

**PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT**

**TENTATIVE TRACT MAP NUMBER 37439**

**In and near the City of Menifee  
Riverside County, California**

**For Submittal to:**

Riverside County Planning Department  
County Administrative Center  
4080 Lemon Street  
Riverside, CA 92501

**Prepared for:**

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January 2, 2018

CRM TECH Project No. 3282P  
Approximately 215 acres

USGS Romoland and Winchester, Calif., 7.5' quadrangles  
APN 364-200-003 and -007; 466-120-002, -019, and -022; 466-310-002 and -026  
Sections 6-8, T6S R2W, and Sections 1 and 12, T6S R3W, San Bernardino Baseline and Meridian

## **EXECUTIVE SUMMARY**

Between October and December 2017, at the request of Sun Holland, LLC, CRM TECH performed a paleontological resource assessment on the area designated for the proposed Tentative Tract Map Number 37439 Project in and near the City of Menifee, Riverside County, California. The project entails primarily a residential development on approximately 158 acres of agricultural land on the southeast corner of Holland Road and Leon Road, in the northwest quarter of Section 8, T6S R2W, San Bernardino Baseline and Meridian (SBBM). In addition, the project also includes the construction of a flood-control channel, a sewer line, and a lift station, all of which lie to the west of the main project site between Leon Road and Southshore Drive, within Sections 6 and 7 of T6S R2W and Sections 1 and 12 of T6S R3W, SBBM.

The study is part of the environmental review process for the proposed project, as required by the lead agency, namely the County of Riverside, in compliance with the California Environmental Quality Act (CEQA). The purpose of the study is to provide the County with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any significant, nonrenewable paleontological resources, as mandated by CEQA. In order to identify any paleontological resource localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during construction activities, CRM TECH initiated records searches at the appropriate repositories, conducted a literature search, and carried out a systematic field survey of the entire project area in accordance with the guidelines of the Society of Vertebrate Paleontology.

Based on the findings from these research procedures, the proposed project's potential to impact significant paleontological resources is determined to be low in the extensively disturbed, coarse-grained surface sediments but high in the relatively undisturbed, finer-grained, older Pleistocene sediments that are anticipated below the surface in most of the project area. Therefore, CRM TECH recommends that a paleontological resource impact mitigation program be developed and implemented during the project to prevent such impacts or reduce them to a level less than significant. As the primary component of the mitigation program, all earth-moving operations at or below the depth of two feet, except in the southwestern corner of the main project site, should be monitored for any evidence of significant, nonrenewable paleontological resources.

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## INTRODUCTION

Between October and December 2017, at the request of Sun Holland, LLC, CRM TECH performed a paleontological resource assessment on the area designated for the proposed Tentative Tract Map Number 37439 Project in and near the City of Menifee, Riverside County, California (Figure 1). The project entails primarily a residential development on approximately 158 acres of agricultural land on the southeast corner of Holland Road and Leon Road, in the northwest quarter of Section 8, T6S R2W, San Bernardino Baseline and Meridian (SBBM; Figures 2, 3). In addition, the project also includes the construction of a flood-control channel, a sewer line, and a lift station, all of which lie to the west of the main project site between Leon Road and Southshore Drive, within Sections 6 and 7 of T6S R2W and Sections 1 and 12 of T6S R3W, SBBM (Figures 2, 3).

The study is part of the environmental review process for the proposed project, as required by the lead agency, namely the County of Riverside, in compliance with the California Environmental Quality Act (CEQA; PRC §21000, et seq.). The purpose of the study is to provide the County with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any significant, nonrenewable paleontological resources, as mandated by CEQA.

In order to identify any paleontological resource localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during construction activities, CRM TECH initiated records searches at the appropriate repositories, conducted a literature search, and carried out a systematic field survey of the entire project area in accordance with the guidelines of the Society of Vertebrate Paleontology (2010). The following report is a complete account of the methods, results, and final conclusion of this study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

