that time on.

- **No Potential:** Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential to contain significant paleontological resources. For projects encountering only these types of rock units, paleontological resources can generally be eliminated as a concern when the Preliminary Environmental Analysis Report (PEAR) is prepared and no further action taken.

5.0 METHODS

In order to determine the potential for paleontological resources to be encountered in the project area, a literature review, a locality search, and a field survey were conducted. A more detailed explanation of each of these methods is included below.

5.1 LITERATURE REVIEW

Geologic maps of the project area, relevant geological and paleontological literature, and the draft geotechnical report prepared for this project (Parikh Consultants, Inc., 2017) were reviewed to determine which geologic units are present within the project area and whether fossils have been recovered from those or similar geologic units elsewhere in the region. As geologic formations and units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas well beyond the project area.

5.2 LOCALITY SEARCH

A fossil locality search was conducted through the online database of the University of California Museum of Paleontology (UCMP) at the University of California, Berkeley. The purpose of a locality search is to establish the status and extent of previously recorded paleontological resources within the project area and within the same or similar deposits as those mapped within the project area.

5.3 FIELD SURVEY

Pedestrian surveys of accessible portions of the project area were conducted on November 21, 2017, and December 1, 2017. The pedestrian surveys involved walking straight transects spaced no more than 15 meters apart across the project area. The purpose of a field inspection is to note the sediments exposed at the surface; relocate known fossil localities, if any; identify any unrecorded paleontological resources exposed on the surface; and note portions of the project area that may be more likely to contain paleontological resources.

5.4 PERSONNEL

Dr. Sarah Rieboldt, consultant Paleontologist, completed this PIR/PER Dr. Rieboldt received her Ph.D. in Paleontology from the University of California, Berkeley, and has extensive experience surveying for and collecting paleontological resources; salvaging large fossil specimens; collecting bulk sediment samples; identifying, preparing, and curating fossil material; and writing paleontological assessments, mitigation plans, and final mitigation monitoring reports. She has conducted paleontological and geological fieldwork in California, Nevada, Utah, Wyoming, Colorado, Texas, and Alabama and has 8 years of experience working with natural history collections at the Field Museum of Natural History in Chicago, Illinois; the University of California Museum of Paleontology at the University of California, Berkeley; and the University of Colorado Museum of Natural History at the University of Colorado, Boulder. Dr. Rieboldt has worked as a geologist and paleontological consultant on many different projects, including carbon sequestration and astrobiology research programs funded by the United States Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA), respectively, as

well as on projects for the State of California Department of Parks and Recreation, Caltrans, and various private developers in California, Nevada, and Utah. Dr. Rieboldt's resume is included in Appendix A.

6.0 RESULTS

6.1 LITERATURE REVIEW

The project is located in the northeastern San Joaquin Valley and lies within the Great Valley Geomorphic Province (California Geological Survey, 2002). This province is an alluvial valley approximately 50 miles wide and over 400 miles long between the Coast Ranges and the Sierra Nevada in the central portion of California (California Geological Survey, 2002: Norris and Webb, 1976). Its northern part is drained by the Sacramento River and is known as the Sacramento Valley; the southern portion is drained by the San Joaquin River and is known as the San Joaquin Valley.

The San Joaquin Valley is filled with marine and alluvial sediments that have been deposited almost continuously since the Jurassic (145.0–201.3 million years ago [Ma]) (California Geological Survey, 2002; Howard, 1979; Norris and Webb, 1976). These sediments overlie the westward-tilted block of the plutonic and metamorphic Sierra Nevada basement (Bartow, 1991). The northern portion of the San Joaquin Valley was part of the Pacific Ocean and subject to submarine deposition from the Jurassic until the late Paleocene (56.0–59.2 Ma), when uplift of the Sierra Nevada put this portion of the San Joaquin Valley on or near the shore of the Pacific Ocean (Bartow, 1991; Howard, 1979). Between the Paleocene (66.0–56.0 Ma) and the Pliocene (5.333–2.588 Ma), deposition across the valley alternated between terrestrial and marine, depending on conditions and location, and the entire valley did not become isolated from the Pacific Ocean until the Pliocene (Bartow, 1991; Howard, 1979). Through the Pliocene to the Present, the valley has experienced alluvial, fluvial, and lacustrine deposition, as well as periods of erosion, variously influenced by tectonic activity and climatic changes (Bartow, 1991).

Figure 2 shows the geology within and surrounding the project area as mapped by Wagner et al. (1991). The geologic units present in the project area are described in more detail below. All the dates for the geologic periods and epochs follow the International Commission on Stratigraphy (2017).

6.1.1 Artificial Fill

Although Artificial Fill is not mapped by Wagner et al. (1991), Artificial Fill Is likely present in most areas beneath the existing roadways within the project area. Artificial Fill consists of sediments that have been removed from one location and transported to another by humans. The transportation distance can range from a few feet to dozens of miles. Composition is dependent on the source. Depending on the area, thickness can vary greatly. Artificial Fill can contain fossils, but these fossils have been removed from their original locations and are thus out of context. As such, they are not considered to be important for scientific study. Therefore, Artificial Fill has no paleontological sensitivity. However, these deposits vary in thickness and may overlie deposits in other geologic units or formations that can contain scientifically significant fossils.

6.1.2 Dune Sand

Dune Sand was deposited during the Holocene (less than 11,700 years ago) and consists of sand from other geologic units within the Great Valley that has been picked up and redeposited by wind or water (Wagner et al., 1991). These deposits are mapped over nearly the entire project area (Figure 2).

