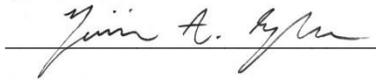


Paleontological Identification and Evaluation Report
Golden Avenue Bridge Replacement and
Rehabilitation Project, BRL-5269(025)
City of Placentia, Orange County, California
California Department of Transportation District 12

Prepared for:

Caltrans District 12
1750 E 4th Street #100
Santa Ana, CA 92705

Prepared by:



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October 2017

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INTRODUCTION

The City of Placentia (City) and the California Department of Transportation (Caltrans) propose to replace and widen Golden Avenue Bridge over Carbon Canyon Creek in the City of Placentia, California. The project area of potential effects (APE) includes construction limits and all proposed work areas. (Appendix A, Project Vicinity Map and Project Aerial Map).

This Paleontological Identification and Evaluation Report (PIR/PER) for the Golden Avenue Bridge Replacement and Rehabilitation Project (Project) was prepared in conformance with the format set forth in the Caltrans Standard Environmental Reference (SER) Handbook, Volume 1, Chapter 8, Paleontological Resources. This PIR/PER provides general guidance for developing, and subsequently implementing, paleontological mitigation efforts including minimum proposal requirements, general fieldwork and laboratory methods, and curation considerations. Specifically, it is intended to summarize the proposed Project and the area of impacts, identify the data sources consulted, identify specific geological units and fossils that may be encountered, provide a recommended course of action related to those paleontological resources, and establish the need for the production of a Paleontological Mitigation Plan (PMP) prepared by a Principal Paleontologist (Caltrans, 2012) prior to any ground disturbing activities.

PROJECT LOCATION AND DESCRIPTION

The City of Placentia (City), in cooperation with the California Department of Transportation (Caltrans), is proposing to replace the existing Golden Avenue Bridge over Carbon Canyon Creek Channel in the City of Placentia, Orange County (Appendix A). The project limits would extend 200 feet from each end of the existing bridge, and 75 feet upstream and downstream of the bridge.

The existing bridge was built in 1934, and is an earth-filled reinforced concrete arch bridge supported on concrete spread footings. The existing bridge is 27 feet wide and 34 feet long, and carries two lanes of traffic over the Carbon Canyon Creek Channel. The bridge has been determined to be functionally obsolete, according to a Caltrans Bridge Inspection Report dated September 29, 2011.

The Carbon Canyon Creek Channel is a narrow, concrete-lined drainage within a larger, unlined channel that flows to the Santa Ana River, several miles downstream from the project area. Flows within the channel are likely variable, with highest flows occurring for short periods after rainstorms. The concrete portion of the channel does not contain vegetation; however, the upper slopes of the larger channel contain several large trees, including *Ailanthus altissima* (tree of heaven), *Pinus spp.* (pine), and *Washingtonia spp.* (fan palm). The rest of the area is bare ground interspersed with weedy plants.

The project includes the removal of the existing bridge in its entirety, including the removal of the asphalt overlay, reinforced concrete deck arch bridge, reinforced concrete spread footings, and the soil backfill contained within the arch bridge. A replacement bridge would be constructed that would be wider than existing bridge, with a width of 58 feet, four inches to accommodate two traffic lanes, Class II bike lanes/shoulders, and sidewalks that meet American Association of State Highway and Transportation Officials (AASHTO) minimum standards. In addition, the replacement bridge would be longer than the existing bridge, with a length of 82 feet, six inches to accommodate a proposed bike path along the Carbon Canyon Creek Channel as part of the Orange County Loop Bikeway Project.

All work would be completed in the existing right-of-way (ROW), and no ROW acquisition would be required for the project. Existing utilities (gas and oil lines) on the north side of the bridge would be relocated between the bridge girders (hanging) along the bridge. Temporary construction easements (TCE) would be required for project construction, and would extend across the 100-foot-wide flood control easement in the Carbon Canyon Creek Channel and along designated access ramps to the channel from Golden Avenue. Construction equipment would be staged along Golden Avenue to the west and east of the bridge. The staging areas would be approximately 100 feet long and 80 feet wide.

Excavation to a maximum depth of 15 feet would be required to construct the cast-in-drilled-hole piles, abutment footings, and abutment seats. Storm drain pipes would be connected at all four quadrants of the bridge to the existing concrete channel wall. To connect the storm drain pipes, work in the channel would be required to form the reinforced concrete collar around the storm drains. Construction would be conducted during the dry season (April to October) when there would be no water in the channel. The trees on both sides of the bridge would be removed to construct the project. Two trees of heaven (*Ailanthus altissima*), one on the north and one on the south side of the bridge, and two fan palms (*Washingtonia spp.*), both on the north side of the bridge, would be removed to accommodate bridge widening.

During construction, Golden Avenue would be closed from California Street to Rose Drive, approximately 0.18 mile east of the project area; however, through access would be allowed to and from residences along Navigation Circle to the east of the bridge. Detour routes around the construction area would be available on Rose Drive, Bastanchury Road, and Valencia Avenue.

The Golden Avenue Bridge project area was delineated to include all resources that could potentially be directly or indirectly affected by the project. The areas of direct effects include the areas where physical impacts will occur. These are generally limited to the proposed and existing right-of-way and include the horizontal and vertical areas ranging from 400 to 500 feet to a maximum depth of 15 feet below ground surface (b.g.s.) associated with ground disturbing activities.

PALEONTOLOGICAL RESOURCES AND SENSITIVITY

Significance of Paleontological Resources

Paleontological resources are the fossilized remains, imprints, or traces of past life preserved in the geologic record. This can include bones, teeth, soft tissues, shells, plant material, microscopic organism, footprints, trackways, and burrows. Fossils are the only record of the history of life on this planet. Despite the frequency of sedimentary rock in the geologic record, and the number of organisms that have lived throughout the planet's history, only a very small number of remains have been preserved in the fossil record. Fossils are important scientific resources, allowing the study of:

- The evolutionary history of extinct organisms, including their lifestyle, interrelationships, distribution, speciation, extinction, and relation to modern groups.
- The taphonomic agents responsible for fossil preservation, including biases in the fossil record.
- Ancient environments in which these organisms lived, and the distribution and change in these environments and their organisms through time.
- The temporal relationships of rock deposits from one area to another, and the timing of geologic events.

According to Caltrans (2012), there are two generally recognized types of paleontological significance:

National- A paleontological resource that is eligible as a National Natural Landmark is an area of national significance (as defined under 36 Code of Federal Regulations 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.

Because of the rarity of fossils, and because the organisms the fossils represent usually no longer exist, paleontologic resources are considered non-renewable and are often afforded federal, state, and local protection. Caltrans (2012) uses the following tripartite scale to determine the paleontological sensitivity of a rock unit:

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; 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.

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 for containing 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 stratum. Rock units designated as low potential generally do not require monitoring and mitigation.

No Potential

Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing 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 is prepared and no further action taken.

Laws and Regulations

A number of federal and state statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally and state authorized projects:

- 23 United States Code (USC) 1.9(a) requires that the use of federal-aid funds must be in conformity with federal and state law. 23 USC 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state.
- 16 USC 431-433 protects any “historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States.”
- Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).
- Section 5097.5 of the California Public Resources Code protects historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological sites, or any other archaeological, paleontological, or historical feature that is situated on land owned by, or in the jurisdiction of, the State of California, or any city, county, district, authority, or public corporation, or any agency thereof.

PROJECT SETTING

California is divided into 11 geomorphic provinces, each naturally defined by unique geologic and geomorphic characteristics. The Project is located in the northwestern portion of the Peninsular Ranges geomorphic province. The Peninsular Ranges province is distinguished by northwest trending mountain

ranges and valleys following faults branching from the San Andreas Fault. The Peninsular Ranges are bound to the east by the Colorado Desert and extend north to the San Bernardino – Riverside County line (Norris and Webb, 1976), west into the submarine continental shelf, and south to the California state line. The Project is within the Los Angeles Basin, an actively subsiding basin bound by the Santa Monica and San Gabriel Mountains to the north, the Santa Ana Mountains to the east, and the Palos Verdes Hills to the south (Yerkes, et al., 1965). Rapid deposition of deep sediment fill has resulted from the subsidence (Yerkes et al., 1965; Yeats, 1978), with local alluvial deposits beneath reaching approximately 13,000 feet thick in thickness (The Planning Center, 2004). The sediments in the project area are largely sourced from alluvial deposits from the Santa Ana Mountains to the north or the San Joaquin and Capistrano Hills to the south, and floodplain deposits from the nearby Santa Ana River (Babilonia, et al., 2013). This deep sediment fill has resulted in the accumulation of notable fossil resources (Miller, 1971) and petroleum resources (Bilodeau, et al., 2007).