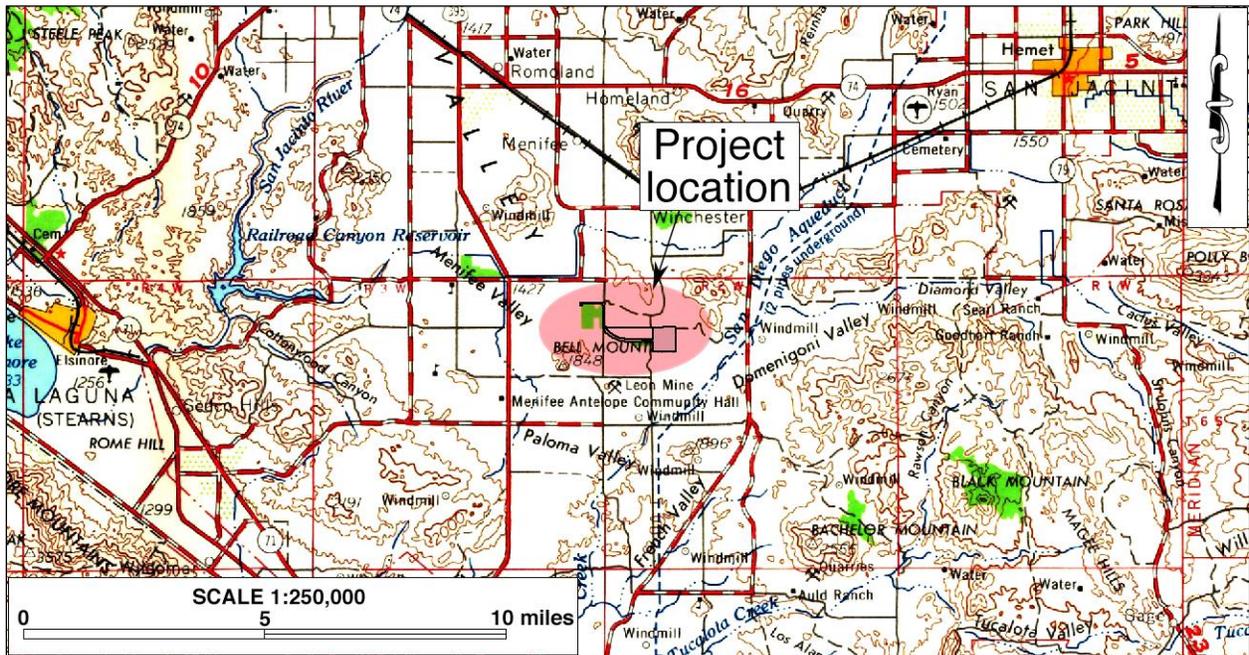


Figure 1. Project vicinity. (Based on USGS Santa Ana, Calif., 1:250,000 quadrangle, 1979 edition)

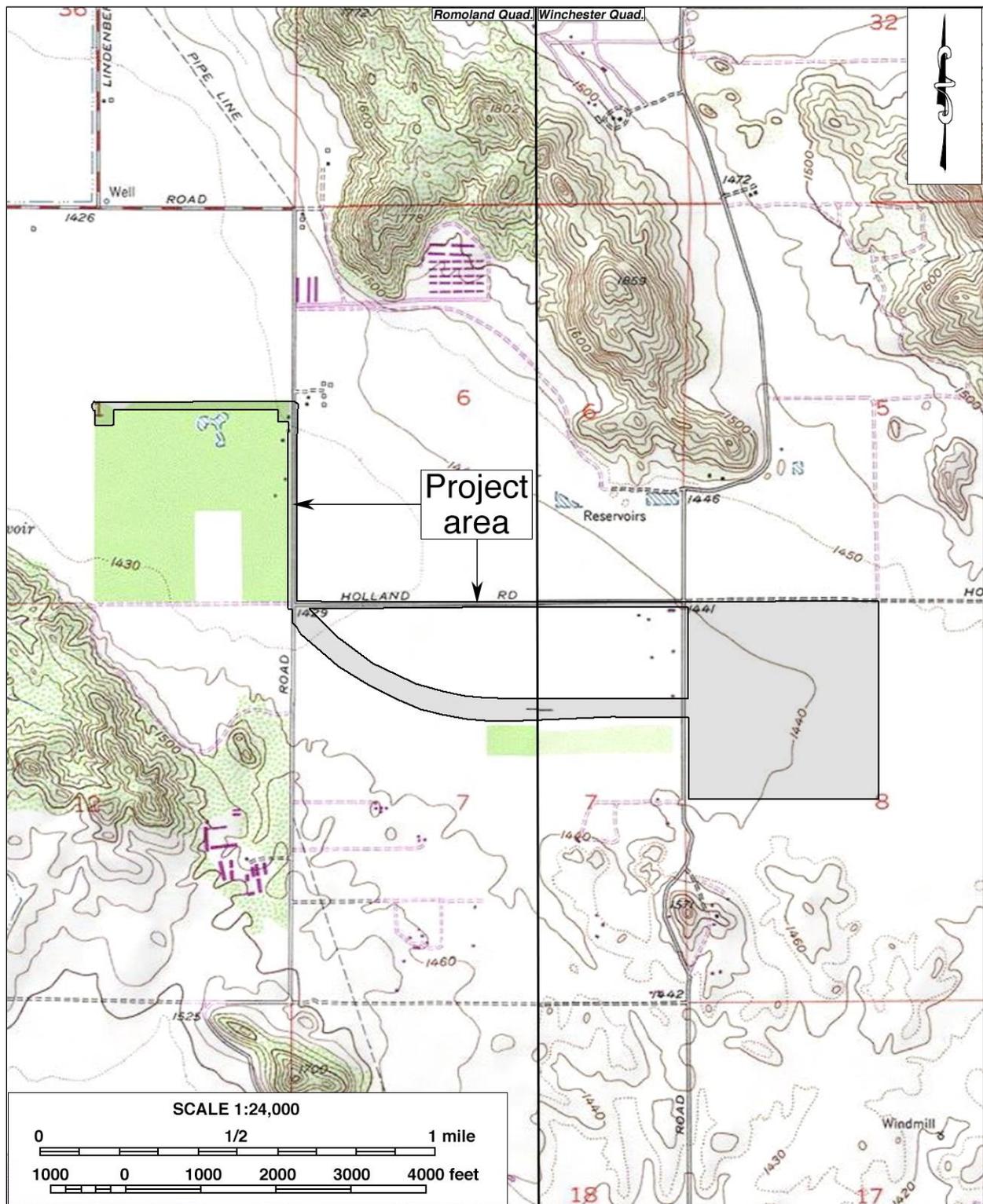


Figure 2. Project area. (Based on USGS Romoland and Winchester, Calif., 1:24,000 quadrangles, 1979 edition)