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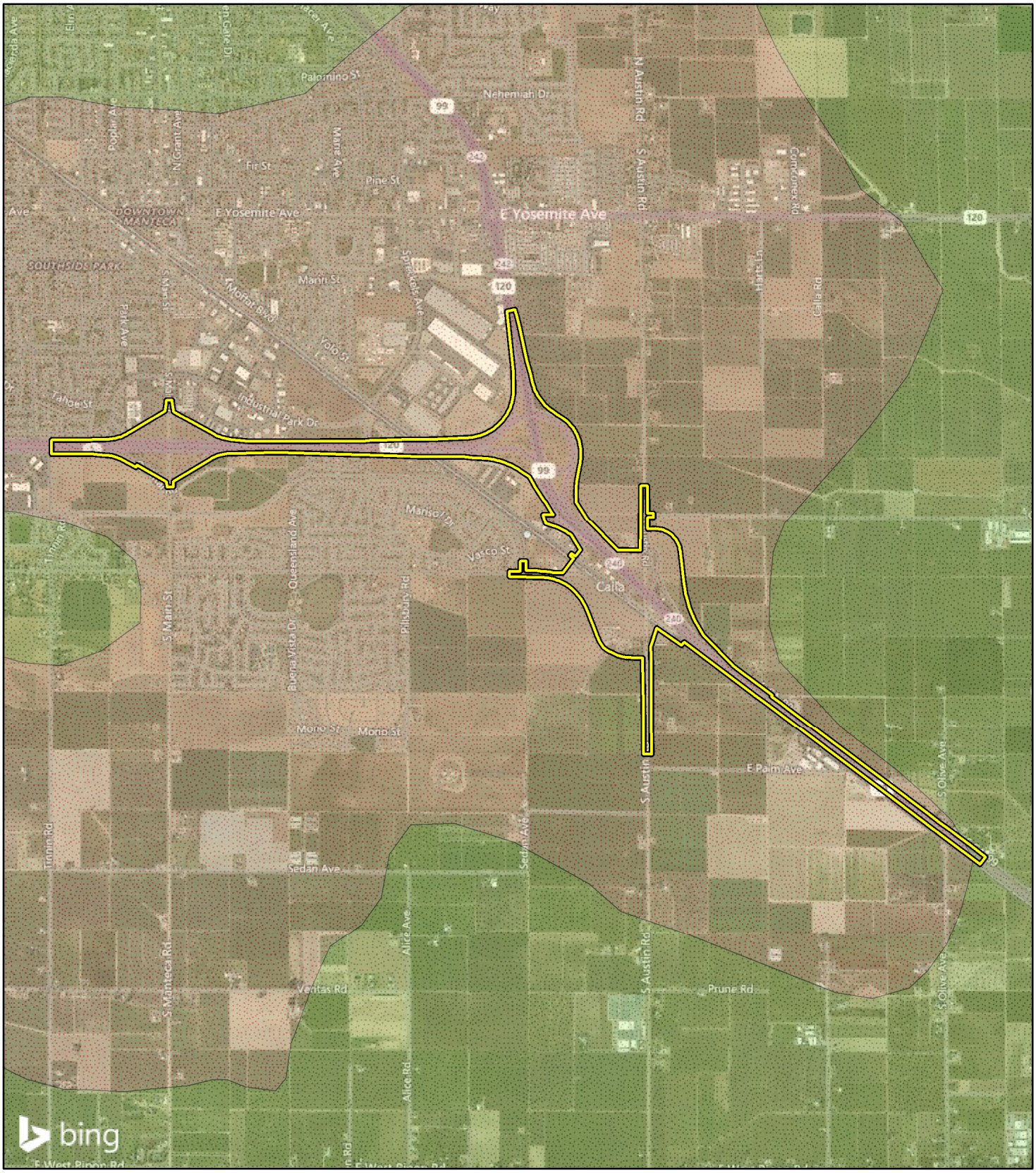

LEGEND

Project Location

Geology

Qs - Dune Sand

Qm - Modesto Formation

0 1500 3000

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SOURCE: Bing Maps (2014); Wagner et al. (1991)

I:\MKT1507\GIS\Geology.mxd (2/8/2018)

FIGURE 2

State Route 99/120
Interchange Connector Project

Geology Map

10-SJ-99/120

PM 3.1/6.2 PM R5.1/T7.2

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Although Holocene (less than 11,700 years ago) deposits, such as Dune Sand, can contain remains of plants and animals, only those from the middle to early Holocene (4,200 to 11,700 years ago; Walker et al., 2012) are considered scientifically important (Society of Vertebrate Paleontology, 2010). Scientifically important fossils from middle to early Holocene deposits are not very common, and the UCMP has no records of vertebrate fossil localities from Holocene deposits in Stanislaus County. As such, the Dune Sand is considered to have low paleontological sensitivity.