PERSONNEL

This report was completed by Benjamin Scherzer, M.S., Paleontologist with Duke Cultural Resources Management (DUKE CRM). Mr. Scherzer has worked in all phases of paleontology (archival research, field survey, excavation, laboratory analysis, construction monitoring) since 2006. Mr. Scherzer is a certified paleontologist for Orange County and qualifies as a Principal Paleontologist according to the Caltrans Standard Environmental Reference (SER) preparer qualifications (2012). Mr. Scherzer holds a M.S. degree in Earth Sciences with an emphasis in vertebrate paleontology from Montana State University, Bozeman, and a Bachelor of Arts degree in Geosciences and Math from Earlham College, Indiana. Mr. Scherzer has worked throughout southern California, Nevada, South Dakota, Utah, and Wyoming. The report was peer reviewed by DUKE CRM Archaeologist Curt Duke, M.A.

RECORDS SEARCH AND LITERATURE REVIEW

Geologic Units

The geology of the project area has been mapped by Morton and Miller (2006) at a scale of 1:100,000. A review of this map indicated that the project area is underlain by deposits from the Pleistocene Epoch (2.5 million years ago to 11,700 years ago) and Holocene Epoch (11,700 years ago to today). Young alluvial fan deposits (*Qyf_{sa}*) from the late Pleistocene and Holocene occur in the western portion, and very old alluvial fan deposits (*Qvof_{sa}*) from the early to middle Pleistocene occur in the eastern portion (Appendix A, Geology Map).

Young alluvial fan deposits (*Qyf_{sa}*) (late Pleistocene - Holocene)

Young alluvial fan deposits are composed of unconsolidated to moderately consolidated alluvial-fan deposits composed of silt and sand, with slightly to moderately dissected surfaces (Morton and Miller, 2006). These deposits underlie the portion of the Project west of Carbon Creek.

Very old alluvial fan deposits (*Qvof_{sa}*) (early to middle Pleistocene)

Very old alluvial fan deposits are composed of moderately to well consolidated silt and sand that is typically orangish-brown and well dissected (Morton and Miller, 2006). These deposits underlie the portion of the Project east of Carbon Creek.

Fossil Localities

On May 1, 2017, the Natural History Museum of Los Angeles County performed a paleontological records search to locate fossil localities within, and in the vicinity of, the Project (Appendix C). The records search did not produce any fossil localities within the Project boundaries, but did document a fossil locality nearby (within 5 miles) in similarly aged deposits which produced remains of *Equus* (horse) at a depth of 8 – 10 feet b.g.s. (McLeod, 2017).

On June 13, 2017, B. Scherzer performed a search of the on-line files of the University of California Museum of Paleontology (UCMP) and The Paleobiology Database (PBDB) for fossil localities from similar deposits nearby. Holocene deposits are too young to have accumulated or fossilized enough biologic material to produce paleontological resources, so the searches focused on Pleistocene fossil localities. The searches produced three additional fossil localities within 5 miles, with represented remains of ground sloth, coyote, wolf, lynx, seal, bear, mastodon, camel, deer bison, rodents, rabbit, duck, pheasant, quail, snake, lizard, boney fish, cartilaginous fish, turtle, crab, mollusc, gastropod, arthropod, and echinoderm.

Due to the fossiliferous nature of the very old alluvial fan deposits (*Q_{vofia}*), they are assigned a high potential, and the young alluvial fan deposits (*Q_{yfia}*) are assigned a low potential. However, given the close proximity between the two deposits, the young alluvial fan deposits very likely transition into high-potential very old alluvial fan deposits with depth. Therefore, the young alluvial fan deposits should be considered to transition into high potential with deep ground disturbing activity (Appendix A, Paleontological Sensitivity Map).

Table 1 - Geologic Units and Their Paleontological Potential

Age	Geologic Unit ¹	Fossils Present	Paleontological Sensitivity ²
Holocene	Young alluvial fan deposits (<i>Q_{yfia}</i>)	None	Low to High Potential
Pleistocene			
	Very old alluvial fan deposits (<i>Q_{vofia}</i>)	Large and small mammal, bird, reptile, fish, mollusc, gastropod, arthropod, echinoderm ³	High Potential

¹ Morton and Miller, 2006

² Caltrans, 2012

³ McLeod, 2017; UCMP; PBDB

FIELD SURVEY

Benjamin Scherzer conducted a pedestrian survey of the Project area on July 20, 2017. The areas of the Project directly adjacent to Carbon Creek are fenced off, so could only be observed from a distance. Golden Avenue Bridge, Golden Avenue, and California Street were all accessible. Nearly all of the area outside of Carbon Creek has been developed for residential housing, and showed no visible bedrock or native sediment. The areas directly adjacent to Carbon Creek were landscaped, but still vegetated and significantly altered by canal construction, so bedrock or native soil was very rare. No paleontological resources were observed during the field survey.

OCTOBER 2017



Figure 1: Carbon Creek in southern portion of Project area. Sediments on right side of canal are very old alluvial fan deposits (Q_{mfs1a}). View to southwest.



Figure 2: Southwest corner of bridge, showing disturbance in shallow deposits and possible undisturbed deposits at depth. View to west.

RECOMMENDATIONS

The Project is anticipated to disturb sediments with high potential to contain significant, nonrenewable paleontological resources. The Project is located in areas identified as having high paleontological sensitivity, either in shallow deposits or at depth. Multiple significant fossil localities are documented near the Project in sedimentary deposits similar to those that underlie the project area. Based on the high paleontological sensitivity of underlying sediments of this PIR/PER study, it is recommended that a PMP be prepared by a Principal Paleontologist, following the preparer qualifications of the Caltrans SER (Caltrans, 2012). The PMP will detail all the measures to be implemented in the event of paleontological discoveries. The PMP shall include, at a minimum, the following elements:

- 1) Required preconstruction paleontological awareness training for ground disturbance personnel, including documentation of training, such as sign-in sheets, to establish communications protocols between construction personnel and the Principal Paleontologist. This training can be given in person or via video.
- 2) Monitoring, by a Paleontological Monitor who meets the qualifications of Caltrans (2012). Monitoring shall occur for any ground disturbance east of Carbon Creek, or, as indicated by the presence of a nearby *Equus* fossil locality, any disturbance deeper than 8 feet b.g.s.
- 3) A signed repository agreement with a repository that meets Caltrans requirements and is approved by Caltrans.
- 4) Field and laboratory methods that meet the curation requirements of the identified repository that will be implemented for monitoring, reporting, collection, and curation of collected specimens.
- 5) A Paleontological Mitigation Report (PMR) discussing findings and analysis will be prepared by a Principal Paleontologist upon completion of Project earthmoving. The report will be included in the environmental Project file and also submitted to the curation facility.

