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March 16, 2016 (updated on August 24, 2021)

Robert O Hill  
Oak Grove, LLC  
One Upper Newport Plaza  
Newport Beach, CA 92660

Subject: Paleontological Resources Assessment for the Oak Grove Residential Project in the Community of Coto de Caza, County of Orange, California

Dear Mr. Hill:

LSA Associates, Inc. conducted a paleontological resources assessment for the proposed Oak Grove Residential Project (project) located in the Community of Coto de Caza, County of Orange (County), California. The purpose of the assessment was to determine whether paleontological resources may be present within the proposed project area, whether they might be impacted by development of the project, and to make recommendations to mitigate any potential impacts to paleontological resources.

## PROJECT DESCRIPTION AND LOCATION

The proposed project includes the development of 13 residential lots averaging 13,900 square feet each within a 5.1-acre area encompassing Assessor's Parcel Numbers (APNs 804-264-12, -22, -23, and -24). The lots will be constructed on both sides of an internal access road (Oak Grove Road) that would bisect the project site from east to west and would terminate in a cul-de-sac near the northeastern corner of the development. Development of the project will entail minor amounts of cut and fill to create level pads for the home sites and for the access road. During grading for this project, there will be approximately 8,550 cubic yards (cy) of cut and approximately 8,550 cy of fill, which will result in a balanced site that does not require soil import/export. An examination of the grading plans indicates that the depth of the most of cuts will be approximately 2 feet (ft); however, some portions of the site would be subject to cuts of up to 7 ft. In addition, based on general grading practices, the fill areas may require removal and recompaction of the upper 2 to 4 ft of on-site soils prior to any fill being placed. As such, it is likely that the maximum cuts associated with the development of this project will be no more than 7 ft.

The proposed project site is located in the Oak Grove portion of Coto de Caza, which is a gated community in the foothills of the Santa Ana Mountains in the southeastern part of the County. The project is located near the northeastern corner of the intersection of Vista del Verde and Via Pajaro. It is depicted on the United States Geological Survey (USGS) *Cañada Gobernadora, California* 7.5-minute topographic quadrangle map (USGS, 1997) in Section 26, Township 6 South, Range 7 West, San Bernardino Baseline and Meridian (Figure 1, see Attachment A).

## REGULATORY ENVIRONMENT

### State of California

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

**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 [CCR] 15000 et seq.) provide regulations for the implementation of CEQA and include more specific direction on the process of documenting, analyzing, disclosing, and mitigating environmental impacts of a project. To assist in this process, Appendix G 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, financed by, or require approval from a governmental agency.

**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 that “No person shall knowingly or willfully excavate upon, remove, destroy, injure, or deface any ... paleontological or historical feature, situated on public lands” and that public lands includes lands “... under the jurisdiction of the state, or any city, county, district, authority, or public corporation, or any agency thereof.”

### County of Orange

The County provides regulations for the protection, assessment, and mitigation of fossil resources within unincorporated areas of the County in its Standard Conditions of Approval (SCA) (County of Orange, 2001). Specifically, paleontological resources are addressed within SCA A05 through A07:

#### **A05 PALEONTOLOGICAL SURVEY**

Prior to the issuance of any grading permit, the applicant shall obtain approval from the Manager, Harbors Beaches and Parks (HBP)/Coastal and Historical Facilities of a report on a literature and records search and field survey of the project site. The applicant shall retain a County-certified paleontologist to complete the literature and records search for recorded sites and previous surveys. The paleontologist shall conduct a field survey unless the entire proposed project site has been documented as previously surveyed in a manner which meets the approval of the Manager, HBP/Coastal and Historical Facilities. The applicant shall implement the mitigation measures in the report in a manner meeting the approval of the Manager, HBP/Coastal and Historical Facilities.

#### **A06 PALEONTOLOGICAL PREGRADE SALVAGE**

Prior to the issuance of any grading permit, the project applicant shall obtain approval from Manager, HBP/Coastal and Historical Facilities of a report of the pre-grade paleontological salvage operation. The applicant shall retain a County-certified

paleontologist to conduct pregrade salvage excavation and prepare a report of the exposed resources. The report shall include methodology, an analysis of artifacts found, a catalogue of artifacts, and their present repository. Applicant shall prepare excavated materials to the point of identification. The applicant shall offer excavated finds for curatorial purposes to the County of Orange, or its designee, on a first refusal basis. Applicant shall pay curatorial fees if an applicable fee program has been adopted by the Board of Supervisors, and such fee program is in effect at the time of presentation of the materials to the County of Orange or its designee, all in a manner meeting the approval of the Manager, HBP/Coastal and Historical Facilities.