6.1.3 Modesto Formation

The Modesto Formation is essentially an alluvial fan deposit composed of interbeds of gravel, sand, and silt deposited by streams carrying glacial outwash from the western side of the Sierra Nevada throughout the entire Great Valley Geomorphic Province (Marchand and Allwardt, 1981). Marchand and Allwardt (1981) indicate a maximum thickness for the Modesto Formation of up to approximately 131 ft and divide the formation into an upper and lower member based on topographic position and soil development. The upper member is composed of unconsolidated, unweathered gravel, sand, silt, and clay, while the lower member is composed of consolidated, slightly weathered, well-sorted silt and fine sand, with occasional gravel interbeds (Marchand and Allwardt, 1981). Dating to the late Pleistocene, the upper member was deposited between approximately 9,000 and 14,000 years ago, and the lower member accumulated between approximately 27,000 and 75,000 years ago (Frye et al., 1968; Marchand and Allwardt, 1981). The period of weathering and non-deposition between the two members is indicated by a discernable soil horizon that is visible in many places (Marchand and Allwardt, 1981). This period likely represents a time of glaciation with few to no active streams carrying sediment out of the Sierra Nevada (Bartow, 1991). Unfortunately, geologic mapping by Wagner, et al. (1991) is not at a sufficient detail to specify which member is present within the project area. The Modesto Formation is mapped in a very small portion at the southern end of the project area (Figure 2).

The Modesto Formation was deposited during the Rancholabrean North American Land Mammal Age (NALMA) (11,000–240,000 years ago). As such, there is a potential for it to contain Rancholabrean fossils similar to those recovered from alluvial deposits of the same age. Common examples of Rancholabrean vertebrate fossils include ground sloth, dire wolf, saber-toothed cat, camel, bison, mammoth, horse, rodent, bird, reptile, and amphibian fossils (Bell et al., 2004; Jefferson, 1991a, 1991b). Rancholabrean fossils reported from nearby Stanislaus County include mammoths (*Mammuthus columbi*); giant ground sloths (*Paramylodon harlani* and *Megalonyx jeffersoni*), horse (*Equus*), camel (*Camelops hesternus*), bison (*Bison antiquus*), and pocket gopher (*Thomomys*) (Jefferson, 1991b). Over 1,500 scientifically significant fossil specimens have also been recovered from the Modesto Formation elsewhere in the Central Valley from Merced County and Fresno County (Cehrs et al., 1979; Dundas et al., 2009; Gust et al., 2012). The fossils from Merced County were discovered during excavation for the Arboleda Drive Freeway Project and represent a varied assemblage of large and small vertebrates, including Columbian mammoth (*Mammuthus columbi*), giant ground sloth (*Paramylodon harlani*), camel (*Camelops hesternus*), American llama (*Hemiauchenia*), bison (*Bison antiquus*), horse (*Equus occidentalis*, *E. conversidens*), deer (*Odocoileus*), dire wolf (*Canis dirus*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), jackrabbit (*Lepus californicus*), Audobon's and Bachman's rabbits (*Sylvilagus audoboni*, *S. bachmani*), ground squirrel (*Spermophilus*), kangaroo rat (*Dipodomys*), pack rat (*Neotoma*), pocket gopher (*Thomomys bottae*), meadow vole (*Microtus*), pocket mouse (*Perognathus*), deer mouse (*Peromyscus*), harvest mouse (*Reithrodontomys*), Canada goose (*Branta canadensis*), California quail (*Calipepla californica*), western scrub jay (*Aphelocoma californica*), northern mockingbird (*Mimus polyglottos*), American

robin (*Turdus migratorius*), western meadowlark (*Sturnella neglecta*), sparrow (*Zonotrichia*), minnows (Cyprinidae), three-spine stickleback (*Gasterosteus aculeatus*), western pond turtle (*Emys marmorata*), rattlesnake (*Crotalus*), and other snakes (Colubridae) (Gust et al., 2012). Based on the quantity, quality, and variety of scientifically significant fossils recovered from the Modesto Formation, it is considered to have high paleontological sensitivity.

6.2 LOCALITY SEARCH

The UCMP has no records of vertebrate fossil localities from Holocene deposits or the Modesto Formation in San Joaquin County. However, the museum has records of 14 fossil localities in the County from Pleistocene deposits similar to the Modesto Formation. Table A lists the fossils recovered from these fossil localities.

Table A: Paleontological Resources from Fossil Localities in Pleistocene Deposits in San Joaquin County

Locality Number	Locality Name	Fossils Recovered
V3315	Hetch Hetchy Tunnel	camel (*Camelops hesternus*)
V4804	Reiche 1	horse (Hipparionini)
V4807	Delta Mendota 13	mastodon (*Mammut*)
V4808	Delta Mendota 14	pocket gopher (*Thomomys*), unspecified mammal
V4809	Delta Mendota 15	bison (*Bison*), horse (Hipparionini)
V4810	Delta Mendota 16	unspecified mammal
V4811	Delta Mendota 17	horse (Hipparionini)
V4819	Delta Mendota 19	horse (*Equus*)
V4822	Lincoln Village	horse (*Equus*)
V4867	Reiche 2	mastodon (*Mammut*), horse (Hipparionini)
V5039	Cometa Road	horse (*Equus*)
V5107	Mormon Slough	carnivore (Carnivora [Fissipedia]), horse (*Equus*), mammoth (*Mammuthus columbi*), unspecified mammal
V66150	Tracy Gravel Pit	giant ground sloth (*Megalonyx jeffersoni*)
V74136	H-E Test Site, Livermore Lab	mammoth (*Mammuthus*)

Source: University of California Museum of Paleontology online database

The UCMP also has five fossil localities from the Modesto Formation in nearby Stanislaus County. The fossils recovered from these localities are listed in Table B.