CONCLUSIONS

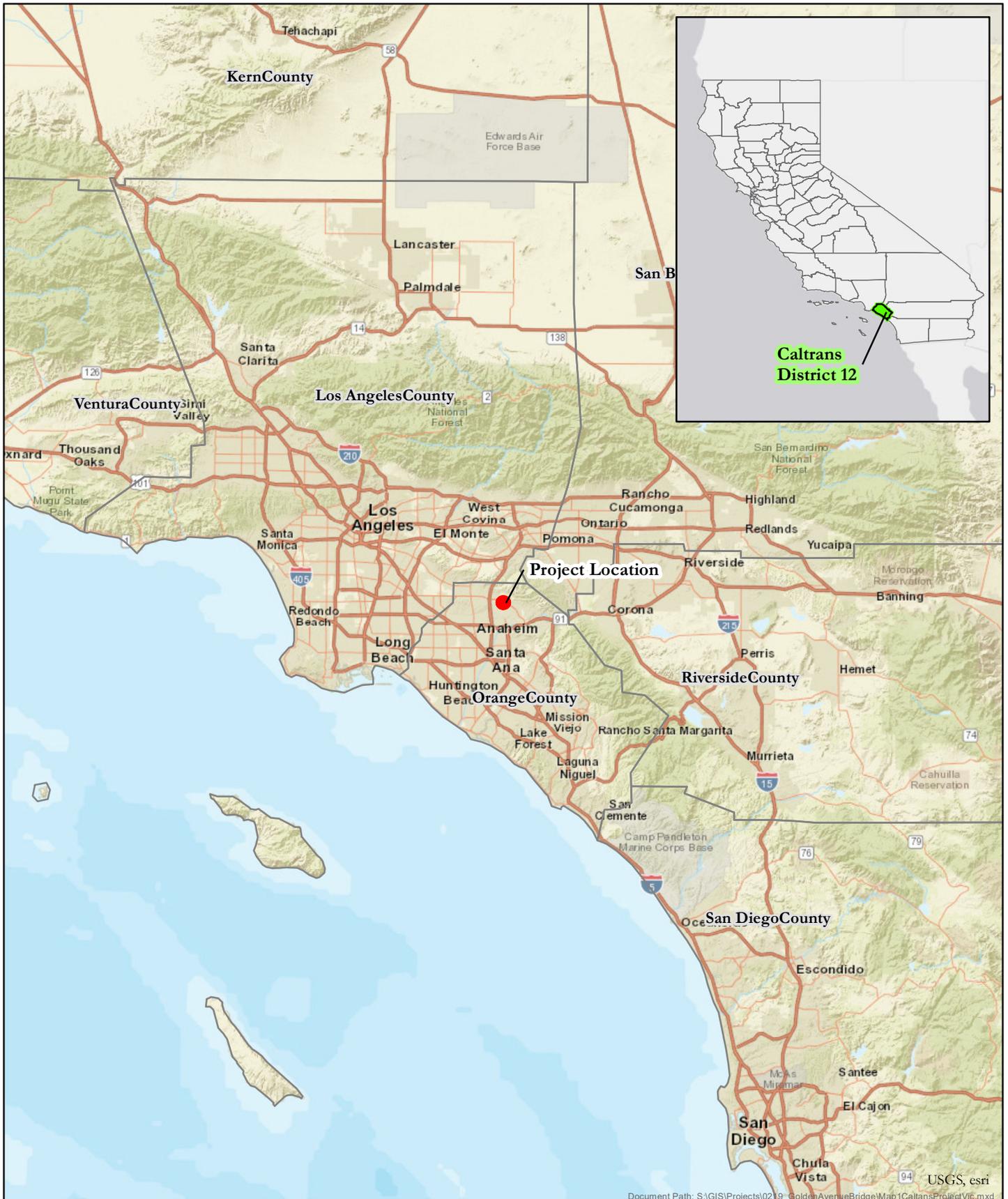
The Project is underlain by geological units with a high potential to contain significant paleontological resources, based on known fossil collecting localities and information from published paleontological and geological literature. The geologic units with a high potential are the very old alluvial fan deposits and deeper elements of the young alluvial fan deposits. Very old alluvial fan deposits are east of Carbon Creek, and young alluvial fan deposits are present west of Carbon Creek. In order to minimize impacts to potentially fossiliferous deposits, a PMP, following the Caltrans SER, should be prepared by a Principal Paleontologist.

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Appendix A

Project Maps

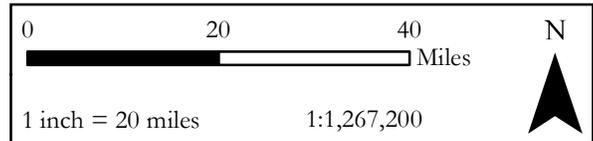


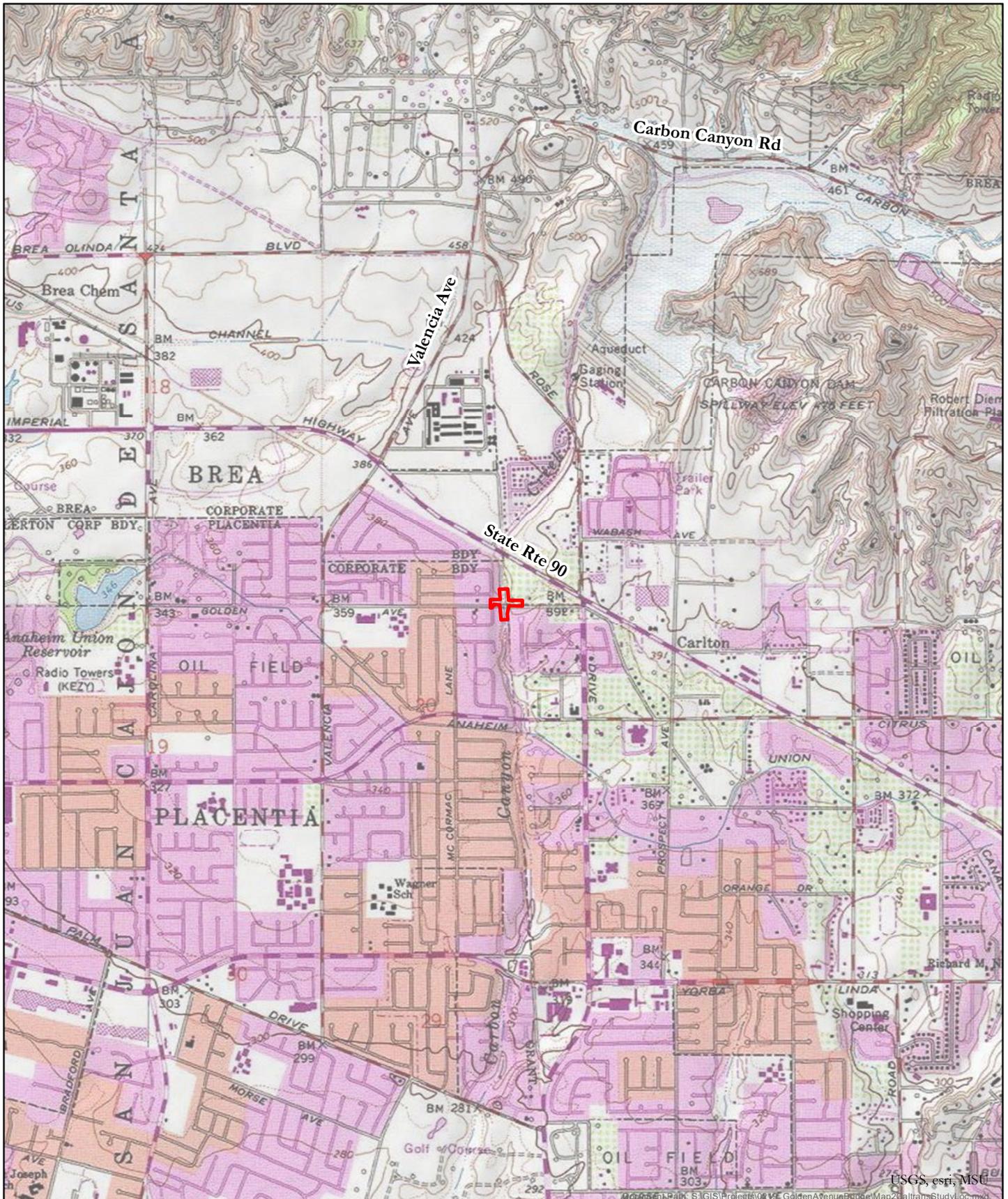
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**Map #1-
Study Vicinity**

*Golden Avenue Bridge
Replacement/ Rehabilitation
Project for The City of Placentia*

📍 Project Location



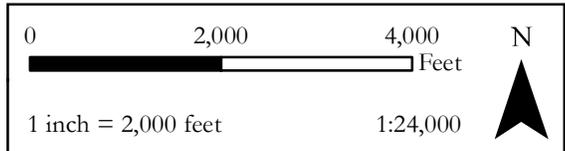


Map #2- Study Location

Golden Avenue Bridge
 Replacement/Rehabilitation
 Project for The City of Placentia