#### **A07 PALEONTOLOGICAL OBSERVATION AND SALVAGE**

Prior to the issuance of any grading permit, the project applicant shall provide written evidence to the Manager, Subdivision and Grading, that applicant has retained a County certified paleontologist to observe grading activities and salvage and catalogue fossils as necessary. The paleontologist shall be present at the pre-grade conference, shall establish procedures for paleontological resource surveillance, and shall establish, in cooperation with the applicant, procedures for temporarily halting or redirecting work to permit sampling, identification, and evaluation of the fossils. If the paleontological resources are found to be significant, the paleontologist shall determine appropriate actions, in cooperation with the applicant, which ensure proper exploration and/or salvage.

Prior to the release of the grading bond the applicant shall submit the paleontologist's follow up report for approval by the Manager, HBP/Coastal and Historical Facilities. The report shall include the period of inspection, a catalogue and analysis of the fossils found, and the present repository of the fossils. Applicant shall prepare excavated material to the point of identification. The applicant shall offer excavated finds for curatorial purposes to the County of Orange, or its designee, on a first refusal basis. These actions, as well as final mitigation and disposition of the resources, shall be subject to approval by the HBP/Coastal and Historical Facilities. Applicant shall pay curatorial fees if an applicable fee program has been adopted by the Board of Supervisors, and such fee program is in effect at the time of presentation of the materials to the County of Orange or its designee, all in a manner meeting the approval of the Manager, HBP/Coastal and Historical Facilities.

### **METHODS**

LSA examined geologic maps of the project area and reviewed relevant geological and paleontological literature to determine which geologic units are present within the project area and whether fossils have been recovered within the project area or from those or similar geologic units elsewhere in the region. Additionally, a fossil locality search was conducted through the Natural History Museum of Los Angeles County (NHMLAC) to determine the status and extent of previously recorded paleontological resources within and surrounding the project site. A pedestrian field survey of the project area was conducted by LSA Senior Cultural Resources Manager Phil Fulton on March 1, 2016. This survey involved walking linear transects over the project area to document and collect any paleontological resources that may have been present as well as to note the sediments at the surface.

## RESULTS

### Literature Review

The project is at the northern end of the Peninsular Ranges Geomorphic Province, a 900-mile long northwest-southeast-trending structural block that extends from the Transverse Ranges in the north to the tip of Baja California in the south and includes the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). This province is characterized by mountains and valleys that trend in a northwest-southeast direction, roughly parallel to the San Andreas Fault (Norris and Webb, 1976; Sharp, 1976). The total width of the province is approximately 225 miles, extending from the Colorado Desert in the east, across the continental shelf, to the Southern Channel Islands (i.e., Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) (Sharp, 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rock covered by limited exposures of Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb, 1976).

Within this larger region, the project is in the Los Angeles Basin, a broad alluvial lowland bounded to the north and east by the San Gabriel and Santa Ana Mountains, respectively, and by the Pacific Ocean to the southwest (Yerkes et al., 1965). The basin is underlain by a structural depression that has discontinuously accumulated thousands of feet of marine and terrestrial deposits since the Late Cretaceous (approximately 100.5 Ma) (Yerkes et al., 1965). Over millions of years, the basin has experienced episodes of subsidence, deposition, uplift, erosion, and faulting, all of which have resulted in very complex geology as well as a prolific oil deposits (Bilodeau et al., 2007; Yerkes et al., 1965). The surface of the basin slopes gently southwestward toward the ocean, interrupted in various places by low hills and traversed by several large rivers (Sharp; 1976; Yerkes et al., 1965).

Geologic mapping by Morton and Miller (2006) indicates the project area contains Young Alluvial Axial Channel Deposits (Figure 2, Attachment B). Although not mapped by Morton and Miller (2006), Artificial Fill is likely also present at the surface of the project site due to previous development for the Merryhill School and equestrian facilities associated with the Coto Equestrian Center. These geologic units and their relative paleontological sensitivities are described in more detail below. The dates for the geologic time intervals are based on the *International Chronostratigraphic Chart* prepared by the International Commission on Stratigraphy (Cohen et al., 2021).