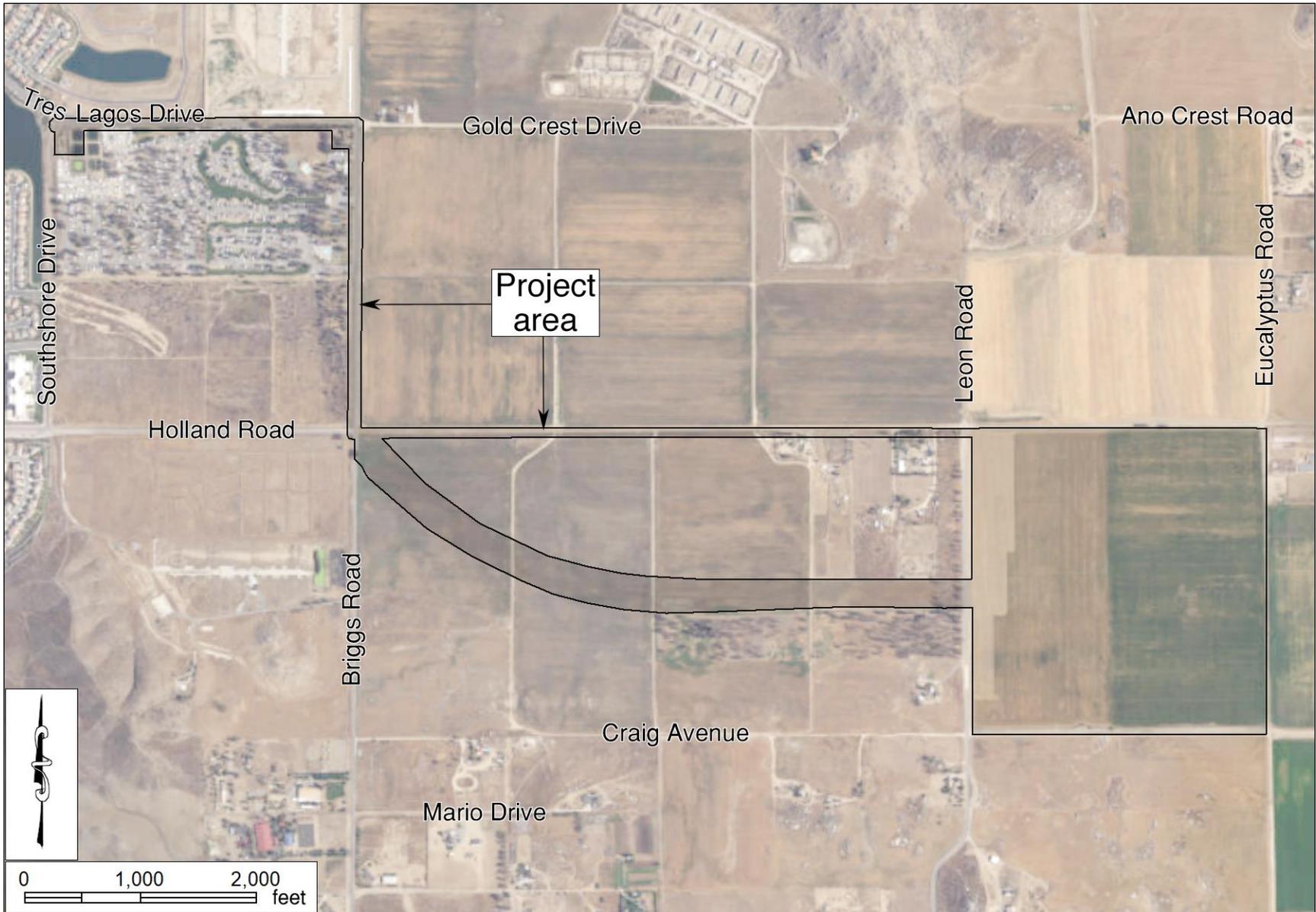


Figure 3. Aerial image of the project area.

## **PALEONTOLOGICAL RESOURCES**

### **DEFINITION**

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically regarded as older than recorded human history and/or older than the middle Holocene Epoch, which dates to circa 5,000 radiocarbon years (Society of Vertebrate Paleontology 2010:11).

Common fossil remains include marine and freshwater mollusk shells; the bones and teeth of fish, amphibians, reptiles, and mammals; leaf imprint assemblages; and petrified wood. Fossil traces, another type of paleontological resource, include internal and external molds (impressions) and casts created by these organisms. These items can serve as important guides to the age of the rocks and sediments in which they are contained, and may prove useful in determining the temporal relationships between rock deposits from one area and those from another as well as the timing of geologic events. They can also provide information regarding evolutionary relationships, development trends, and environmental conditions.

Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or because of human disturbances; however, they generally lay buried beneath the surficial soils. Thus, the absence of fossils on the surface does not preclude the possibility of their being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found in the subsurface.

### **SIGNIFICANCE CRITERIA**

According to guidelines proposed by Eric Scott and Kathleen Springer (2003:6) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

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

## PALEONTOLOGICAL SENSITIVITY

The fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical and biological factors. Skeletal tissue with a high percentage of mineral matter is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, however, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of certain parts of the organisms themselves. As a consequence, paleontologists are unable to know with certainty, the quantity of fossils or the quality of their preservation that might be present within any given geologic unit.

Sedimentary units that are paleontologically sensitive are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations within which they are enclosed and, with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine the formation's potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

The paleontological sensitivity for a geologic formation is determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. Determinations of paleontologic sensitivity must consider not only the potential to yield a large collection of fossil remains but also the potential to yield a few fossils that can provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology issued a set of standard guidelines intended to assist paleontologists to assess and mitigate any adverse effects/impacts to nonrenewable paleontological resources. The guidelines defined four categories of paleontological sensitivity for geologic units that might be impacted by a proposed project, as listed below (Society of Vertebrate Paleontology 2010:1-2):

- **High Potential:** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- **Undetermined Potential:** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment.
- **Low Potential:** Rock units that are poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances.
- **No Potential:** Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

## SETTING

### REGIONAL GEOLOGIC SETTING

The project area is located in the eastern portion of the Menifee Valley, one of the many tectonically controlled valleys within the valley-and-ridge systems found in the Perris Block. These structurally depressed troughs are filled with nonmarine sediments of upper Pliocene through Recent age, while the ridges are typically composed of plutonic igneous rocks, metasedimentary rocks, and late-stage intrusive dikes (Mann 1955:Plate 1; Kennedy 1977:5).