 Project Location

7.5-Min USGS
 Yorba Linda
 Quadrangle



USGS, esri, MSC



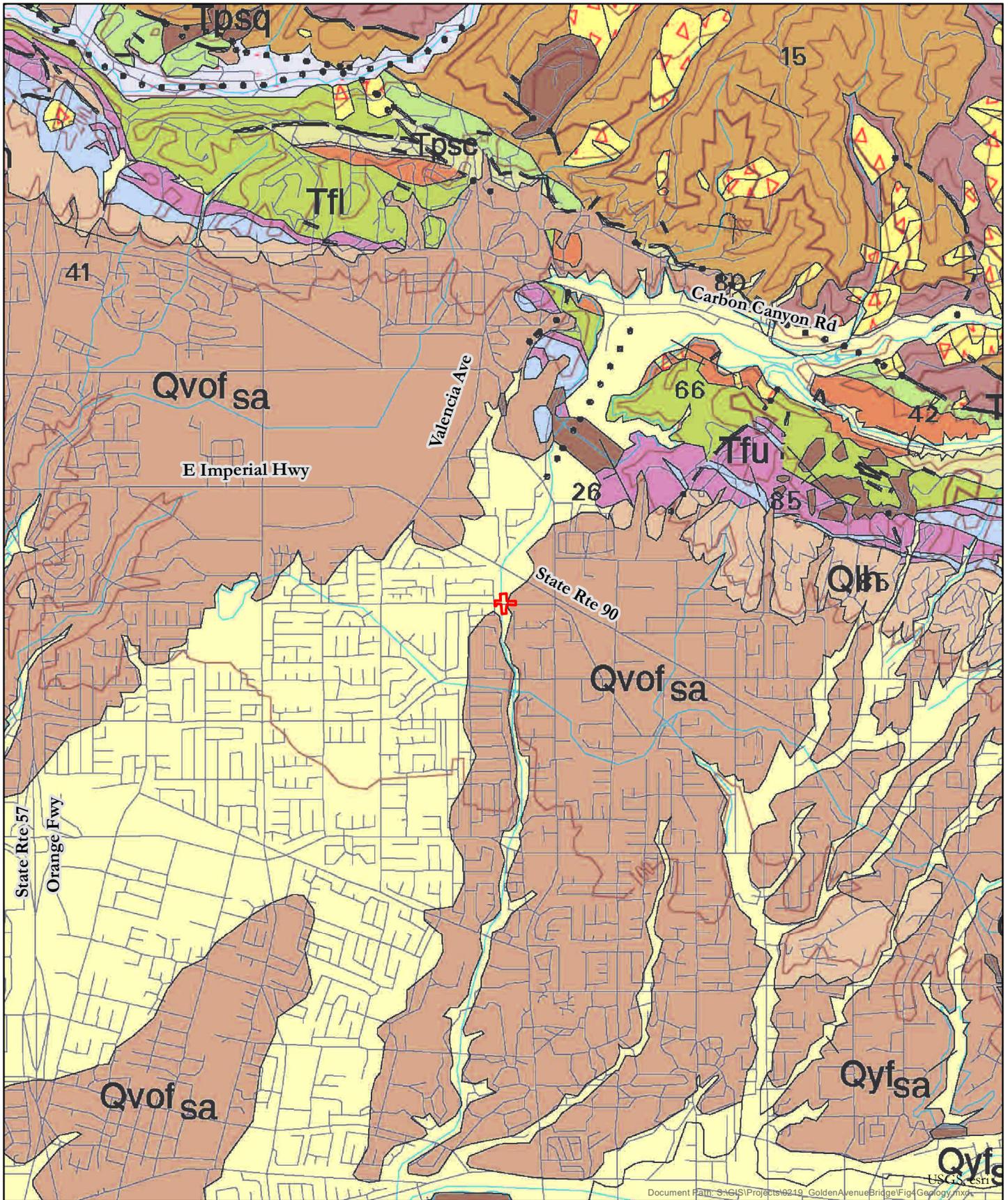
esri
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Map #3- Reconnaissance Survey Area

Project Boundary

*Golden Avenue Bridge
 Replacement/ Rehabilitation
 Project for The City of Placentia*

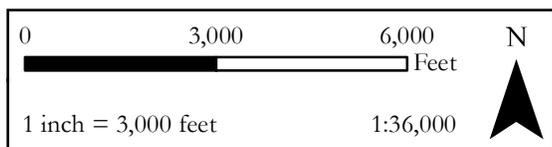


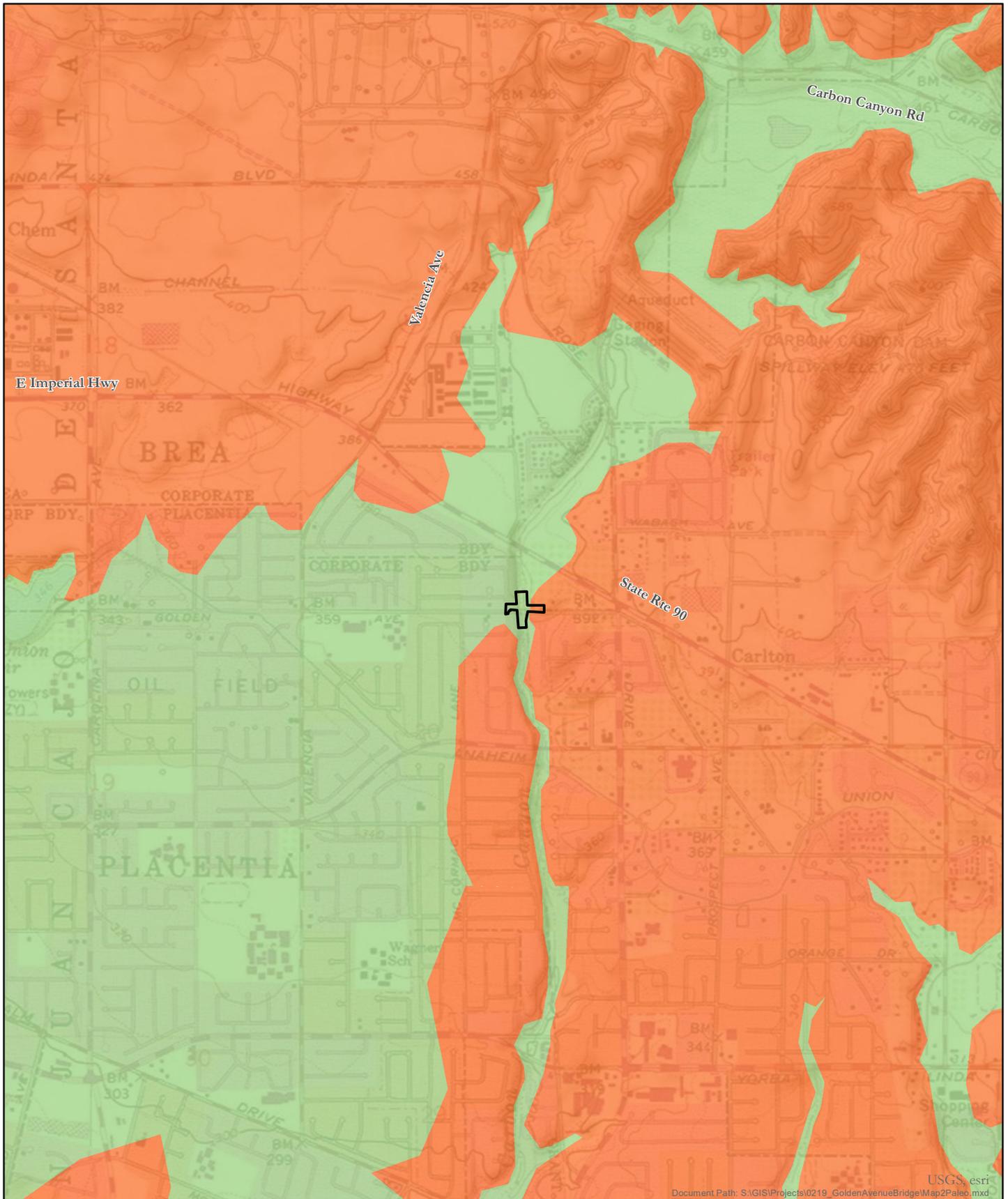


Map 4- Geology

Golden Avenue Bridge
Replacement/ Rehabilitation Project
For The City of Placentia

 Project





USGS, esri
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Map 5- Paleontological Sensitive Areas
*Golden Avenue Bridge
 Replacement/ Rehabilitation Project
 For The City of Placentia*

Project
Sensitivity
 High
 Low

0 1,650 3,300
 Feet
 1 inch = 1,650 feet 1:19,800

N

Appendix B

Resumes

Curt Duke

President/Archaeologist



Expertise

Cultural Resources Management
California Prehistory
Section 106 Compliance
CEQA Compliance
Native American Consultation

Education

CSU, Fullerton, M.A., Anth, 2006
SDSU, Grad Studies, Anth, 1996/97
UC Santa Cruz, B.A., Anth, 1994

Professional Registrations

RPA, No. 15969
County of Riverside (No. 151)
County of Orange

Professional Memberships

Society for California Archaeology
Society for American Archaeology
Pacific Coast Archaeological Society
Assoc. of Environmental Professionals

Professional Experience

President/Archaeologist, DUKECRM, April 2011 to present.
Archaeologist/Principal, LSA Associates, 1997-2011.
Archaeological Technician, SRI, 1997.
Archaeological Technician, Petra Resources, 1997.
Archaeological Technician, KEA Environmental, 1997.
Archaeological Technician, Keith Companies, 1997.
Archaeological Technician, KEA Environmental, 1997.
Archaeological/Paleontological Tech., LSA Associates, 1996.
Archaeological/Paleontological Tech., Petra Resources, 1996.
Archaeological Technician, Affinis Environmental Services, 1996.
Archaeological Technician, KEA Environmental, 1996.
Archaeological Tech., Macko Archaeological Inc., 1995 to 1996.
Archaeological Technician, Heritage Resource Consultants, 1995.
Archaeological Technician, Chambers Group, 1995.
Archaeological Tech./Teachers Assistant, Cabrillo College, 1994
Anthropological Laboratory Technician, UC Santa Cruz, 1994.