Table B: Paleontological Resources from Fossil Localities in the Modesto Formation in Stanislaus County

Locality Number	Locality Name	Fossils Recovered
PB01018	Sutter Energy Center II	no specimens at UCMP
V72007	Garber Farm	giant ground sloth (*Megalonyx jeffersoni*), mammoth (*Mammuthus columbi*)
V72186	McManis Ranch	bison (*Bison latifrons*)
V99464	Walnut Energy Center Unit B1	camel (*Camelops*), bison (*Bison*)

Source: University of California Museum of Paleontology online database
UCMP = University of California Museum of Paleontology

6.3 FIELD SURVEY

Ground visibility ranged from 95 to 100 percent within the agricultural properties where wheat had been recently harvested and almond orchards and rows of grapevines were kept free of grasses and weed. Sediment consisted of sandy silt, loamy sandy silt, or silty sand, with small ground bivalve shell fragments added for nutrients in one parcel. Within the Caltrans, UPRR, and San Joaquin County rights-of-way, visibility ranged from 0 to 100 percent, with some areas covered in grasses, weeds, and shrubs. The basins and spillways contained sandy, pebbly imported fill. No paleontological resources were observed during the survey.

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7.0 SUMMARY AND RECOMMENDATIONS

Consideration of the impacts this project would have on paleontological resources must take into account the paleontological sensitivities of the geologic units involved and the project development methods. No paleontological resources are known to exist within the project area, and this study does not anticipate special paleontological situations that would require project redesign to avoid critical localities or strata. Artificial Fill, which has no paleontological sensitivity, is present from the surface to varying depths throughout the project area where it was used during development of the existing roadways. The majority of the project area contains Holocene Dune Sand, which has low paleontological sensitivity. In the far southern end of the project area and likely underlying the Dune Sand at unknown depths, are deposits of the Modesto Formation, which has high paleontological sensitivity.

Based on current project plans, the majority of excavation is limited to areas that have already been disturbed during development of the existing roadways or areas mapped as containing Holocene Dune Sand, which has low paleontological sensitivity. Although driving piles for the bridge footings may reach the high sensitivity Modesto Formation, this excavation method has a limited impact area; precludes access to the cutting face, which reduces the amount of contextual information that may be collected; limits the recovery of larger and more complete specimens; and, depending on the parameters of the operations, may pose safety issues that limit or prevent access to the spoils generated, if any. Only a very small portion at the southern end of the project area (approximately 500 ft) contains the Modesto Formation at the surface, and project development in this area involves median replacement, new pavement, and restriping, all of which would involve ground disturbance shallower than approximately 2 ft. Therefore, development of this project is unlikely to impact scientifically significant paleontological resources and no further paleontological studies, such as a PER or a PMP, are required for this project.

In the unlikely event paleontological resources are discovered during ground-disturbing activities, it is recommended that work in the immediate area of the discovery be halted until the find can be evaluated by a qualified paleontologist and, if necessary, collected from the field. If the find is determined to be significant and there is a potential to encounter sediments similar to those from which the fossil was recovered, it is recommended that the paleontologist prepare a PMP to guide paleontological mitigation for the remainder of the project. The PMP should follow the current guidelines of Caltrans.

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8.0 REFERENCES

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Transportation, District 6. Prepared by Cogstone Resources Management, Inc. under contract to URS Corp., Inc. December 2012.

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Appendix A Resume

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SARAH RIEBOLDT, PH.D.
PALEONTOLOGIST

EXPERTISE

Paleontological Mitigation Reports

Paleontological Resource Monitoring

Fossil Collection, Salvage, Identification, and Curation

Federal, State, and Local Laws, Ordinances, Regulations, and Standards (LORS) Regarding Paleontological Resources

EDUCATION

University of California, Berkeley, Ph.D., Paleontology, 2005.

University of Colorado, Boulder, Magna cum Laude B.A., Biology, Minor in Geology, 1999.

TEACHING

Science Specialist, San Roque School, Santa Barbara, California, January 2006–June 2008.

Graduate Student Instructor, Department of Integrative Biology, University of California, Berkeley, August 2000–December 2000, January 2001–May 2001, and January 2003–May 2003.

PROFESSIONAL RESPONSIBILITIES

Dr. Rieboldt is a paleontologist at LSA with 15 years of experience in the paleontology and geology fields. Dr. Rieboldt's field and laboratory experience includes working on research projects throughout California, Nevada, Utah, Colorado, Wyoming, Texas, and Alabama. She has 8 years of experience working with natural history collections in museums in California, Colorado, and Illinois and 7 years of experience as a paleontological consultant in California and Utah, monitoring for paleontological resources, and writing paleontological resource assessment reports and mitigation plans. She also has experience in monitoring the excavation and construction process on multiple subdivision developments and a natural gas pipeline, as well as monitoring drilling and coring operations.

Dr. Rieboldt prepares paleontological assessment reports, mitigation plans, and monitoring reports following the completion of paleontological mitigation monitoring. She provides guidance on the various federal, State, and local regulations and guidelines regarding paleontological resources as they apply to project around Southern California. She also is responsible for scheduling paleontological monitors on both large- and small-scale projects.

PROJECT EXPERIENCE

State Route 710 North Study
Los Angeles County, California

LSA is leading an environmental team to prepare an Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the State Route 710 (SR-710) North Study, which spans 23 cities and communities in Los Angeles County. This project, under the direction of the California Department of Transportation (Caltrans) in cooperation with the Los Angeles Metropolitan Transportation Authority (Metro), proposes to improve mobility and relieve congestion between State Route 2 and Interstates 5, 10, 210, and 605 in east/northeast Los Angeles and the San Gabriel Valley. Development of this project involves four alternatives: Freeway Tunnel, Light Rail, Bus Rapid Transit, and Transportation System Management/Transportation Demand Management. Dr. Rieboldt wrote the Paleontological Identification Report (PIR)/Paleontological Evaluation Report (PER) for this project.