The Perris Block is defined by English (1926) as a region between the San Jacinto and Elsinore-Chino fault zones, bounded on the north by the Cucamonga (San Gabriel) Fault and on the south by a vaguely delineated boundary near the southern end of the Temecula Valley. It is considered to have been active since Pliocene time (Woodford et al. 1971:3421). The project area lies across the level valley floor, away from the flanks of any of the ridge systems. In this area, the valley trends nearly east-west and is likely to be more erosional than tectonic in origin.

### CURRENT NATURAL SETTING

The main project site consists of a generally square-shaped tract of agricultural land in Assessor's Parcel Numbers (APN) 466-310-002 and -026, bounded by Holland Road on the north, Eucalyptus Road on the east, Craig Avenue on the south, and Leon Road on the west (Figures 3, 4). It lies one mile east of the eastern boundary of the City of Menifee, which runs along Briggs Road in this area. The surrounding area is rural in character despite recent suburban growth in the Menifee Valley, dominated by large expanses of agricultural fields with scattered farmsteads (Figure 3).

In addition to the 158-acre site of the proposed residential development, the project area also encompasses the following components for the off-site infrastructure works:

- A flood-control channel right-of-way extending west from the main project site, across agricultural land in APN 466-120-002, -019, and -022, to the intersection of Holland Road and Briggs Road on the Menifee city boundary, for a total distance of approximately 1.1 miles;



Figure 4. Typical landscapes in the project area. *Left*: main project site, view to the north; *right*: sewer line alignment across vacant field, view to the east. (Photographs taken on November 15, 2017)

- A sewer line alignment within the existing rights-of-way of Holland Road, Briggs Road, and Tres Lagos Drive, as well as a segment running across a vacant field between Tres Lagos Drive and Gold Crest Drive (APN 364-200-003 and -007), measuring approximately 2.0 miles in total length, partially within the Menifee city limits;
- A lift station site at the Wilderness Lakes RV Resort (APN 364-200-007), on the southeast corner of Tres Lagos Drive and Southshore Drive, within the Menifee city limits, measuring approximately one acre (Figures 2-4).

The terrain across the project area is generally level, with elevations ranging between approximately 1,425 feet and 1,440 feet above mean sea level. At the time of survey, portions of the agricultural fields at the main project site were planted in such crops as potatoes and cilantro. The field to the west of Leon Road, where the flood-control channel right-of-way lies, is currently used for cattle grazing. Among the existing roadways containing the sewer line alignment, Briggs Road and Tres Lagos Drive are paved, while the segment of Holland Road involved in the project is unpaved. The lift station site, on the northwest corner of the Wilderness Lakes RV Resort, is occupied partially by two earthen retention basins that were filled with water at the time of the survey.

## **METHODS AND PROCEDURES**

### **RECORDS SEARCHES**

The paleontological records searches for this study were provided by the San Bernardino County Museum (SBCM) in Redlands and the Natural History Museum of Los Angeles County (NHMLAC) in Los Angeles. These institutions maintain regional files for paleontological localities as well as supporting maps and documents. The records search results are used to identify previously completed paleontological resource assessments and known paleontological localities in the vicinity of the project area. In addition, the Riverside County Land Information System was also consulted for information on the County's overall paleontological sensitivity assessment of the project location.

### **LITERATURE REVIEW**

In conjunction with the records searches, CRM TECH geologist/paleontologist Harry M. Quinn, California Professional Geologist #3477, pursued a literature review on the project area. Sources consulted during this part of the research include primarily topographic, geologic, and soil maps of the Menifee Valley area, published geologic literature pertaining to the project location, and other materials in the CRM TECH library, including unpublished reports produced during similar surveys on nearby properties.

### **FIELD SURVEY**

On November 15, 2017, CRM TECH paleontological surveyors Daniel Ballester, Ben Kerridge, and Amanda Lloyd carried out the field survey of the project area under the direction of Harry M. Quinn. The survey was completed on foot by walking a series of parallel east-west, north-south, and northwest-southeast transects spaced 25 meters (approximately 75 feet) apart. In this way, the

ground surface in entire the project area was carefully examined to determine the soil types, to verify the geological formations, and to look for any indications of paleontological remains. Ground visibility was poor (virtually 0 percent) where agricultural crops or road pavement are present, but was fair to excellent (70 to 100 percent) elsewhere in the project area.

## RESULTS AND FINDINGS

### RECORDS SEARCHES

The records search results identified no known paleontological localities in the project area or within a one-mile radius (Gilbert 2017; McLeod 2017). Just beyond the one-mile radius, however, “numerous” paleontological localities have been discovered in the Domenigoni and Diamond Valleys that yielded several thousand fossils of late Pleistocene age from similar stratigraphic units to those that are known to occur at the project location (Gilbert 2017:2). To the east and the south of the project location, three other paleontological localities have also been reported within a few miles, where the fossil remains of a horse, a bison, and two mammoths were discovered in sedimentary deposits that are “somewhat similar” to those present in the project area below the surface (McLeod 2017:1-2).

Based on the records search results, both museums find the surface soils in the project area to be Pleistocene, or older Quaternary, in age (Gilbert 2017:2; McLeod 2017:1). The SBCM assigns these sediments a high potential for significant nonrenewable paleontological resources (Gilbert 2017:2). The NHMLAC, on the other hand, considers the surface material, which tends to be coarse-grained and derived from nearby hills of metamorphic and plutonic igneous rocks, to be unlikely to contain any significant vertebrate fossils (McLeod 2017:1). However, the NHMLAC further states that the finer-grained material at depth is higher in paleontological sensitivity (*ibid.*). The County of Riverside, similarly, has assigned a high paleontological sensitivity to the subsurface sediments at this location at depth (County of Riverside n.d.).