**Artificial Fill.** Artificial Fill consists of sediments that have been removed from one location and transported to another location by human activity, rather than by natural means. The transportation distance can vary from a few feet to many miles, and composition is dependent on the source and purpose. Artificial Fill will sometimes contain modern debris, such as asphalt, wood, bricks, concrete, metal, glass, plastic, or plant material, and may contain fossils. Any fossils encountered in Artificial Fill have been removed from their original location and are thus out of stratigraphic context. Therefore, they are not considered important for scientific study. As such, Artificial Fill has no paleontological sensitivity.

**Young Axial Channel Deposits.** The Young Axial Channel Deposits are Holocene to late Pleistocene in age (less than 129,000 years ago) and consist of slightly to moderately consolidated silt, sand, and gravel (Morton and Miller, 2006). They formed as streams and washes carried sediment down from higher elevations in the San Joaquin Hills and foothills of the Santa Ana Mountains.

Although Holocene (less than 11,700 years ago) deposits can contain remains of plants and animals, only those from the middle to early Holocene (4,200–11,700 years ago) are considered scientifically important (SVP, 2010), and fossils from this time interval are not very common. The Holocene sediments overlie older, Pleistocene sediments, which have produced scientifically important fossils elsewhere in Orange County and the region (Jefferson 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). These older, Pleistocene deposits span the end of the Rancholabrean North American Land Mammal Age (NALMA), which dates from 11,000 to 240,000 years ago (Sanders et al., 2009) and was named for the Rancho La Brea fossil site in central Los Angeles. The presence of *Bison* defines the beginning of the Rancholabrean NALMA (Bell et al., 2004), but fossils from this time also include other large and small mammals, reptiles, fish, invertebrates, and plants (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). There is a potential to find these types of fossils in the older sediments of this geologic unit, which may be encountered below a depth of approximately 10 ft. Therefore, these deposits are assigned low paleontological sensitivity from the surface to a depth of 10 ft and high sensitivity below that mark.

### **Fossil Locality Search**

The fossil locality search conducted by the NHMLAC indicated that no fossil localities are present within the boundaries of the project site. However, this search noted records of two fossil localities nearby from the same or similar geologic units as those within the project site (e.g., the Young Axial Channel Deposits) either at the surface or at depth. The closest locality, LACM 4119, from an unnamed Pleistocene geologic unit near Jeronimo Open Space produced bison (*Bison*) fossils from a depth of 20 ft below the surface. The next closest locality from similar deposits is LACM 1215, located southwest of the project area near the intersection of Crown Valley Parkway and Interstate 5. This locality yielded fossil teeth of sharks (Chondrichthyes) and unspecified mammals (Mammalia). The results letter from the NHMLAC is provided in Attachment C.

### **Field Survey**

Because much of the project area contains existing buildings with associated paved areas, only approximately 20 percent of the project area contained exposed ground that could be surveyed. The southwestern portion consists of a paved parking lot and the abandoned buildings of the former Merryhill School, while other areas contain the stables/equestrian facility buildings of the Coto Equestrian Center. On the north boundary of the project, what appears to be a manufactured/graded slope that heads up to the equestrian stables above the project. It is unclear whether any cutting occurred at this north end during prior development within the current project area, or whether the slope simply represents minor smoothing out of the existing topography. Sediment observed consisted primarily of brown silty sand with occasional rounded cobbles and boulders. One area contained sandy wash deposits. These sediments are consistent with the Young Axial Channel Deposits that are mapped in the project area (Morton and Miller, 2006). No paleontological resources were observed during the survey.


## **RECOMMENDATIONS**

The project site contains Artificial Fill, which has no paleontological sensitivity, as well as Young Axial Channel Deposits, which have low paleontological sensitivity from the surface to a depth of 10 ft and high sensitivity below that depth. With excavation for the various project components

extending to a maximum depth of 7 ft across the project site, development of this project is not expected to extend into paleontologically sensitive sediments of the Young Axial Channel Deposits. Therefore, LSA recommends that no paleontological mitigation measures are required for this project. In the unlikely event that fossil remains are encountered, paleontological mitigation will need to be developed, including paleontological monitoring, collection of observed resources, preservation, stabilization and identification of collected resources, curation of resources into a museum repository, and preparation of a monitoring report of findings. If project plans change to include more substantial excavation that extends below a depth of 10 ft or additional areas, this recommendation must be revisited.