Digital 395 Project
San Bernardino, Kern, Inyo, and Mono Counties, California; Douglas and Washoe Counties and Carson City, Nevada

Dr. Rieboldt prepared the Paleontological Resources Monitoring and Mitigation Plan (PRMMP) for the Digital 395 Project, which involved the installation of over 590 miles of fiber-optic line along United States Highway 395 (US-395) on the east side of the Sierra

PROFESSIONAL EXPERIENCE (CONTINUED)

Paleontologist, LSA Associates, Inc., Irvine, California, April 2013–Present.

Project Manager, Department of Geological Sciences, California State University, Fullerton, and John D. Cooper Archaeological and Paleontological Center, Santa Ana, California, April 2012–April 2013.

Geologist, Geological Survey of Alabama, Tuscaloosa, Alabama, April 2010–February 2012.

Collections Assistant, Field Museum of Natural History, Chicago, Illinois, February 2009–February 2010.

Science Writer, University of California Museum of Paleontology, Berkeley, California, April 2009–November 2009.

Collections Assistant, Chicago Academy of Sciences, Chicago, Illinois, October 2008–February 2009.

Postdoctoral Research Associate, Center for Integrative Planetary Science, University of California, Berkeley, May 2005–December 2005.

Paleontological Consultant, Ric Windmiller Consulting, Auburn, California, June 2000–June 2005.

Graduate Student Researcher, Department of Integrative Biology, University of California, Berkeley, January 2004–December 2004.

Science Writer, University of California Museum of Paleontology, Berkeley, California, June 2003–December 2003.

PROJECT EXPERIENCE (CONTINUED)

Nevada. Running from Barstow, California, to Reno, Nevada, the project route passed through lands managed by the United States Department of the Interior, Bureau of Land Management; the United States Department of Agriculture, Forest Service; the United States Department of Defense; the States of California and Nevada; and the lands of several Native American tribes. As such, this project was subject to multiple federal, State, and local regulations and policies regarding paleontological resources.

NBCUniversal Studios G Lot Project
Universal City, Los Angeles County, California

Dr. Rieboldt is currently preparing the Final Mitigation Monitoring Report for the NBCUniversal G Lot Project. This project has involved substantial excavation into the Middle Miocene (15.97 to 11.62 million years ago) Topanga Group and produced dozens of specimens of fossil leaves and bony fish, as well as a few whale specimens. As part of the mitigation monitoring report, Dr. Rieboldt is documenting project compliance with the applicable State and County requirements for paleontological resources. She is also identifying and describing the fossils recovered and their scientific significance.

NBCUniversal Studios Universal Hollywood Drive Project
Universal City and Los Angeles, Los Angeles County, California

Dr. Rieboldt prepared the Paleontological Resources Monitoring Plan (PRMP) for the NBCUniversal Studios Universal Hollywood Drive Project, located in the City of Los Angeles and Universal City, which is in unincorporated Los Angeles County. This project involves improving and widening Universal Hollywood Drive and includes excavation into Holocene to Late Pleistocene (less than 126,000 years ago) Young Alluvial Deposits and Middle Miocene (15.97 to 11.62 million years ago) Topanga Group. The PRMP outlines best practices for paleontological monitoring.

Foothill Parkway Westerly Extension Project
City of Corona and unincorporated Riverside County, California

The Foothill Parkway Westerly Extension Project, located in the City of Corona and unincorporated Riverside County, involves construction of approximately 2 miles of roadway with associated structures and connector road improvements to accommodate existing and future traffic demands in that area. The project includes excavation into paleontologically sensitive deposits of Holocene to Pleistocene Alluvial Deposits, the Paleocene Silverado Formation, and the Late Cretaceous Williams and Ladd Formations. Dr. Rieboldt prepared the Paleontological Resources Impact Mitigation Plan for this project, which outlines best practices for paleontological monitoring during project excavation, as well as procedures for preparing, curating, and documenting any recovered fossils.

SARAH RIEBOLDT, PH.D.
PALEONTOLOGIST

PROFESSIONAL EXPERIENCE (CONTINUED)

Paleontological Consultant, California Department of Parks and Recreation, San Francisco, California, and University of California Museum of Paleontology, Berkeley, California, June 2001–December 2002.

Graduate Student Researcher, University of California Museum of Paleontology, Berkeley, California, August 2002–December 2002.

Paleontological Consultant, ECORP Consulting, Inc., Roseville, California, June 2002.

Paleontological Consultant, Jones & Stokes Associates, Sacramento, California, August 2001–January 2002.

Collections Assistant, University of California Museum of Paleontology, Berkeley, California, August 1999–December 1999.

Collections Assistant, University of Colorado Museum of Natural History, Boulder, Colorado, September 1997–May 1999.

PRESENTATIONS

RECS (Research Experience in Carbon Sequestration) Workshop, (Birmingham, Alabama). June 6, 2011.

Geological Society of America Annual Meeting, (Denver, Colorado), "Taphonomy of Jupiter's Icy Moon Europa." November 7–10, 2004.

Bioastronomy Meeting: Habitable Worlds, (Reykjavik, Iceland), "Life, Past and Present, on Jupiter's Icy Moon, Europa." July 12–16, 2004.