### LITERATURE REVIEW

The surface geology in the project area was mapped by Jahns (1954:Plate 3) and Rogers (1965) as **Qal**, or alluvium of Holocene age. This is the same material mapped as the surface material in the nearby Domenigoni Valley, the site of many important vertebrate paleontological discoveries in recent decades (Springer and Scott 1994:47A; Springer et al. 1998:79A; Springer et al. 1999:77A). Most of these fossil remains were recovered from depths greater than ten feet below the surface (*ibid.*). They were found because of the deep excavation required for a major reservoir construction, which is much deeper than normally required for typical development projects.

More recently, Morton (2003a), Morton (2003b), and Morton and Miller (2006) mapped the surface geology in the project area as mostly **Qof<sub>a</sub>** with a small area of **Kdvg** in the southwestern corner of the main project site (Figure 5). **Qof<sub>a</sub>** represents old sandy alluvial fan deposits of late to middle Pleistocene age, and **Kdvg** represents granodiorite and tonalite of Cretaceous age, an igneous rock that has little paleontological potential (*ibid.*).

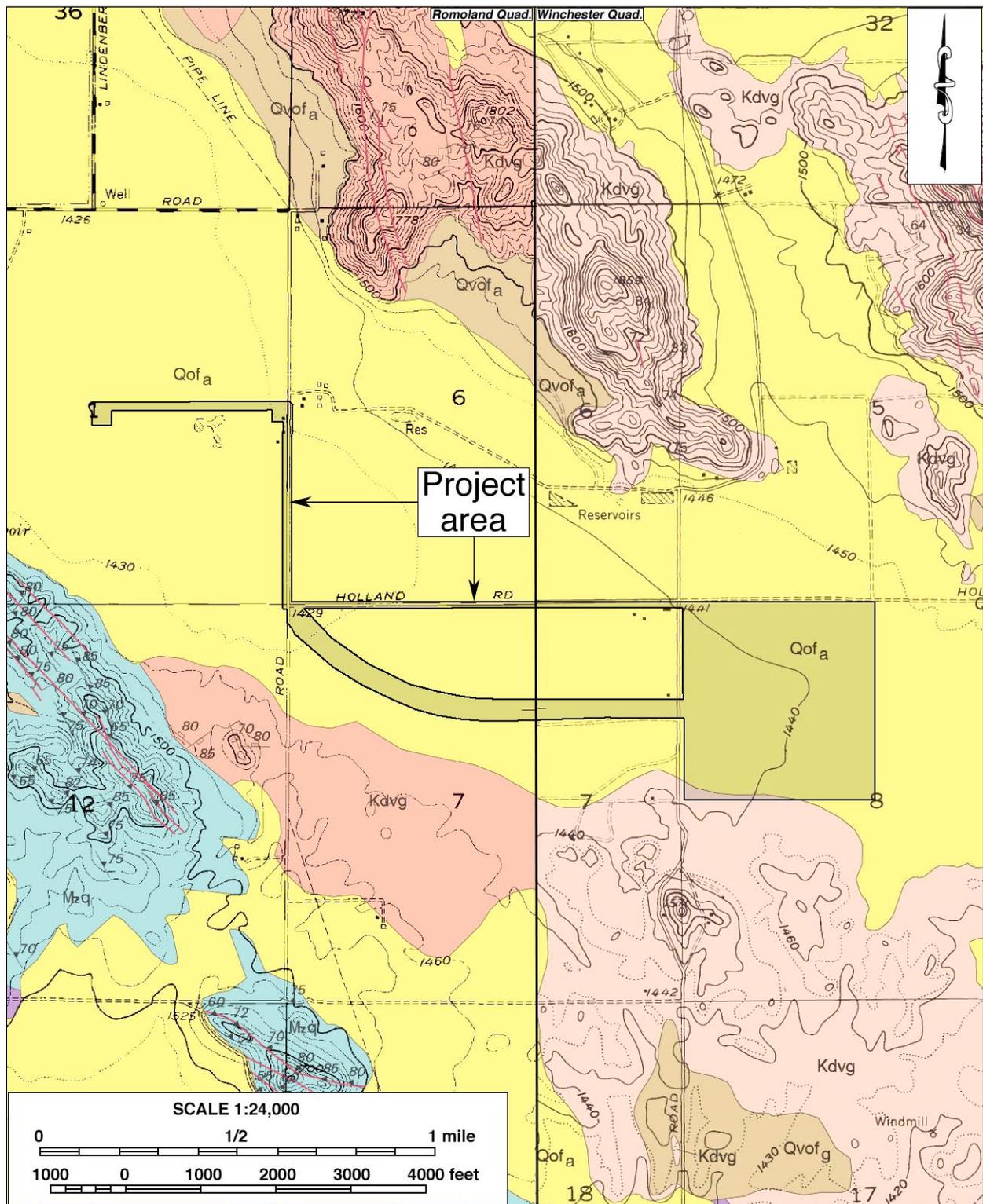


Figure 5. Geologic map of the project vicinity. (Based on Morton 2003a; 2003b)

Knecht (1971: Map Sheets 120, 130) mapped a large number the surface soil types in the project area, as listed below:

- **Ds2, Dt, Du, and Dv:** Domino Series; develop in basins and on alluvial fans.
- **EnA, EnC2, EoB, EpA, and EwB:** Exeter Series; develop in basins and on alluvial fans composed of moderately coarse granitic materials.
- **GtA, GyA, and GyC2:** Greenfield Series; develop on alluvial fans and old terraces composed mainly of granitic material.
- **HgA:** Hanford Series; develops on well-drained alluvial fans composed mainly of granitic material.
- **MnC2 and MnF2:** Monserate Series; develop in alluvium derived from granitic sources and on low sloping areas of alluvial fans and terraces; may contain a sandy clay subsoil.
- **PaA:** Pachappa Series; develops in granitic-rich alluvium in basins and on alluvial fans; may be locally calcareous.
- **RaA:** Ramona Series; develops on well-drained alluvial fan and terrace deposits composed mainly of material of granitic origin (*ibid.*:29-54).

While most of the alluvial fan deposits are probably Holocene in age, some of the terrace deposits may be Pleistocene in age.

## FIELD SURVEY

The field survey yielded negative findings for potential paleontological resources, and no surficial indications of any fossil remains were observed within or adjacent to the project area. As the project area is composed of current and former agricultural fields, public roadways, and retention basins, all surface soils within and adjacent to the project boundaries have clearly been disturbed in the past.

## DISCUSSION

The results of the records search and the literature research indicate that with the exception of a small area in the southwestern corner of the main project site (Figure 5), the soils to be impacted by the proposed project are mostly alluvial materials of late to middle Pleistocene origin. While the older geologic maps consulted during this study (e.g., Jahns 1954:Plate 3 and Rogers 1965) suggest that the surface sediments at this location are Holocene in age, the more recent maps (e.g., Morton 2003a, Morton 2003b, and Morton and Miller 2006) point to a Pleistocene age for these sediments. In light of past fossil discoveries nearby in similar sediments, the Pleistocene-age alluvial fan deposits are considered to be of high paleontological sensitivity. The Cretaceous-age granodiorite and tonalite in the southwestern corner of the main project site, in contrast, is low in paleontological sensitivity.

The exposed surface soils in the project area, however, have been extensively disturbed by past agricultural and construction activities, and are unlikely to contain any intact fossil remains. Furthermore, the NHMLAC finds the surface soils to be coarse-grained and derived from nearby hills of metamorphic and plutonic igneous rocks, and thus unlikely to contain any significant vertebrate fossils (McLeod 2017:1). Irish et al. (2003:18) notes that most of the fossils recovered

from similar situations were from depths greater than ten feet, although some were found as shallow as three feet near the base of hills. Based on available information, the undisturbed, finer, and older sediments are estimated to be present at depths below two feet in the project area.

## CONCLUSION AND RECOMMENDATIONS

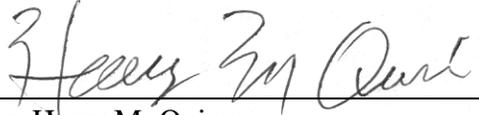
CEQA guidelines (Title 14 CCR App. G, Sec. V(c)) require that public agencies in the State of California determine whether a proposed project would “directly or indirectly destroy a unique paleontological resource” during the environmental review process. The present study, conducted in compliance with this provision, is designed to identify any significant, nonrenewable paleontological resources that may exist within or adjacent to the project area and to assess the possibility for such resources to be encountered in future excavation and construction activities.

Based on the research results presented above, the proposed project’s potential to impact significant paleontological resources is determined to be low in the extensively disturbed, coarse-grained surface sediments but high in the relatively undisturbed, finer-grained, older Pleistocene sediments that are anticipated below the surface in most of the project area. Therefore, CRM TECH recommends that a paleontological resource impact mitigation program be developed and implemented during the project to prevent such impacts or reduce them to a level less than significant. The mitigation program should be developed in accordance with the provisions of CEQA as well as the proposed guidelines of the Society of Vertebrate Paleontology (2010) and should include, but not be limited to, the following:

- Except in the southwestern corner of the main project site (Figure 5), earth-moving operations reaching reach beyond the depth of two feet should be monitored for any evidence of significant, nonrenewable paleontological resources. The monitor should be prepared to quickly salvage paleontological remains as they are unearthed to avoid construction delays, and should collect samples of sediments that are likely to contain fossil remains of small vertebrates or in vertebrates. The monitor must have the power to temporarily halt or divert construction equipment to allow for the removal of abundant or large specimens.
- Collected sediment samples should be processed to recover small fossils, and all recovered specimens should be identified and curated at a repository with permanent retrievable storage.
- A report of findings, including an itemized inventory of recovered specimens and a discussion of their significance when appropriate, should be prepared upon completion of the research procedures outlined above. The approval of the report and the inventory by the County of Riverside would signify completion of the mitigation program.

**CERTIFICATION:** I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this paleontological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

**DATE:** December 29, 2017

**SIGNED:**   
**Print Name:** Harry M. Quinn

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**APPENDIX 1**

**PERSONNEL QUALIFICATIONS**

**PROJECT GEOLOGIST/PALEONTOLOGIST**  
**Harry M. Quinn, M.S., California Professional Geologist #3477**

**Education**

1968 M.S., Geology, University of Southern California, Los Angeles, California.  
1964 B.S, Geology, Long Beach State College, Long Beach.  
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

**Professional Experience**

2000- Project Paleontologist, CRM TECH, Riverside/Colton, California.  
1998- Project Archaeologist, CRM TECH, Riverside/Colton, California.  
1992-1998 Independent Geological/Geoarchaeological/Environmental Consultant, Pinyon Pines, California.  
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.  
1988-1992 Project Geologist/Director of Environmental Services, STE, San Bernardino, California.  
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.  
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.  
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.  
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

**Previous Work Experience in Paleontology**

1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.  
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.  
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.  
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

**Memberships**

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Association of Environmental Professionals; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

**Publications in Geology**

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

## **PALEONTOLOGICAL SURVEYOR/FIELD DIRECTOR**

**Daniel Ballester, M.S.**

### **Education**

2013 M.S., Geographic Information System (GIS), University of Redlands, California.  
1998 B.A., Anthropology, California State University, San Bernardino.  
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.  
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.