Sincerely,

**LSA ASSOCIATES, INC.**



Sarah Rieboldt, Ph.D.  
Senior Paleontological Resources Manager  
Cultural and Paleontological Resources Group

Attachments: A. Figure 1: Project Location and Vicinity Map  
B. Figure 2: Geology Map  
C. Results of the Locality Search at the Natural History Museum of Los Angeles County

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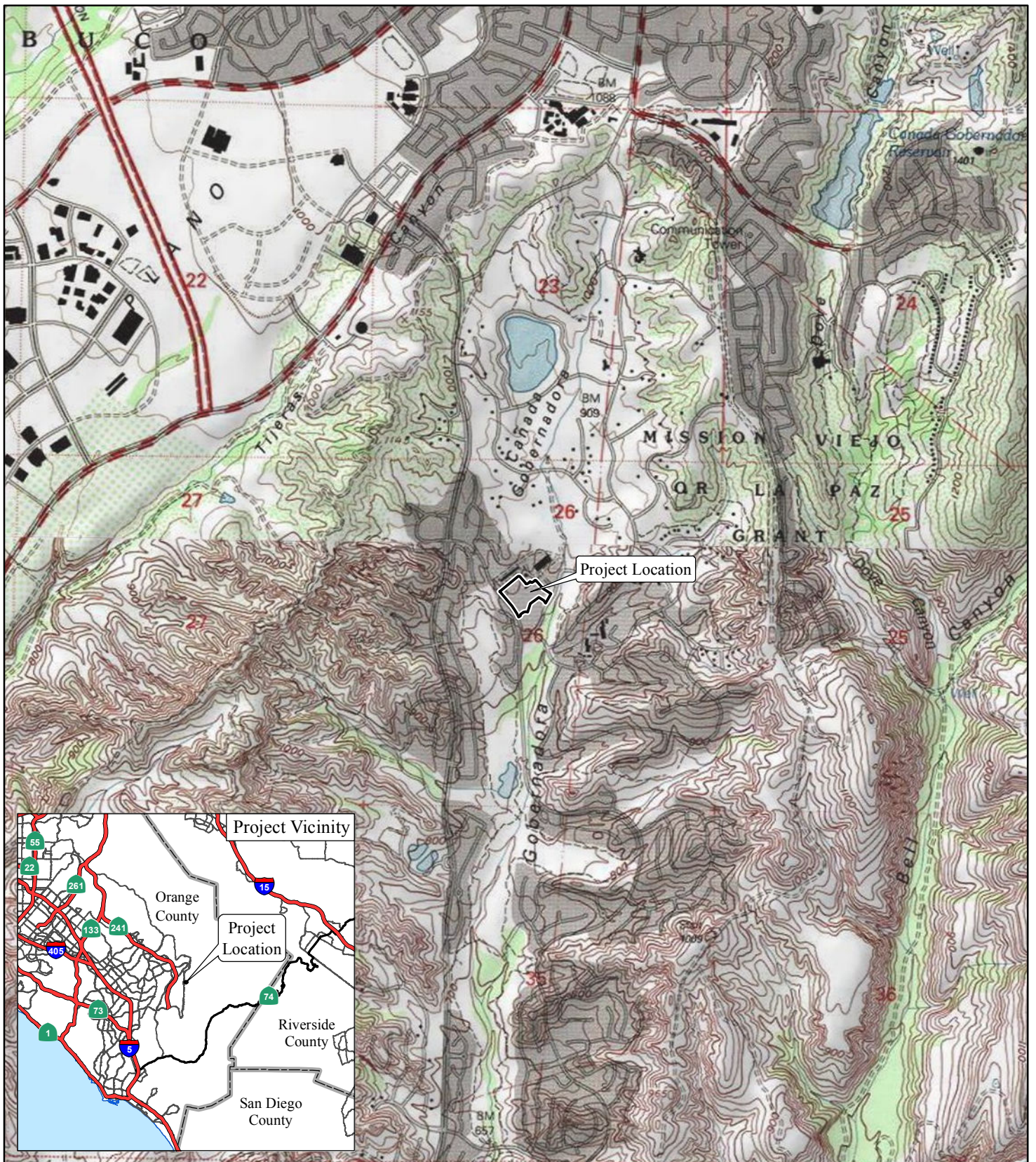
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## ATTACHMENT A

### FIGURE 1: PROJECT LOCATION AND VICINITY MAP



LSA

LEGEND

 Project Location

FIGURE 2



*Oak Grove Residential  
Project Location and Vicinity Map*

SOURCE: USGS 7.5' Quad - Santiago Peak (1997) and Canada Gobernadora (1997), CA  
 F:\OAK1601\GIS\ProjLocation.mxd (2/29/2016)