35th Lunar and Planetary Science Conference (Houston, Texas), "Geosciences at Jupiter's Icy Moons: The Midas Touch." March 16, 2004.

PROJECT EXPERIENCE (CONTINUED)

Pio Pico Energy Center Project
San Diego County, California

Dr. Rieboldt prepared the PRMMP for the Pio Pico Energy Center Project. This project involved the construction of a power plant for three General Electric natural gas-fired combustion turbine generators in an unincorporated area on Otay Mesa in San Diego County. Development of this project will include clearing and grading of the project area, construction of the power plant, and installation of natural gas lines and electricity transmission lines, all within paleontologically sensitive sediments of the Late Oligocene (23.03–28.1 million years ago) Otay Formation. The PRMMP followed all applicable State, County, and California Energy Commission (CEC) requirements and guidelines.

Vernola Marketplace Apartments Project: Phases A and B
Jurupa Valley, California

Dr. Rieboldt prepared the Paleontological Resources Assessment for Phases A and B of the Vernola Marketplace Apartments Project in the City of Jurupa Valley in Riverside County. This project involves the development of 597 multifamily residential units on approximately 25.7 acres of land near the intersection of Interstate 15 and 68th Street. It includes excavation into Holocene through Early Pleistocene deposits, some of which are sensitive for paleontological resources. The paleontological assessment documented the location and nature of the sensitive sediments and made recommendations to ensure project development does not adversely impact those resources.

SR-60/Theodore Street Interchange Project
Moreno Valley, California

LSA is conducting environmental technical studies for air quality and biological, cultural, and paleontological resources for the State Route 60 (SR-60)/Theodore Street Interchange Project in the City of Moreno Valley in Riverside County. The proposed project involves reconstruction of the local interchange at SR-60 and Theodore Street in order to reduce congestion, improve traffic flow, and accommodate forecasted traffic demands in and around Moreno Valley. Project development includes removal and replacement of the Theodore Street bridge over SR-60, auxiliary lanes along SR-60, and new entrance and exit ramps from SR-60 to Theodore Street. Dr. Rieboldt is preparing the PIR/PER for this project.

San Onofre Nuclear Generating Station Project
San Diego County, California

As part of an on-call contract with Southern California Edison (SCE), Dr. Rieboldt prepared the Paleontological Resources Assessment for the San Onofre Nuclear Generating Station (SONGS) Project, located on the Camp Pendleton Marine Corps

PRESENTATIONS (CONTINUED)

Seventh Field Conference of the International Subcommission on Cambrian Stratigraphy: The Cambrian System of South China, (Guiyang, China), "Cambrian Inarticulate Brachiopods from Nevada and Texas." August 2001.

Fourth International Brachiopod Congress (London, England), "Can Oxygen Isotopes from Inarticulate Brachiopods Resolve the Causes of Faunal Turnovers in the Cambrian?" July 10–14, 2000.

Geological Society of America Cordilleran Section Meeting, (Berkeley, California), "Inarticulate Brachiopods from the Pioche Formation (Lower and Middle Cambrian), Nevada and their Relation to the Extinction of the Olenellida." June 2–4, 1999.

PROJECT EXPERIENCE (CONTINUED)

Base in San Diego County. This assessment provided a review of the 17 geologic units within the surrounding SONGS facilities and their paleontological sensitivity ratings. Based on the paleontological sensitivities of these 17 geologic units and potential construction methods, the assessment also provided recommendations for mitigating impacts to paleontological resources that may be encountered during development of any future projects at the SONGS facilities.

Central Region Landfills – Frank R. Bowerman Landfill Wetlands Basin, Phase VIIIC, and East Flank Landslide Projects
Orange County, California

Dr. Rieboldt is currently preparing the Final Mitigation Monitoring Report for the Wetlands Basin, Phase VIIIC, and East Flank Landslide Projects. To date, LSA has collected over 100 fossil specimens from these combined projects, and the recovery of these specimens was completed without delay to the project schedule. The most notable specimens collected during the projects so far are several early Miocene (18–20 million years before present) whale fossils and leaves and molluscs from the Cretaceous (72–83 million years before present). As part of the mitigation monitoring report, Dr. Rieboldt is documenting project compliance with the applicable State and County requirements for paleontological resources. She is also identifying and describing the scientific significance of the fossils recovered.

Newport Coastal Coverage Solution Project
Crystal Cove State Park
Orange County, California

The Newport Coastal Coverage Solution Project, located in Crystal Cove State Park in Orange County, involves installation of a building for communications equipment with associated access roads to improve safety communications in that area. The project includes excavation into paleontologically sensitive deposits of the Middle Miocene Topanga Group and possibly Middle to Late Miocene Monterey Formation. Because this project is within the boundaries of a State Park, Dr. Rieboldt obtained the required permit for paleontological field work on State lands and prepared the Paleontological Resources Impact Mitigation Plan (PRIMP), which outlines best practices for paleontological monitoring during project excavation, as well as procedures for preparing, curating, and documenting any recovered fossils.

PROJECT EXPERIENCE (CONTINUED)

North County Corridor New State Route 108 Project
Stanislaus County, California

LSA conducted environmental technical studies for the North County Corridor New State Route 108 (SR-108) Project in Stanislaus County. The proposed project involves relocating the current alignment of SR-108 in order to reduce congestion, improve traffic flow, and accommodate forecasted traffic demands in the northern part of Stanislaus County. LSA prepared the PIR/PER, and at the request of Caltrans, Dr. Rieboldt prepared a preliminary Paleontological Mitigation Plan (PMP) for this project.