Selected Project Experience

Skyridge Residential, Mission Viejo, 2011-present. Role: Project Manager/Principal Investigator. Mr. Duke conducted a Phase II test excavation of prehistoric archaeological site CA-ORA-507. This work included research, preparation of a research design/work plan, excavation, lab analysis, Native American consultation, and preparing a detailed technical report. The report was reviewed by the City, ACOE, and SHPO. Employer: DUKE CRM.

Olive View Medical Center, San Fernando, 2012-present. Mr. Duke's role on this project was Principal Investigator. Under contract to the City of Los Angeles and Chattel Architecture, Planning, and Preservation, Inc. DUKE CRM prepared a Phase I Archaeological Survey Report and conducted archaeological monitoring. For the Phase I Mr. Duke conducted the records search, field survey and report preparation. He also led the consultation efforts with Native Americans on behalf of the County and FEMA. The results of the survey were negative, meaning that no archaeological resources were identified and there were no delays to the project. However, SHPO recommended archaeological monitoring due to a perceived high potential for historical archaeological resources. Employer: DUKE CRM.

6th Street Viaduct Replacement Project, City of Los Angeles, 2013. DUKE CRM is under contract to GPA Environmental, Inc. and the City to provide archaeological and paleontological support for the construction phase of this project. The viaduct is

comprised of two bridges: 1) a bridge over the Los Angeles River and the UPRR, BNSF, Metrolink, and Metro Railroads; and 2) a bridge over U.S. Highway 101. Mr. Duke's role on this project is Project Manager and Principal Investigator for archaeology. DUKE CRM prepared an Environmentally Sensitive Area (ESA) Action Plan for archaeology and worked with Bruce Lander who prepared a Paleontological Mitigation Plan (PMP). These documents will be used to specify how archaeological and paleontological resources shall be treated during construction of this multi-year, multi-phase project. DUKE CRM will be responsible for overseeing the implementation of the archaeological and paleontological monitoring program on behalf of the City to ensure that mitigation measures are adhered to. Employer: DUKECRM.

AT&T Mobility, On-Call, 2011-present. Role: Project Manager/ Principal Investigator. Mr. Duke conducts records searches, field surveys and prepares reports for various wireless facilities throughout southern and central California. Employer: DUKECRM.

Sepulveda Boulevard Bridge Widening, Manhattan Beach, 2012-13. Mr. Duke's role on this project is Project Manager/Principal Investigator. Under contract to the City of Manhattan Beach and GPA Environmental, Inc. Mr. Duke is preparing a Phase I Archaeological Survey Report. He conducted the field survey, records search, and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Caltrans is the lead agency for NEPA; the City is the lead agency for CEQA. Employer: DUKECRM.

Lamb School Residential Subdivision, Huntington Beach, 2013. Mr. Duke is the Project Manager/Principal Archaeologist for this project. DUKE CRM is conducting the cultural resources mitigation measures required by the City. This includes historical documentation of the school building and site, and archaeological and paleontological construction monitoring. This work is on-going. The DPR site record will be submitted to the South Central Coastal Information Center and the monitoring report will be submitted to the City upon completion of construction. Employer: DUKECRM.

Wardlow School Residential Subdivision, Huntington Beach, 2013. Mr. Duke is the Project Manager/Principal Archaeologist for this project. DUKE CRM is conducting the cultural resources mitigation measures required by the City. This includes historical documentation of the school building and site, and archaeological and paleontological construction monitoring. This work is on-going. The DPR site record will be submitted to the South Central Coastal Information Center and the monitoring report will be submitted to the City upon completion of construction. Employer: DUKECRM.

Scalzo Property, San Juan Capistrano, 2012. Role: Project Manager/Principal Investigator. Mr. Duke conducted a due diligence study for this 16-acre property. This work included research, site visit, and brief letter report. Employer: DUKECRM.

1st Street over Glendale Boulevard, Los Angeles, 2012. Mr. Duke's role on this project was Project Manager/Principal Investigator. Under contract to the City of Los Angeles and GPA Environmental, Inc. Mr. Duke prepared a Phase I Archaeological Survey Report and Historic Property Survey Report. Mr. Duke was the project manager for this project. He conducted the field survey and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: DUKECRM.

San Fernando Road Widening at Balboa Road, Los Angeles, 2012. Role: Project Manager/Principal Investigator. Under contract to the City of Los Angeles and GPA Environmental, Inc. Mr. Duke prepared a

Phase I Archaeological Survey Report and Historic Property Survey Report. Mr. Duke was the project manager for this project. He conducted the research, field survey, and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. DUKE CRM will be preparing the Paleontological Identification Report. Employer: DUKE CRM.

Mobilitie, On-Call, 2011-12. Role: Project Manager/Principal Investigator. Mr. Duke conducts records searches, field surveys and prepares reports for various wireless facilities throughout southern and central California. Employer: DUKECRM.

California Avenue Widening, Long Beach, 2011. Role: Project Manager/Principal Investigator. Under contract to the City of Long Beach and GPA Mr. Duke prepared a Phase I Archaeological Survey Report. Mr. Duke was the project manager for this project. He conducted the research, field survey, and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: DUKECRM.

Palomar Mountain Fuels Modification, 2011. Role: Project Manager/ Principal Investigator. Under contract to the Palomar Mountain Fire Safe Council, Mr. Duke conducted a Phase I archaeological survey of 11.5 acres. The survey report was completed quickly and was accepted by the Palomar Mountain Fire Safe Council and the BLM without any comments. Employer: DUKE CRM.

Mid County Parkway, Riverside County, CA, 2004-2011. Role: Task Manager/ Principal Investigator. The studies for the Mid County Parkway project included a 32-mile corridor (from Interstate 15 to State Route 79) in western Riverside County. The archaeological survey covered 3,680 acres and identified 91 archaeological sites. An extended Phase I survey (limited excavation) was conducted at 79 of the sites. Ultimately Phase II excavations were conducted at eight of the sites. Four archaeological sites were determined eligible for the National Register. A built environment historic resources survey was conducted and one historic dairy was determined eligible for the National Register. This project included extensive consultation with Indian Tribes. All work was conducted in compliance with Section 106 of the NHPA, NEPA, and CEQA. FHWA, Caltrans, and RCTC were the lead agencies and Jacobs Engineering was the lead engineering firm under contract to RCTC. Employer: LSA Associates.

Colton Crossing Rail-to-Rail Grade Separation, Colton, CA, 2008-2011. Role: Project Manager/ Principal Investigator. The Colton Crossing project involved the separation of the at-grade crossing of the UP and BNSF railroads. The Colton Crossing is a historically significant railroad crossing where a stand-off between the SP and California Southern railroads took place. Despite SP's efforts the California Southern railroad was granted access across SP's right-of-way. Research showed that the project's APE contained numerous historic buildings and was very active in historic times. Under Mr. Duke's direction an archaeological survey and an extended Phase I survey (limited excavation) were conducted. Sixteen historical archaeological sites were discovered; these included building remnants and refuse deposits. None of the archaeological sites were determined eligible for the National Register. A built environment historic resources survey evaluated the UP and BNSF railroads, the SP passenger depot, the American Railway Express Company building, and the historic South Colton neighborhood; none of which were determined eligible for the National Register. All work was conducted in compliance with Section 106 of the NHPA, NEPA, and CEQA. FHWA and Caltrans were the lead agencies working in cooperation with SANBAG, FRA, UP, and BNSF. HDR was the lead engineering firm under contract to SANBAG. Employer: LSA Associates.