## **ATTACHMENT B**

### **FIGURE 2: GEOLOGY MAP**

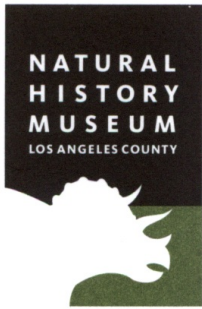


## **ATTACHMENT C**

### **RESULTS OF THE LOCALITY SEARCH AT THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY**

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  
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3 March 2016

LSA Associates, Inc.  
20 Executive Park, Suite 200  
Irvine, California 92614

Attn: Brooks Smith, Associate, Cultural & Paleontological Resources Group

re: Paleontological Resources Records Check for the proposed Oak Grove Residential Project,  
LSA project number OAK1601, Phase 02.5, in the community of Coto De Caza, Orange  
County, project area

Dear Brooks:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed Oak Grove Residential Project, LSA project number OAK1601, Phase 02.5, in the community of Coto De Caza, Orange County, project area as outlined on the portion of the Cañada Gobernadora USGS topographic quadrangle map that you sent to me via e-mail on 18 February 2016. We do not have any vertebrate fossil localities that lie directly within the proposed project area boundaries, but we do have localities somewhat nearby or further afield from the same deposits that may occur either at the surface or at depth in the proposed project area.

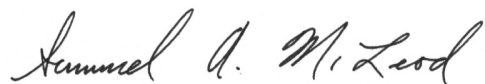
Almost all of the proposed project area has surface deposits composed of younger Quaternary Alluvium, derived as alluvial fan deposit from the more elevated terrain to the west or from the Cañada Gobernadora drainage adjacent to the east. These deposits usually do not contain significant vertebrate fossils, at least in the uppermost layers, but may contain significant vertebrate fossils in older Quaternary deposits at relatively shallow depth. Our closest vertebrate fossil locality from similar older Quaternary deposits is LACM 4119, west-southwest of the proposed project area in a drainage leading into Oso Creek, that produced a fossil specimen of bison, *Bison*. Our next closest vertebrate fossil locality from Quaternary deposits is LACM

1215, southwest of the proposed project area in Oso Creek near what is now the intersection of Crown Valley Parkway with Interstate 5, that produced undetermined fossil teeth of both shark, Chondrichthyes, and mammal, Mammalia. On the far western border of the proposed project area there may be exposures of the middle to late Eocene Santiago Formation, and that rock unit probably occurs at depth in the rest of the proposed project area. We have no fossil vertebrate localities from the Santiago Formation in Orange County, but we have several localities from this rock unit in San Diego County. Our closest vertebrate fossil locality from the Santiago Formation is LACM 5347, situated in San Onofre Canyon east of Interstate 5, that produced fossil specimens of the insectivore *Sespedectes*. Our other Santiago Formation vertebrate fossil localities include LACM 3881, 3883-3884, 3979, 4022, 5346-5347, 6926 and 68102, clustered around Carlsbad, that produced a composite fauna of primarily mammals (see appendix). David J. Golz (1976. Eocene Artiodactyla of Southern California. Los Angeles County Museum Science Bulletin, 26:1-85) published on the LACM specimens of the protoceratid artiodactyl *Leptoreodon leptolophus* and the camels *Protylopus petersoni* and *Protylopus stocki* from our Santiago Formation locality LACM 68102.

Grading or shallow excavations in the uppermost few feet of the younger Quaternary alluvial sediments in the proposed project site area are unlikely to uncover significant fossil vertebrate remains. Deeper excavations in that portion of the proposed project area that extend down into older sedimentary deposits, as well as any excavations in the possible exposures of the Santiago Formation in the proposed project area, however, may well encounter significant vertebrate fossils. Any substantial excavations in the proposed project area, therefore, should be closely monitored to quickly and professionally collect any specimens without impeding development. Sediment samples should also 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,



Samuel A. McLeod, Ph.D.  
Vertebrate Paleontology

enclosures: appendix; invoice

Composite Santiago Formation fossil fauna based on specimens in the LACM collections

Reptilia

Chelonia

Testudinidae

Trionychidae

Crocodylia

Aves

Mammalia

Artiodactyla

Camelidae

*Protylopus petersoni*

*Protylopus stocki*

Protoceratidae

*Leptoreodon leptolophus*

Dinocerata

Uintatheriidae

Insectivora

Dormaliidae

*Proterixoides*

*Sespedectes*

Perissodactyla

Amynodontidae

*Amynodon intermedius*

Brontotheriidae

Rodentia

Aplodontidae

*Eohaplomys*

Geomyidae

*Griphomys*

Paramyidae

*Microparamys*