Hidden Canyon Project
Orange County, California

Dr. Rieboldt prepared the Paleontological Mitigation Monitoring Report for the Hidden Canyon Project. LSA has collected specimens of sharks, rays, whales, and mollusks from the Early Miocene to Early Oligocene (15.97–33.9 Ma) Vaqueros Formation. As part of the mitigation monitoring report, Dr. Rieboldt documented project compliance with the applicable State and City of Irvine requirements for paleontological resources. She also identified and described the fossils recovered.

Aldi Distribution Center Project
Moreno Valley, Riverside County, California

Dr. Rieboldt prepared the Final Paleontological Mitigation Monitoring Report for the Aldi Distribution Center Project in Moreno Valley in Riverside County. This project involved excavation into paleontologically sensitive Late Pleistocene deposits and produced specimens of horse (*Equus*), camel (*Hemiauchenia*) and giant ground sloth (*Megalonyx jeffersonii* or *Nothrotheriops shastensis*). For the final report, Dr. Rieboldt identified and described the recovered material and documented project compliance with the applicable State, City, and project-specific requirements for paleontological resources.

City of Menifee On-Call Cultural Resources Studies Peer Review Projects
Menifee, California

LSA is under contract with the City of Menifee in Riverside County to provide on-call peer review of cultural and paleontological resources documents prepared for project compliance with applicable federal, State, City, and project-specific requirements and guidelines for cultural and paleontological resources. These documents may include field survey reports, assessments, mitigation monitoring programs, and final mitigation reports. Dr. Rieboldt is conducting the peer review of all paleontological documents under this contract.

Ball Road Sanitary Sewer and Storm Drain Improvements Project
Anaheim, California

Dr. Rieboldt prepared the Paleontological Analysis Memorandum for Ball Road Sanitary Sewer and Storm Drain Improvements Project in the City of Anaheim in Orange County. This project involves the replacing and upgrading sewer and storm drain facilities along Ball Road and into Carbon Creek and demolishing an abandoned railroad bridge. It includes excavation into Holocene to Late Pleistocene deposits, some of which are sensitive for paleontological resources. The paleontological analysis documented the location and nature of the sensitive sediments and made recommendations to ensure project development does not adversely impact those resources.

Howland's Landing Well Project
Santa Catalina Island, California

As part of an on-call contract with SCE, Dr. Rieboldt prepared the Paleontological Resources Assessment for the Howland's Landing Well Project on Santa Catalina Island in Los Angeles County.

PROJECT EXPERIENCE (CONTINUED)

This emergency project involved drilling exploration wells to determine where fresh water may be reached and then drilling, constructing, and testing the final well, which will provide fresh water for the Howland's Landing area. The project included excavation into Holocene to Late Pleistocene deposits and metamorphic rocks of the Late Cretaceous Catalina Schist, a part of the Franciscan Formation. Although the Pleistocene sediments that may be present at depth have the potential to contain scientifically important fossils, the excavation methods used for this project would preclude the recovery of paleontological resources. The paleontological assessment documented the location and nature of the sensitive sediments and, based on the excavation methods, recommended that no paleontological mitigation was required for the project.

Sesi Property Landfill Closure Project
San Diego, California

Dr. Rieboldt prepared the Paleontological Mitigation Monitoring Report (PMMR) for the Sesi Property Landfill Closure Project. This project involved constructing a monolithic landfill cover with surface drainage facilities and other improvements for closure of landfilled auto-shredder waste on the Sesi property in the City of San Diego, San Diego County. Development of this project involved excavation into the paleontologically sensitive Otay and Lindavista Formations and therefore, required full-time monitoring during ground-disturbing activities in native deposits.

Morse Street Townhomes Project
Oceanside, California

Dr. Rieboldt prepared the Paleontological Assessment for the Morse Street Townhomes Project. This project involved the development of 38 townhomes on a 2.3-acre parcel of land near the intersection of Morse Street and the Pacific Coast Highway in the City of Oceanside in San Diego County. Development of this project included clearing and grading to prepare the project area, construction of the various buildings, and installation of utilities.

Stratford Ranch Residential Project
Perris, California

LSA conducted an archaeological and paleontological resources assessment for the Stratford Ranch Residential Project in the City of Perris in Riverside County. The proposed project includes a new residential community with 400 lots and a 15-acre Stockpile Plan on approximately 80 acres in northeastern Perris. Project development involves clearing and grading to prepare the project area, construction of a new road within the area, and installation of on-site storm drains, new water service, new sewer lines, new electric service, new natural gas lines, and a new telecommunication infrastructure system to serve the proposed residential uses. Dr. Rieboldt prepared the paleontological resources section of this assessment.

34202 Del Obispo Street Project
Dana Point, California

LSA conducted environmental technical studies for the 34202 Del Obispo Street Project in the City of Dana Point in Orange County. This mixed-use project involves the development of a residential community, commercial space, and a small amount of parkland/open space. Dr. Rieboldt prepared the Paleontological Resources Assessment for this project.

Spieker Continuing Care Retirement Community Project
San Juan Capistrano, California

Dr. Rieboldt prepared the Paleontological Resources Assessment as one of several environmental technical studies LSA conducted for the Spieker Continuing Care Retirement Community Project in

PROJECT EXPERIENCE (CONTINUED)

the City of San Juan Capistrano in Orange County. This project involves the development of a Continuing Care Retirement Community designed for residents over the age of 60 years. Development of this project includes the construction of independent living residences, community buildings, and a health care center.