I-15/I-215 Interchange Project, Devore, San Bernardino County, 2008-11. Role: Task Manager. Mr. Duke was the cultural resources task manager. Under Mr. Duke's direction an ASR, HRER, and HPSR were prepared. An archaeological site was recorded immediately adjacent to the project boundaries, within the APE. Mr. Duke and his staff worked closely with the Caltrans archaeologist to record and evaluate this site for the National Register without conducting a Phase II excavation. In doing this, the client saved thousands

of dollars and almost one year on their schedule. His staff also evaluated a portion of historic Route 66 and several related historic buildings. Employer: LSA Associates.

24th Street Improvements, City of Bakersfield, 2008-2011. Mr. Duke's role on this project was Cultural Resources Task Manager/Principal Investigator. Under contract to the City of Bakersfield and Parsons Brinckerhoff, Inc. Mr. Duke prepared the Historic Property Survey Report. He managed a team of archaeologists, paleontologists, and historians to complete the HRER, ASR, PIR/PER, and APE map. He conducted the archaeological field survey. His team identified 93 historic period buildings/structures, including two historic districts. Employer: LSA Associates.

Alta East Wind Project, Mojave, Kern County, CA 2010-11. CH2M HILL, Inc., requested a paleontological resources assessment for the Alta East Wind Project northwest of the City of Mojave in southeastern Kern County, California. The project includes developing pads for wind generation turbines, turbine access and service roads, management facilities, and a transmission line running from the center of the project south to connect with an existing distribution grid. The study area includes five sections of land that contain sediments that have potential for paleontological resources. The early Pliocene Horned Toad Formation contains the late Hemphillian Warren Local Fauna, with 24 fossil mammalian taxa. The literature review identified 34 fossil localities in the Horned Toad Formation, 12 of which were verified within project boundaries. The field survey located an additional 69 localities within project boundaries. Because of the potential for direct impacts to all paleontological resource localities, mitigation procedures are summarized. A project-specific paleontological resources impact mitigation program (PRIMP), including fossil salvage by qualified paleontologists, was recommended to accompany development of this project. Employer: LSA Associates.

I-215/SR-74 Interchange Improvements Project, Perris: Paleontological Mitigation Monitoring, 2010-11. Mr. Duke was the Task Manager for this project. The scope of work included paleontological monitoring during grading operations and environmental awareness (paleontological focus) training. He was responsible for working with the qualified paleontologist and coordinating field assignments for this project. Mr. Duke and his staff worked a communication system with the grading contractor that allowed for minimal field effort while achieving compliance. This allowed for savings to the overall budget. Employer: LSA Associates.

Aliso Canyon Park Improvements, Los Angeles, 2010. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke prepared a Phase I Archaeological Survey Report. Mr. Duke was the project manager and principal-in-charge for this project. He oversaw the research, field survey, and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: LSA Associates.

Five Winds Ranch Conservation/Mitigation Bank, Yucaipa, San Bernardino County, 2010. Mr. Duke served as the Principal-in-Charge for this project. He coordinated with staff biologists and archaeologists to complete a general biological survey, a waters/wetland delineation, a cultural resources survey, a Mitigation Banking Feasibility Study, a draft and final Mitigation Banking Prospectus, and a Bank Enabling Instrument. Several cultural resources were identified, both historic and prehistoric in nature. These resources were not impacted and therefore no additional work was necessary. Employer: LSA Associates.

Mammoth Lakes Parks and Recreation and Trail System Master Plan, 2010. Mr. Duke prepared a cultural resources assessment for the Draft Parks and Recreation Master Plan (PRMP) and the Draft Trail System Master Plan (TSMP) EIRs. He conducted a records search, site visits, and prepared a report documenting the effort and making management recommendations. The cultural resource assessment was completed pursuant to California Environmental Quality Act (CEQA). Employer: LSA Associates.

Rancho Vista Boulevard (Ave. P) Grade Separation Project, Palmdale, 2007-10. Mr. Duke's role was Principal Archaeologist, providing project supervision and regulatory expertise. Under contract to the City of

Palmdale and LAN Engineering, Mr. Duke's team conducted a records search and field survey, and prepared an Archaeological Survey Report and Historic Properties Survey Report which was reviewed and approved by Caltrans. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: LSA Associates.

California Valley Solar Ranch, California Valley, San Luis Obispo County, 2009-10. Role: Principal-in-Charge. California Valley Solar Ranch is a 4,000-acre project located on the Carrizo Plain in eastern San Luis Obispo County. Mr. Duke was the Principal-in-Charge for this project. His team conducted a records search, field survey, Native American scoping, and prepared an archaeological survey report. His team identified, recorded, and evaluated several historical archaeological sites. Employer: LSA Associates.

Melrose Triangle, West Hollywood, 2009-10. Under contract to the City of West Hollywood Mr. Duke oversaw the preparation of a historic resources survey which included research, field surveys, and preparation of a historic context and survey report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates.

Hollyhock House, Barnsdall Park, Los Angeles, 2009-10. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke oversaw the preparation of a supplemental historic structure report which included research, field inspection, and preparation of a report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates.

Delano-Alpaugh Water Reclamation Pipeline, Kern and Tulare Counties, 2006-2009. Mr. Duke prepared a cultural resources assessment study for the Delano-Alpaugh Water Reclamation Pipeline (DAWRP) while working for a previous employer. His role was cultural resources task manager and principal investigator. The project was approximately 11 miles Long. The research and field survey were conducted to determine whether the DAWRP project would result in impacts to any historical resources and/or unique archaeological resources. The cultural resources assessment was completed pursuant to CEQA and Section 106 of the NHPA. His team completed a cultural resources records search and a field survey. The project was immediately adjacent to Allensworth State Historic Park and National Register Historic District. The field survey identified two historical archaeological sites adjacent to the project alignment. Employer: LSA Associates.

Professional Hospital Supply, Temecula, 2008. Mr. Duke and his staff were retained by the Garrett Group to conduct an Archaeological and Paleontological Monitoring Program for the 32-acre Professional Hospital Supply Project in the City of Temecula. The construction monitoring program is the result of an agreement between the City of Temecula and the Pechanga Band of Mission Indians due to the presence of a portion of an archaeological site near the project boundaries. No cultural or paleontological resources were identified. Employer: LSA Associates.

Lancaster Highlands Project, Meridian Land Development Company, 2007. Mr. Duke oversaw the completion of a cultural resource assessment for the 1,891-acre project. All work was completed for Meridian Land Development Company. Tasks included a records search and field survey for archaeology and paleontology. Employer: LSA Associates.

Temecula 32, Archaeological Phase II Testing, 2007. Mr. Duke and his staff were retained by the Garrett Group to conduct an intensive pedestrian survey and test excavation in and around the reported location of a prehistoric lithic scatter. However, no remnants associated with the site were identified on or beneath the surface. Therefore, Mr. Duke recommended that this site should not be considered "a unique archaeological resource" or "historical resource" under CEQA. LSA worked with the Pechanga Band of Luiseño Indians and they monitored all field activities. Employer: LSA Associates.

I-15/SR-79 Interchange Project, Riverside County, 2006-10. Role: Task Manager. Mr. Duke was the cultural resources task manager. This project is located on top of a significant, National Register-listed

archaeological site that is also very sacred to the Luiseño Band of Indians. Under Mr. Duke's direction an ASR, ESA Action Plan, and HPSR were prepared. Due to the sensitivity surrounding the sacred site Mr. Duke and his staff consulted regularly with the Caltrans archaeologist, Native American Coordinator, and Native Americans. Employer: LSA Associates.

Residence "A," Barnsdall Park, Los Angeles, 2009. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke oversaw the preparation of a historic structure report which included research, field inspection, and preparation of a report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates.

Westlake Historic Resources Survey, Los Angeles, 2008-09. Under contract to the Community Redevelopment Agency of Los Angeles (CRA LA) and Chattel Architecture Planning and Preservation, Inc. Mr. Duke oversaw the preparation of a historic resources survey which included research, field surveys, and preparation of a historic context and survey report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates.