### **Professional Experience**

2002- Field Director/GIS Specialist, CRM TECH, Riverside/Colton, California.  
2011-2012 GIS Specialist for Caltrans District 8 Project, Garcia and Associates, San Anselmo, California.  
2009-2010 Field Crew Chief, Garcia and Associates, San Anselmo, California.  
2009-2010 Field Crew, ECorp, Redlands.  
1999-2002 Project Archaeologist, CRM TECH, Riverside, California.  
1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.  
1998 Field Crew, A.S.M. Affiliates, Encinitas, California.  
1998 Field Crew, Archaeological Research Unit, University of California, Riverside.

## **PALEONTOLOGICAL SURVEYOR**

**Amanda Lloyd, B.A.**

### **Education**

2013 Certificate of Completion, Maritime Archaeology, Sanisera Field School, Port Sanitja Survey, Menorca, Spain.  
2010 B.A., Anthropology (minor in Archaeology), *summa cum laude*, Biola University, La Mirada, California.  
2009 Certificate of Completion, Field Archaeology, Balkan Heritage Field School, Heraclea Lyncestis Excavation, Bitola, Macedonia.

### **Professional Experience**

2016- Project Archaeologist/Paleontologist, CRM TECH, Colton, California.  
2012- Paleontological/Cultural Resource Monitor and Surveyor, ECORP Consulting, Inc., Stantec Consulting Services, and Cogstone Resource Management .  
2009-2010 Teaching Assistant (lab supervisor and co-lecturer), Physical Anthropology and Lab and Field Methods in Archeology, Biola University, La Mirada, California.  
2008- Site and lab supervisor for mammoth excavation site Biola 2001-1, La Mirada, California

**PALEONTOLOGICAL SURVEYOR/REPORT WRITER**  
**Ben Kerridge, M.A.**

**Education**

2014 Archaeological Field School, Institute for Field Research, Kephallenia, Greece.  
2010 M.A., Anthropology, California State University, Fullerton.  
2009 Project Management Training, Project Management Institute/CH2M HILL.  
2004 B.A., Anthropology, California State University, Fullerton.

**Professional Experience**

2015- Project Archaeologist/Report Writer, CRM TECH, Colton, California.  
2015 Teaching Assistant, Institute for Field Research, Kephallenia, Greece.  
2009-2014 Publications Delivery Manager, CH2M HILL, Santa Ana, California.

- Led teams of editors, document processors, and graphic designers in production of technical documents in support of construction, remediation, and mitigation/monitoring projects of varying sizes around the world.
- Provided field and research support to cultural resources management teams on various projects.

2010- Naturalist, Newport Bay Conservancy, Newport Beach, California.  
2009-2010 Senior Commentator, GameReplays.org.  
2006-2009 Technical Publishing Specialist, CH2M HILL, Santa Ana, California.  
2002-2007 Host and Head Writer, *The Rational Voice Radio Program*, Titan Radio, California State University, Fullerton.  
2002-2006 English Composition/College Preparation Tutor, Various Locations, California.

**APPENDIX 2**

**RECORDS SEARCH RESULTS**

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

tel 213-763-3466  
nhm.org

Vertebrate Paleontology Section  
Telephone: (213) 763-3325

e-mail: [smcleod@nhm.org](mailto:smcleod@nhm.org)

17 November 2017



CRM Tech  
1016 East Cooley Drive, Suite B  
Colton, CA 92324

Attn: Nina Gallardo, Project Archaeologist

re: Paleontological resources for the proposed 1594.001 Canterwood New Tract Map Project, CRM TECH No. 3282, in the Menifee Valley vicinity, Riverside County, project area

Dear Nina:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed 1594.001 Canterwood New Tract Map Project, CRM TECH No. 3282P, in the Menifee Valley vicinity, Riverside County, project area as outlined on the portions of the Romoland and Winchester USGS topographic quadrangle maps that you sent to me via e-mail on 3 November 2017. We do not have any vertebrate fossil localities that lie directly within the proposed project boundaries, but we do have localities somewhat nearby from sedimentary deposits similar to those that may occur subsurface in the proposed project area.

The entire proposed project area has surface material composed of older Quaternary Alluvium, derived as alluvial fan deposits from the surrounding elevated terrain. These deposits, so close to the source hills where the bedrock is composed of metamorphic and plutonic igneous rocks, tend to be coarse and are therefore unlikely to contain significant vertebrate fossils in the uppermost layers, but there may be finer-grained material at depth that may well contain significant fossil vertebrate remains. Our closest vertebrate fossil locality from somewhat similar sedimentary deposits is LACM 5168, on the north side of Railroad Canyon Reservoir just north of west of the proposed project area, that produced a specimen of fossil horse, *Equus*. Our next closest vertebrate fossil locality from similar older Quaternary deposits is LACM 8008, just east of due south of the eastern-most portion of the proposed project area just north of Tualota Creek, that produced a fossil specimen of mammoth, *Mammuthus*, at a depth of 48 feet below the surface. Our next closest vertebrate fossil locality from similar older Quaternary sediments is LACM 7261, south-southeast of

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the proposed project area in what is now the Skinner Reservoir, that produced specimens of fossil mammoth, *Mammuthus*, and bison, *Bison*, at shallow but unstated depth.

Shallow excavations in the older Quaternary alluvial fan deposits exposed throughout the proposed project area are unlikely to uncover any significant vertebrate fossils. Deeper excavations that extend down into older and perhaps finer-grained sedimentary deposits, however, may well encounter significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should be closely monitored to quickly and professionally collect any fossils discovered 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,

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

Samuel A. McLeod, Ph.D.  
Vertebrate Paleontology

enclosure: invoice



**San Bernardino County  
Museum  
Division of Earth Sciences**

**Ian Gilbert**  
Curator of Earth Sciences

**email:**  
[igilbert@sbcm.sbcounty.org](mailto:igilbert@sbcm.sbcounty.org)

21 November, 2017

CRM TECH  
Attn: Nina Gallardo  
1788 El Prado  
San Diego, CA 92101

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**PALEONTOLOGY LITERATURE / RECORDS REVIEW, Canterwood  
New Tract Map Project (CRM TECH Contract No. 3282)**

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Dear Ms. Gallardo,

The Division of Earth Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named project in Riverside County, California. The proposed residential housing tract project is located in the Paloma Valley area, near the City of Menifee and the community of Winchester, at the southeast corner of Leon Road and Holland Road (APNs 466-310-002 and 466-310-026), Sections 6-8, Township 6 South, Range 2 West, San Bernardino Base and Meridian, extending into Sections 1 and 12, Township 6 South, Range 3 West, San Bernardino Base and Meridian, as seen on the following United States Geological Survey (USGS) 7.5 minute topographic quadrangle maps: Romoland, California (1953 edition: photorevised 1979); and Winchester, California (1953 edition: photorevised 1979).

Previous geologic mapping of the proposed project property by Morton and Miller (2006) indicates that the proposed project traverses surface and subsurface rocks of Late to Middle Pleistocene-aged Old Alluvial Fan Deposits (**Qof<sub>a</sub>**), and Cretaceous Era-aged Granodiorite and tonalite of Domenigoni Valley (**Kdvg**) (fig. 1). The Domenigoni Valley granitics, **Kdvg**, have no potential to contain significant fossil resources, and so are assigned low paleontological

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## Canterwood New Tract Map Project (CRM TECH Contract No. 3282)

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sensitivity. However, the Pleistocene-aged alluvium, unit **Qof<sub>a</sub>**, has high potential to yield significant nonrenewable paleontological resources, and so is assigned high paleontological sensitivity.

Pleistocene-aged sediments elsewhere throughout much of inland southern California, particularly in Riverside and San Bernardino Counties of the Inland Empire, have been reported to yield significant fossils of plants and extinct Ice Age animals (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Springer and Scott, 1994; Scott, 1997; Springer et al., 1998, 1999, 2007, 2009, 2010; Anderson et al., 2002). Fossils recovered from these Pleistocene sediments represent extinct taxa including mammoths, mastodons, ground sloths, dire wolves, short-faced bears, sabre-toothed cats, large and small horses, large and small camels, and bison (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991; Scott, 1997; Springer et al., 2009).

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM and a literature search through the SBCM Earth Sciences library. The results of this search indicate that no recorded paleontological resource localities are present within the proposed project. Furthermore, no resource localities are recorded by the SBCM within one mile of the project in any direction. However, dozens of fossil localities (SBCM 5.6.428 – 5.6.470) are located about 2.5 miles to the east of the proposed project in similarly mapped (Morton and Miller, 2006) stratigraphic units (fig. 1). Furthermore, numerous known localities are recorded from the Domenigoni and Diamond Valleys, just east of the proposed project, where construction of Diamond Valley Lake resulted in the recovery of several thousand fossils of late Pleistocene age from subsurface Pleistocene alluvium (Springer and Scott, 1994; Scott, 1997; Springer et al., 1998, 1999, 2007, 2009, 2010).

### **Recommendations**

The results of the literature review and the check of the RPLI at the SBCM demonstrate that the proposed project has high potential to impact significant nonrenewable paleontological resources. Excavation into Pleistocene-aged Old Alluvial Fan Deposits, **Qof<sub>a</sub>**, will require a qualified vertebrate paleontologist to develop a paleontological resource impact mitigations program (PRIMP) to mitigate impacts to nonrenewable paleontological resources. This mitigation program must include curation of recovered resources (Scott et al., 2004) and be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside and the proposed guidelines of the Society of Vertebrate Paleontology.

## Canterwood New Tract Map Project (CRM TECH Contract No. 3282)

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1. Prior to the initiation of excavation activities, a field reconnaissance of the proposed project shall be conducted, to assess paleontological sensitivity in more detail and to recover any exposed paleontological remains.
2. Monitoring of excavation in areas identified as likely to contain paleontological resources by a qualified paleontological monitor. Based upon the results of this review, monitoring should be restricted to Old Alluvial Fan deposits (**Qof<sub>a</sub>**) (Morton and Miller, 2006). Paleontological monitors should be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments which are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially-fossiliferous units described herein are not present, or if present, are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
3. Preparation of recovered specimens to a point of identification and permanent preservation, including screen-washing of sediments and microscopic examination of residual materials to recover small invertebrates and vertebrates.
4. Identification and curation of specimens into a professional, accredited museum repository with permanent retrievable storage. The paleontologist should have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontological resources is not complete until such curation into an established museum repository has been fully completed and documented.
5. Preparation of a report of findings with an appended itemized inventory of specimens. This report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontological resources.

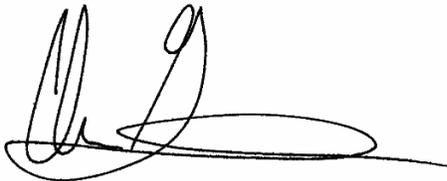
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Please do not hesitate to contact us with any further questions that you may have.

Sincerely,

A handwritten signature in black ink, appearing to read 'Ian Gilbert', with a long horizontal flourish extending to the right.

Ian Gilbert, Curator of Earth Sciences  
Division of Earth Sciences  
San Bernardino County Museum

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