State Route 120/McKinley Avenue Interchange Project
Manteca, California

LSA is conducting environmental technical studies for the State Route 120 (SR-120)/McKinley Avenue Interchange Project in Manteca in San Joaquin County. The proposed project involves the construction of a new interchange at SR-120 and McKinley Avenue in order to reduce congestion, improve traffic flow, and accommodate forecasted traffic demands in and around the City of Manteca. Dr. Rieboldt assisted in the preparation of the PIR/PER and prepared the PMP for this project.

Kaiser Bellflower East Center Demolition Project
Los Angeles County, California

The proposed project involves demolition of the existing Administration Building and East Center Wing of the Kaiser Bellflower Medical Center and remodeling of the exterior and lobby of the West Wing of the Medical Center. Excavation activities associated with this project are anticipated to reach 15–20 feet below ground surface. Dr. Rieboldt wrote the Paleontological Resources Memorandum and the PRIMP for this project.

Vancouver Street Sewer Extension Project
Carlsbad, California

Dr. Rieboldt prepared the PRMMP for the Vancouver Street Sewer Extension Project. This project involved the extension of an existing sewer line from Vancouver Street to Via de Canto through Hidden Canyon Community Park in the City of Carlsbad in San Diego County. Development of this project included traditional excavation, as well as horizontal directional drilling, for the installation of the sewer line segments.

Durfee Avenue Grade Separation Project
Pico Rivera, California

LSA conducted environmental technical studies for the Durfee Avenue Grade Separation Project in the City of Pico Rivera in Los Angeles County. The project proposes to lower Durfee Avenue below the Union Pacific Railroad (UPRR) tracks to improve safety for vehicular, rail, and pedestrian traffic along Durfee Avenue and nearby streets and the railroad right-of-way. Project development includes lowering Durfee Avenue, Walnut Avenue, and Stephens Street; raising the UPRR tracks; and relocating various wet and dry utilities As due diligence for the client, Dr. Rieboldt prepared the paleontological assessment for this project.

State Route 94/State Route 125 Interchange Branch Connector Project
San Diego County, California

LSA conducted cultural and paleontological resources assessments for the State Route 94/State Route 125 (SR-94/SR-125) Interchange Branch Connector Project in San Diego County. The proposed project involves the construction of a freeway-to-freeway connector to allow direct south-to-east movement for the SR-94/SR-125 interchange in order to improve regional circulation and reduce traffic on local streets in the Cities of La Mesa and Lemon Grove, and in the unincorporated community of Spring Valley. Project development includes construction of a freeway connector between southbound SR-125 and eastbound SR-94, auxiliary lanes on those freeways, and new noise barriers and retaining

PROJECT EXPERIENCE (CONTINUED)

walls, as well as modifications to existing structures. Dr. Rieboldt prepared the PIR/PER for this project.

Surfside Inn Pedestrian Overcrossing Project
Dana Point, California

LSA conducted cultural and paleontological resources assessments for the Surfside Inn Pedestrian Overcrossing Project in the City of Dana Point in Orange County. The proposed project involves replacement and rehabilitation of the pedestrian overcrossing across the Pacific Coast Highway and Metrolink right-of-way from the Capistrano Surfside Inn to Doheny State Beach. Dr. Rieboldt prepared the paleontological resources assessment.

Adelanto Solar Project
San Bernardino County, California

Dr. Rieboldt prepared a paleontological resources analysis report for the Adelanto Solar Project in San Bernardino County. This report included a summary of the geology and potential paleontological resources of the project area, results from a paleontological locality search through the San Bernardino County Museum, and recommendations for mitigating potential impacts to paleontological resources.

North Star Solar Project
Fresno, California

LSA conducted a paleontological resources assessment for the proposed North Star Solar Switching Station and Generation Tie Line (Gen Tie) Project in Fresno County. The purpose of this project is to generate and transmit renewable solar electricity from proven technology at a competitive cost, with low environmental impact, and deliver it to market as soon as possible. The project consists of an approximately 1.5-mile-long gen tie line that will tie into a new 115-kilovolt (kV) Switching Station, which is an expansion of the existing Pacific Gas and Electric (PG&E) Mendota substation. Project construction work will involve location preparation, foundation installation, power pole placement, generation line installation, and erection and connection of the gen tie line and switching station equipment. Dr. Rieboldt prepared the Paleontological Resources Assessment for this project.

PUBLICATIONS

Elrick, M., S. Rieboldt, M. Saltzman, and R.M. McKay
2011. Oxygen-isotope trends and seawater temperature changes across the Late Cambrian Steptoean positive isotope excursion (SPICE event). Geology 39(10): 987-990.

Lipps, J.H., and S.E. Rieboldt
2005. Habitats and taphonomy of life on Europa. Icarus 177:515-527.

Parham, J.F., and S.E. Rieboldt
2005. *Contia tenuis* (Sharp-tailed snake): Reproduction. Natural History Note. Herpetological Review 36(4):456.

SELECTED REPORTS

Mount Diablo State Park Paleontological Resources Inventory and Management Recommendations. Prepared for the State of California Department of Parks and Recreation, Bay Area District. December 2002.

Paleontological Resources Assessment for Bayside Covenant Church, Sierra College Boulevard and Cavitt-Stallman Road, City of Roseville, Placer County, California. Prepared for Bayside Covenant Church. June 2002.

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