Needles Highway Improvement Projects, County of San Bernardino, 2004-08. Role: Cultural Resources Task Manager. To complete this project Mr. Duke oversaw the completion of archaeological and paleontological research and field surveys along Needles Highway between the City of Needles and Aha Macav Parkway. During the study a total of 45 cultural resources identified; 14 were previously recorded and 31 were newly recorded. These resources include 33 prehistoric cultural resources, four historic cultural resources, two cultural resources with historic and prehistoric components, and six cultural resources of unknown age. All work was completed in compliance with CEQA, NEPA, and NHPA. Employer: LSA Associates

Superstition Solar I Project, Salton Sea, Imperial County, 2008. Role: Principal-in-Charge. Superstition Solar I is a 5,600-acre project located on BLM Land. Mr. Duke was the Principal-in-Charge for this project. His team conducted a records search, reconnaissance survey, Native American scoping, and prepared a Class III Intensive Survey Research Design. Employer: LSA Associates.

Thomas Mountain Fuels Reduction Project, near Idyllwild, CA, 2008. Mr. Duke and his colleague Virginia Austermann worked with the San Bernardino National Forest (SBNF) to complete a cultural resources assessment of the proposed 10,465-acre Thomas Mountain Fuels Reduction project located in the San Jacinto Ranger District of the San Bernardino National Forest, Riverside County, California. The proposed project was an undertaking that could have affected heritage resources, and the archaeological survey of the area of potential affect (APE) was conducted in compliance with Section 36 CFR Part 800 of Section 106 of the NHPA. The report presented the results of the records search, numerous field surveys completed by others from 1980 through 2007, and Native American consultation. In total nineteen cultural resources were documented and considered for planning purposes. Working with the SBNF archaeologist, our team applied the 1996 *Programmatic Agreement for Compliance with Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region*. Mr. Duke's role was Principal-in-Charge overseeing all contract negotiations and providing quality control. Employer: LSA Associates

Magnolia Boulevard Widening, Los Angeles, 2008. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke prepared a Phase I Archaeological Survey Report. Mr. Duke was the project manager and principal-in-charge for this project. He oversaw the research, field survey, and report preparation. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: LSA Associates

South District Maintenance Yard, Los Angeles, 2008. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke oversaw the preparation of a historic resources survey which included research, field surveys, and preparation of a historic context and survey report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates

Fire Station 82, Los Angeles, 2008. Under contract to the City of Los Angeles, Bureau of Engineering Mr. Duke oversaw the preparation of a historic resources survey which included research, field surveys, and preparation of a historic context and survey report. Mr. Duke acted as the principal-in-charge for this project. Employer: LSA Associates

Chuckwalla Solar I Project, Desert Center, Riverside County, 2007-08. Chuckwalla Solar I is a 4,000-acre project located on BLM Land. Mr. Duke was the Principal-in-Charge for this project. His team conducted a records search, intensive field survey, Native American scoping, and prepared a Class III Intensive Survey Report. Employer: LSA Associates

McSweeney Farms, Hemet, CA, 2004-2008. Mr. Duke directed all cultural resources efforts for the McSweeney Farms project. He conducted third-party review of prior Phase I archaeological survey and extended Phase I survey. His team conducted Phase II and geoarchaeological excavations at several sites throughout the project, one of which is a large, regional prehistoric village site. Mr. Duke worked with SunCal, the City of Hemet, the Army Corps of Engineers (ACOE), and local Indian Tribes to balance the needs of each party. In addition, his team provided archaeological and paleontological monitoring for the project. He worked with Tribal monitors to document important archaeological sites, while maintaining the overall project schedule. Employer: LSA Associates

Hacienda at Fairview Valley Specific Plan, Apple Valley, Mojave Desert, CA, 2007-08. The Fairview Valley Specific Plan project is located near the Town of Apple Valley in the high desert. Under Mr. Duke's direction a team of archaeologists conducted a records search, field survey, and prepared a technical report for the County of San Bernardino. The team identified 73 cultural resources and determined that only 15 of these resources are considered significant under CEQA. The team worked with the project applicant and design team to avoid or mitigate impacts to all of the significant cultural resources. Employer: LSA Associates.

Majestic Hills Specific Plan, Hesperia, Mojave Desert, CA, 2006-07. The Majestic Hills Specific Plan project is located in the City of Hesperia in the high desert. Under Mr. Duke's direction a team of archaeologists conducted a records search, field survey, and prepared a technical report for the City. The team identified 32 cultural resources and determined that 11 of these resources are considered significant under CEQA. The team worked with the project applicant and design team to avoid or mitigate impacts to all of the significant cultural resources. Employer: LSA Associates.

Temecula Education Center, 2006. Mr. Duke and his staff were retained by the City of Temecula to conduct an Archaeological Monitoring Program for the Temecula Education Center Project. The construction monitoring program for the 40-acre site is the result of an agreement between the City of Temecula and the Pechanga Band of Mission Indians due to the presence of a portion of site CA-RIV-237 within the project boundaries. Minimal archaeological data were recovered.

Mesquite Regional Landfill, Imperial County, CA, 2004-2006. Under contract to the Sanitary Districts of Los Angeles County, Mr. Duke conducted a Class III Data Recovery project for ten Native American cultural resources within the boundaries of the proposed Mesquite Regional Landfill (MRL) Project, located in Imperial County, California. This effort was combined with a supplementary cultural resource reconnaissance of adjacent Bureau of Land Management (BLM) land to identify the extension of these resources beyond the project boundaries. Employer: LSA Associates.

20th Street West Extension, Palmdale, 2006. Mr. Duke's role was Principal Archaeologist, providing project supervision and regulatory expertise. Dr. Lange led the field survey and prepared the report. Under contract to the City of Palmdale and LAN Engineering, Mr. Duke and his team conducted a records search and field survey, and prepared an Archaeological Survey Report. The results of the assessment were negative, meaning that no archaeological resources were identified and there were no delays to the project. Employer: LSA Associates.

Southern California Edison, Southern and Central, CA, 2003-2005. Mr. Duke worked with SCE on its deteriorating poles program. As poles are deteriorating, SCE replaces them with new poles. Prior to pole replacement archaeological surveys were conducted of each pole location. The majority of this work has been conducted on federal lands. Under his direction archaeologists have surveyed over 2,000 pole locations in the Inyo National Forest, Angeles National Forest, San Bernardino National Forest, Sequoia National Forest, and under the jurisdiction of California and Arizona offices of the Bureau of Land Management (5 different field offices). In this process, his team recorded more than 35 archaeological resources ranging from isolated chipped stone to historic mining sites. His historian evaluated the Catalina Tile Company manufacturing plant on Catalina Island for the California Register of Historical Resources. Mr. Duke worked closely with SCE staff and various Federal agencies to ensure a quick review and approval of the cultural resources efforts. Employer: LSA Associates

Community and Environmental Transportation Acceptability Process (CETAP), Riverside, CA, 1999-2001. Mr. Duke participated in a reconnaissance survey that recorded over 500 prehistoric and historic resources. The results of the cultural resource efforts were reported in a HPSR, HRER and an ASR. Mr. Duke assisted in preparing the reports and provided management for the cultural resources aspect of this project. Employer: LSA Associates

Los Coches Creek Elementary School, near Alpine, CA, 2003-2006. Mr. Duke conducted a Phase I archaeological survey and oversaw subsequent Phase II test excavations. All work was conducted under the authority of the U.S. Army Corps of Engineers (ACOE). Mr. Duke worked with the El Cajon Union School District and the ACOE to avoid impacts to a majority of the cultural resources on site. Employer: LSA Associates

Whipple-Havasut Circuit, SCE, near Lake Havasu, CA, 2003. Role: Project Manager/Principal Investigator. Mr. Duke's team conducted an archaeological survey of 249 poles along 25 miles of land located on the Chemehuevi Indian Reservation and BLM lands. The project was located within the boundaries of the Desert Training Center (DTC); however, no DTC cultural resources were observed. Seven cultural resources were identified: four prehistoric sites, two prehistoric isolates, and one 1920s historic camp. All work was completed in compliance with NHPA and NEPA. Employer: LSA Associates

McCoy Circuit, SCE, Near Blythe, CA, 2003. Role: Project Manager/Principal Investigator. Mr. Duke's team conducted an archaeological survey of 388 poles along 19 miles of land located on BLM lands. The project was located within the boundaries of the Desert Training Center (DTC); however, no DTC cultural resources were observed. Four cultural resources were identified within or adjacent to the project boundaries: one historic/prehistoric site with an intaglio, two historic sites, and one prehistoric site. All work was completed in compliance with NHPA and NEPA. Employer: LSA Associates.

Orchard Hills (Planning Area 1), Irvine, 2002. Under contract to the Irvine Company, Mr. Duke conducted Phase II archaeological excavation on several sites. Mr. Duke served as the field director and co-Principal Investigator. This work was completed by Mr. Duke while with another employer.

Muddy Canyon Archaeological Project (Crystal Cove-Phase IV), Newport Coast, Orange County, 1999-02. Mr. Duke served as field crew and cartographer for the Phase II test excavations and field director and cartographer for Phase III data recovery excavations. Mr. Duke supervised up to 15 archaeologists excavating at eight prehistoric archaeological sites.

Fort Irwin, National Training Center, CA, 1999. Role: Crew Chief/Teaching Assistant. Mr. Duke assisted in a Field School for CSU, Fullerton. He instructed students in proper survey techniques, artifact identification, and site record preparation. In addition, Mr. Duke co-authored the survey report.

San Nicolas Island, Naval Base Ventura County, CA, 1997. Role: Field crew. Mr. Duke was part of an excavation and lab crew conducting test excavations at various archaeological sites. Laboratory sorting was conducted in the evenings. Employer: Petra Resources

Salton Sea Navy Test Base, CA, 1996-97. Role: Field crew. Mr. Duke was part of a survey crew conducting intensive surveys on the west shore of the Salton Sea. Excavation was conducted at sites that appeared to be significant. Employer: KEA Environmental

Chocolate Mountains Gunnery Range, CA, 1996. Role: Field crew. Mr. Duke was part of a survey crew conducting intensive surveys in the Chocolate Mountains. Employer: KEA Environmental

Other Projects

Stadium Arco Station, San Diego, 2003-04

Cingular/PBMS, ~2,000 Facilities, Southern Calif., Nevada, and Arizona, 1997-2001

AT&T Wireless, ~1,000 Facilities, Southern California, 1998-2001

Bonita Canyon Sports Park, Newport Beach, 1997

Hicks Canyon Retention Basin, Irvine, CA, 1996

Testing of Phase III, Las Trancas Canyon, Newport Coast, 1995

Data Recovery of Site CA-ORA-64, Newport Beach, 1995

#

Benjamin Scherzer**Paleontologist****Expertise**

Paleontological Resources Management
Fossil excavation
Fossil preparation
Stratigraphy
Natural gas mudlogging
Directional drilling

Education

M.S., Earth Science, 2008, MSU, Bozeman, MT
B.A., Geology/Math, 2002, Earlham College, IN

Professional Registrations

Paleontologist, County of Orange
Paleontologist, County of Riverside

Professional Memberships

Society of Vertebrate Paleontology
Geological Society of America
Society for Sedimentary Geology
American Association of Petroleum Geologists, Pacific Section

Publications and Professional Papers

Scherzer, B. 2017. A possible physeteroid (cetacea: odontoceti) from the Yorba member of the Puente Formation, Orange County, California: Western Association of Vertebrate Paleontology Annual Meeting: Program with Abstracts, PaleoBios, v. 34 (supplemental), p. 11.

Scherzer, B. 2016. An archaic baleen whale (Cetacea: Mysticeti) from the Vaqueros Formation, and other fossil material from the Skyridge Project, Orange County, California: 76th Annual Meeting, Society of Vertebrate Paleontology, abstracts of papers, Journal of Vertebrate Paleontology.

Scherzer, B. 2015. Miocene teleost fish from Chino Hills: preliminary results from the Vila Borba Project, San Bernardino County, California: Western Association of Vertebrate Paleontology Annual Meeting, PaleoBios, v. 32, no. 1, p. 4.

Scherzer, B., and R. Benton. 2011. An evaluation of sixteen years of paleontological visitor site reports in Badlands National Park, South Dakota: Proceedings of the 9th Conference on Fossil Resources, Brigham Young University Geology Studies, v. 49(A), p. 31.

Professional Experience

Stratigrapher, Archeological Resource Management Corporation, November 2015 to present.
Paleontologist, DUKE CRM, February 2014 to present.
Paleontological Specialist II, San Diego Natural History Museum, October 2013 to present.
Paleontological Specialist II, SWCA Environmental Consultants (Pasadena), March 2012 to present.
Paleontologist, SWCA Environmental Consultants (Vernal, UT), 2011 to 2012.
Fossil Preparator, Carter County Museum, 2010 to 2011.
Physical Science Technician, Badlands National Park, 2010.
Mudlogger/Geologist, Pason Systems USA, 2006 to 2009.
Paleontological Field Assistant, ARCADIS US, 2006 to 2007.

Selected Project Experience

I-15 TEL, Riverside and San Bernardino Counties, 2017
Lewis Street, Anaheim, 2017
The Crossings, Chino Hills, 2016-present
Reata Glen, Mission Viejo, 2016 - present
Greenville-Banning Channel, Costa Mesa, 2016
Fairfield Ranch, Chino Hills, 2016
Diamond Valley, Hemet, 2017
Marywood Residential, Orange, 2016-present
Rancho Mission Viejo, Mission Viejo, 2015-present
Santa Margarita Water District Tesoro Reservoirs, Mission Viejo, 2015
Evanston Inn, Pasadena, 2015
Village of Terrasa, Corona, 2015
Sycamore to Peñasquitos 230 kV Transmission Line, San Diego, 2015-present
Lakeside Temescal Valley, Temescal Valley, 2015-present
Vila Borba, Chino Hills, CA, 2013-present
Proposed State Route 60/Interstate 605 (SR-60/I-605) Interchange Improvement Project, Los Angeles County, 2014
RP-Outfall Relocation, Ontario, 2014
Serrano Ridge, Temesca Valley, 2014
Lago Los Serranos, Chino Hills, 2014
Vila Borba, Chino Hills, 2014-present
California Street/Highway 101, Ventura, 2014-present
Baker WTP, Lake Forest, 2014
Skyridge Residential, Mission Viejo, 2014-present
Rialto Unified CNG, Rialto, 2014
Willow Heights, Diamond Bar, 2014
Thomas Ranch, Corona, 2014
Wyle Lab Property, Norco, 2014
Pacific Highlands, San Diego, 2014
SDCWA Pipeline, San Marcos, 2014
SDG&E On-call, Carlsbad, 2014
TL694A, Vista, 2014
Sol y Mar, Ranchos Palos Verdes, 2013-2014
Mojave Solar Power, Hinkley, 2013
Rio Grande and Columbia 3, Rosamond, 2013
Genesis Solar Energy, Blythe, 2012-13

Appendix C

Paleontological Records Search Results

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org



Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

1 May 2017

Duke Cultural Resources Management
20371 Lake Forest Drive, A-2
Lake Forest, CA 92630

Attn: Benjamin Scherzer

re: Paleontological resources for the proposed Golden Avenue Bridge Replacement /
Rehabilitation Project, in the City of Placentia, Orange County, project

Dear Benjamin:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Golden Avenue Bridge Replacement / Rehabilitation Project, in the City of Placentia, Orange County, project as outlined on the portion of the Yorba Linda USGS topographic quadrangle map that you sent to me via e-mail on 20 April 2017. We do not have any vertebrate fossil localities that lie within the proposed project area boundaries, but we do have localities nearby from the same sedimentary deposits that occur in the proposed project area.

In the northwestern portion of the proposed project area and in the central drainage the surface deposits are composed of younger Quaternary Alluvium, derived as alluvial fan deposits from the Chino Hills just to the northeast broadly via Carbon Canyon Creek that currently flows directly through the proposed project area. The southeastern portion of the proposed project area has surface deposits composed of older Quaternary Alluvium, derived as alluvial fan deposits from the Chino Hills just to the northeast. The younger Quaternary deposits typically do not contain significant vertebrate fossils in the uppermost layers, but at depth there are older Quaternary deposits such as occur in the southeastern portion of the proposed project area that may well contain significant fossil vertebrate remains. Our closest fossil vertebrate locality in these older Quaternary deposits is LACM 4943, just west of south of the proposed project area in

the City of Orange between the Newport Freeway (Highway 55) and the Santa Ana River near the intersection of Glassell Street and Fletcher Avenue. Locality LACM 4943 produced specimens of fossil horse, *Equus*, at a depth of 8-10 feet below the surface.

Grading or very shallow excavations in the younger Quaternary Alluvium exposed in the northwestern and central portions of the proposed project area may not encounter significant vertebrate fossils. Deeper excavations there, as well as any excavations in the older Quaternary Alluvium exposed in the eastern portion of the proposed project area, however, may well uncover significant fossil vertebrate remain. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding construction activities. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script that reads "Samuel A. McLeod".

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice