PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT

PP 2017-225, CUP 2017-226, AND PM 2017-227

In and near the City of Menifee
Riverside County, California

For Submittal to:

City of Menifee
Planning Division
29714 Haun Road
Menifee, CA 92586

Prepared for:

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April 9, 2018

CRM TECH Project No. 3300P
Approximately 20.7 acres
USGS Romoland, Calif., 7.5' quadrangle
Section 7, T5S R2W, and Section 12, T5S R3W, San Bernardino Baseline and Meridian

EXECUTIVE SUMMARY

Between January and April 2018, at the request of Briggs & 74, LLC, CRM TECH performed a paleontological resource assessment on approximately 20.7 acres of vacant land on the eastern edge of the City of Menifee, Riverside County, California. The subject property of the study is located at the intersection of Briggs Road and State Route 74, in the southwest quarter of Section 7, T5S R2W, and the southeast quarter of Section 12, T5S R3W, San Bernardino Baseline and Meridian. It consists of a portion of Assessor's Parcel Number (APN) 327-320-013 and portions of the Briggs Road and State Route 74 rights-of-way.

The study is part of the environmental review process for the proposed subdivision of the portion of APN 327-320-013 for commercial development and associated off-site infrastructure improvement on Briggs Road and State Route 74 (PP 2017-225, CUP 2017-226, and PM 2017-227). The City of Menifee, as the lead agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA). The purpose of the study is to provide the City 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 in future excavation and construction activities, CRM TECH initiated records searches at the appropriate repositories, conducted a literature search, and carried out a systematic field survey of the project area, in accordance with the guidelines of the Society of Vertebrate Paleontology. The results of these research procedures indicate that the proposed project's potential to impact significant paleontological resources appears to be low in the coarse-grained and disturbed surface sediments but high in the finer-grained, older Pleistocene sediments potentially present at depth.

Based on these findings, 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 below the depth of two feet on APN 327-320-013 or the depth of five feet within the public right-of-way should be monitored for any evidence of significant, nonrenewable paleontological resources.

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INTRODUCTION

Between January and April 2018, at the request of Briggs & 74, LLC, CRM TECH performed a paleontological resource assessment on approximately 20.7 acres of vacant land on the eastern edge of the City of Menifee, Riverside County, California (Figure 1). The subject property of the study is located at the intersection of Briggs Road and State Route 74, in the southwest quarter of Section 7, T5S R2W, and the southeast quarter of Section 12, T5S R3W, San Bernardino Baseline and Meridian (Figure 2). It consists of a portion of Assessor's Parcel Number (APN) 327-320-013 and portions of the Briggs Road and State Route 74 rights-of-way (Figure 3).

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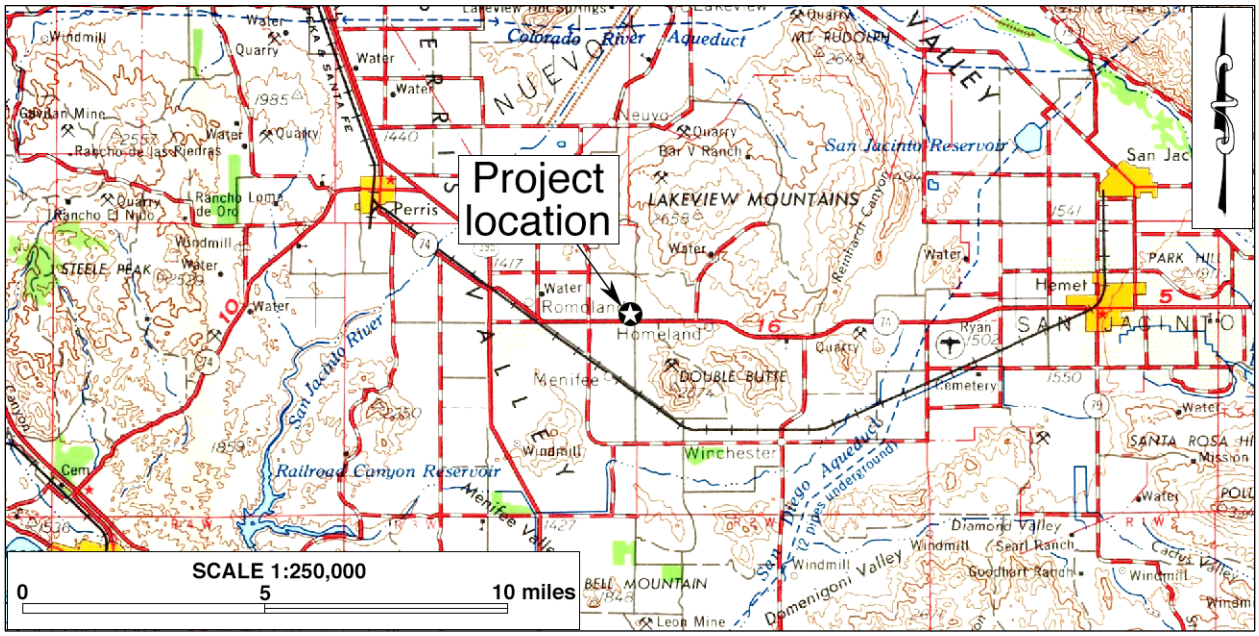

Figure 1. Project vicinity. (Based on USGS Santa Ana, Calif., 1:250,000 quadrangle, 1979 edition)

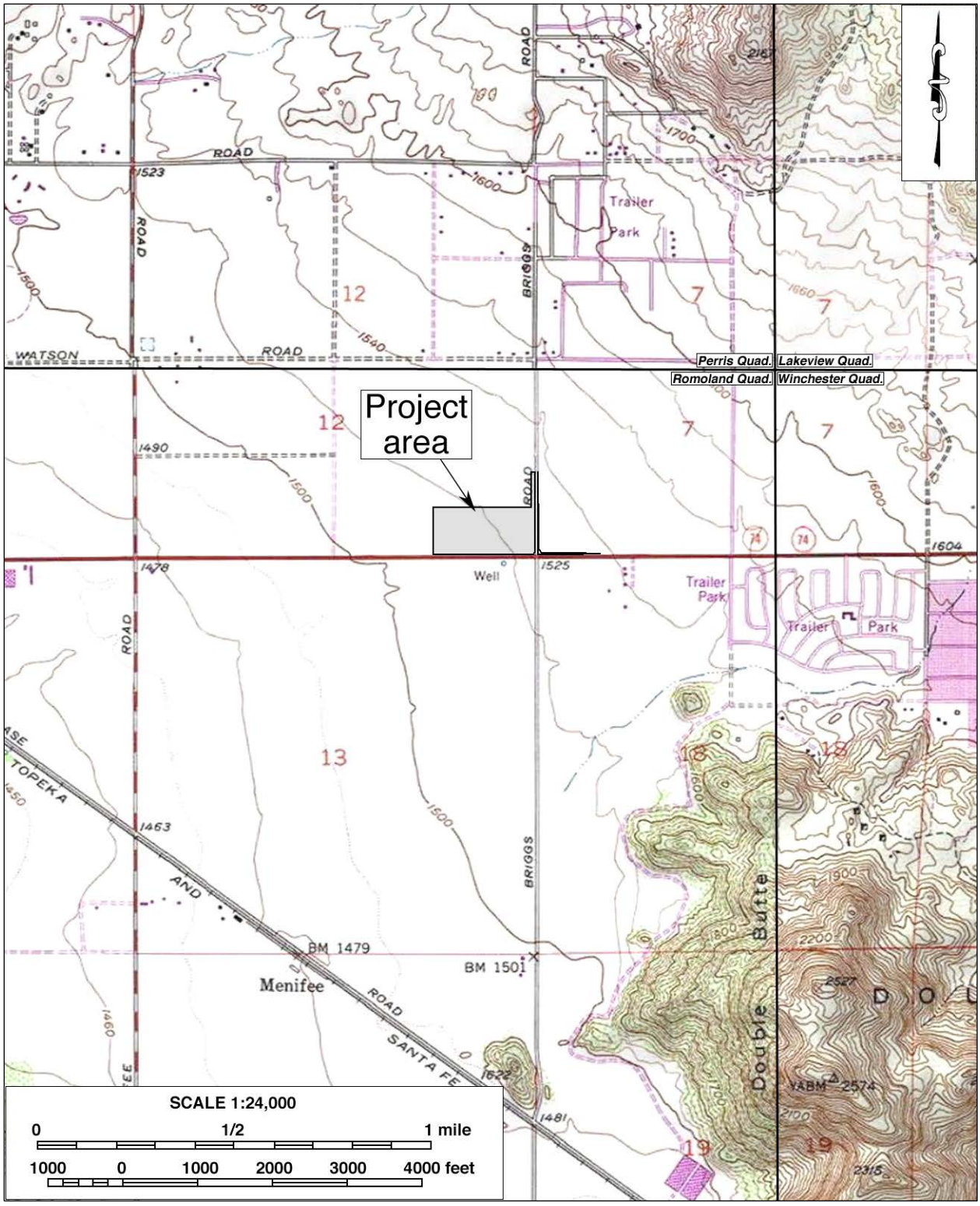

Figure 2. Project area. (Based on USGS Perris, Lakeview, Romoland, and Winchester, Calif., 1:24,000 quadrangles, 1979 edition)

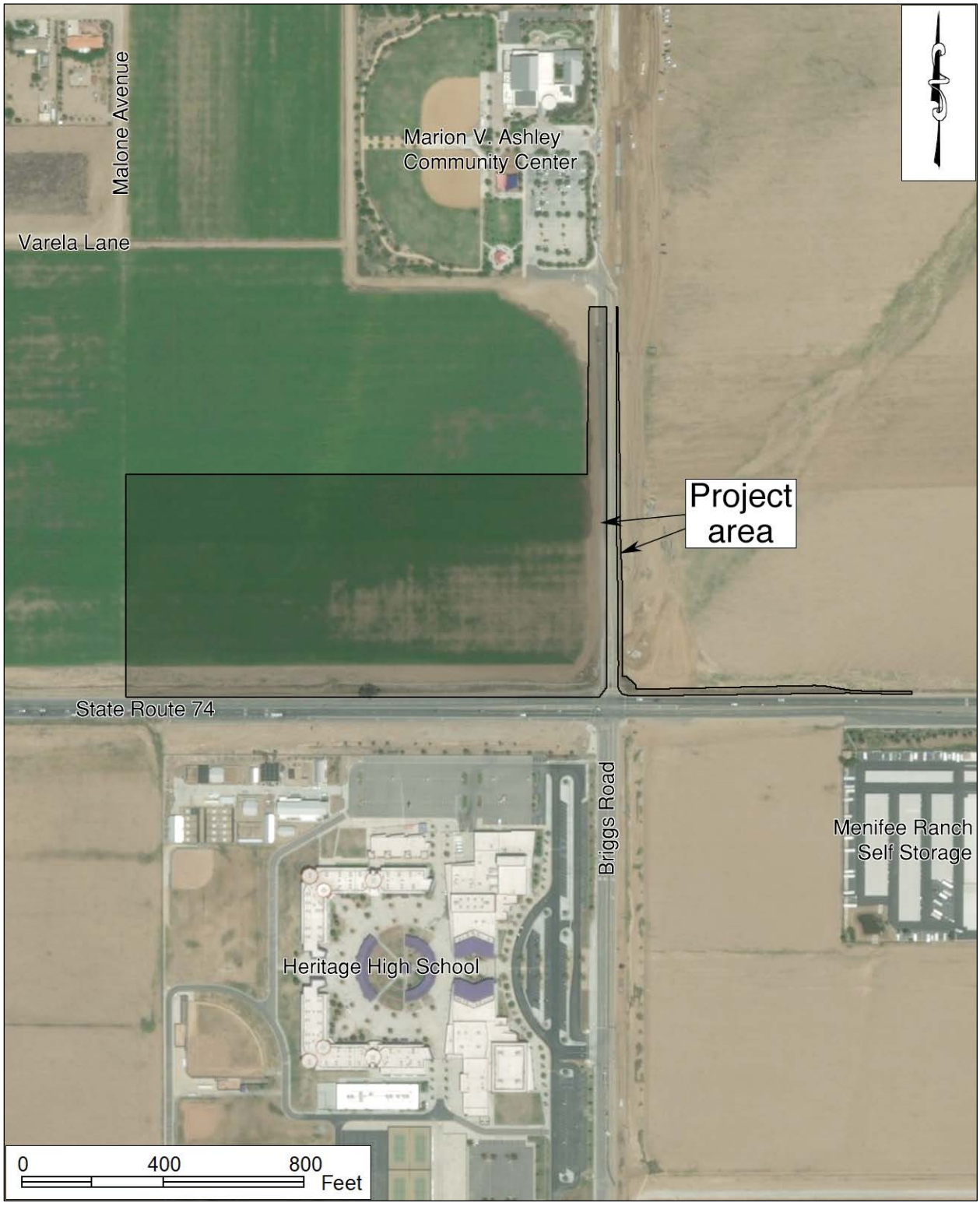

Figure 3. Aerial view of the project area.

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 approximately 12,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene (circa 2.6 million to 12,000 years B.P.) glaciation and the beginning of the current Holocene epoch (circa 12,000 years B.P. to the present).

Common fossil remains include marine shells; the bones and teeth of fish, amphibians, reptiles, and mammals; leaf 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 for yielding vertebrate fossils but also the potential of yielding a few significant fossils that may 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 City of Menifee is situated in the northern portion of the Peninsular Ranges province, which is bounded on the north by the Transverse Ranges province, on the northeast by the Colorado Desert province, and on the west by the Pacific Ocean (Jenkins 1980: 40-41; Harms 1996:150). The Peninsular Ranges province extends southward to the southern tip of Baja California (Jahns 1954). The project location lies in the southeastern portion of the Perris Valley, approximately a mile to the southwest of the Lakeview Mountains, an outcropping ridge of basement rocks.

The Perris Valley is one of the many tectonically controlled valleys within the valley-and-ridge systems to be found within the Perris Structural Block. These structurally depressed troughs are filled with sediments of upper Pliocene through Recent age, and the ridges are composed of plutonic igneous rocks, metasedimentary rocks, and late stage intrusive dikes (Mann 1955: Plate 1; Kennedy 1977:5). English (1926) defined the Perris Block as the 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. This structural block is known to have been active since Pliocene time (Woodford et al. 1971:3421).

CURRENT NATURAL SETTING

The project area consists of approximately 19.27 acres of former agricultural land on APN 327-320-013 as well as an L-shaped portion of existing public right-of-way along the east side of Briggs Road and the north side of State Route 74 (Figures 3, 4). Large tracts of undeveloped land lie to the east

Figure 4. Current natural setting of the project area. (View to the northeast; photograph taken on January 17, 2018)

and the west of the project location, while the Marion V. Ashley Community Center and Heritage High School are situated to the north and the south, respectively (Figure 3). The terrain in the project area is level, and elevations range approximately from 1,515 feet to 1,535 feet above mean sea level.

Soils in the vicinity consist of medium-brown fine- to coarse-grained alluvial silty sands mixed with small rocks, and have been extensively disturbed by past agricultural activities, disking, and road construction within the public right-of-way. Vegetation in the project area features mostly a sparse growth of the typical small grasses and shrubs as well as a single eucalyptus tree and occasional patches of wild mustard and foxtails, especially along the edges of the property.

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 files of regional paleontological localities as well as supporting maps and documents. The records search results are used to identify known previously performed paleontological resource assessments as well as known paleontological localities within a one-mile radius of the project area. Copies of the records search results are attached to this report in Appendix 2.

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 surrounding 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 January 17, 2018, CRM TECH archaeologist Daniel Ballester carried out the field survey of the portion of the project area on APN 327-320-013 under the direction of Harry M. Quinn. The survey was completed on foot by walking a series of parallel east-west transects spaced by 15 meters (approximately 50 feet). On February 13, 2018, after off-site infrastructure improvement was incorporated into the project plans, Ballester completed the field inspection of the portion of the project area lying within the public right-of-way. As that portion of the project area consists of a narrow strip of the land along the existing roadways, it was inspected from the east side of Briggs Road and the north side of State Route 74.

In this way, the ground surface in the entire project area was systematically and carefully examined to determine the soil types, to verify the geological formations, and to look for any indications of

paleontological remains. Except for the road pavement, ground visibility was excellent (90 to 100 percent) due to the sparse vegetation growth (Figure 4).

RESULTS AND FINDINGS

RECORDS SEARCHES

The paleontological resources records searches by the NHMLAC and the SBCM identified no known vertebrate paleontological localities within the project area. According to the NHMLAC, the surface material in the project vicinity is composed of older Quaternary alluvial fan deposits, from the Lakeview Mountains to the northeast, that tend to be coarse-grained and are thus unlikely to contain significant vertebrate fossils (McLeod 2018:1-2; see Appendix 2). However, the museum observes that finer-grained material that could be present at depth may contain significant fossil vertebrate remains, as similar sediments elsewhere nearby have yielded fossil localities (McLeod 2018:1). The nearest vertebrate fossil localities identified by the NHMLAC were LACM 5168 (a horse) and LACM 7261 (a bison and a mammoth) located near Canyon Lake and Lake Skinner, respectively (*ibid.*:1-2). The NHMLAC therefore recommends that any "substantial excavation" in the project area be monitored for paleontological resources (*ibid.*:2).

The SBCM considers the the project area to be entirely atop Late to Middle Pleistocene-aged Old Alluvial Fan Deposit that carry a high potential to contain significant nonrenewable paleontological resources (Gilbert 2018:1-2). The "High B" rating assigned by the County of Riverside suggests that resources may be encountered at or below the depth of four feet during construction activities (*ibid.*:2). The SBCM reported 21 fossil localities (SBCM 5.6.626, 5.6.671 to 5.6.683, and 5.6.868 to 5.6.875) within a one-mile radius and from similar stratigraphic units to those present in the project area (*ibid.*). Additionally, the subsurface late Pleistocene alluvium in nearby Domenigoni and Diamond Valleys, to the southeast of the project area, are the source of several thousand fossils from the late Pleistocene Epoch (*ibid.*). The SBCM therefore recommends a qualified vertebrate paleontologist to develop a paleontological resource impact mitigations program consistent with CEQA provisions and guidelines of the County of Riverside (*ibid.*:2-3).

LITERATURE REVIEW

The surface geology within the project area was mapped by Rogers (1965) as **Qal**, or alluvium of Holocene age. This is the same material mapped on the surface in the Domenigoni Valley, the site of important vertebrate paleontological finds in recent decades (Springer and Scott 1994; Springer et al. 1998; Springer et al. 1999). Most of these fossil remains from the Domenigoni Valley were recovered at depths greater than ten feet below the surface (Scott 2004). 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. One exception may be deep cuts used to develop retention basins or to install utility lines.

Miller et al. (1991:Plate 1B) mapped the surface geology in the project area as **Qo**, defined as older alluvium of early Holocene age. It consists of poorly consolidated sand, gravel, and silt associated with essentially inactive drainages and alluvial fans (*ibid.*). Morton (2003a) and Morton and Miller (2006) later remapped the surface geology mostly as $\mathbf{Qof_a}$ (Figure 5), or old alluvial fan deposits of

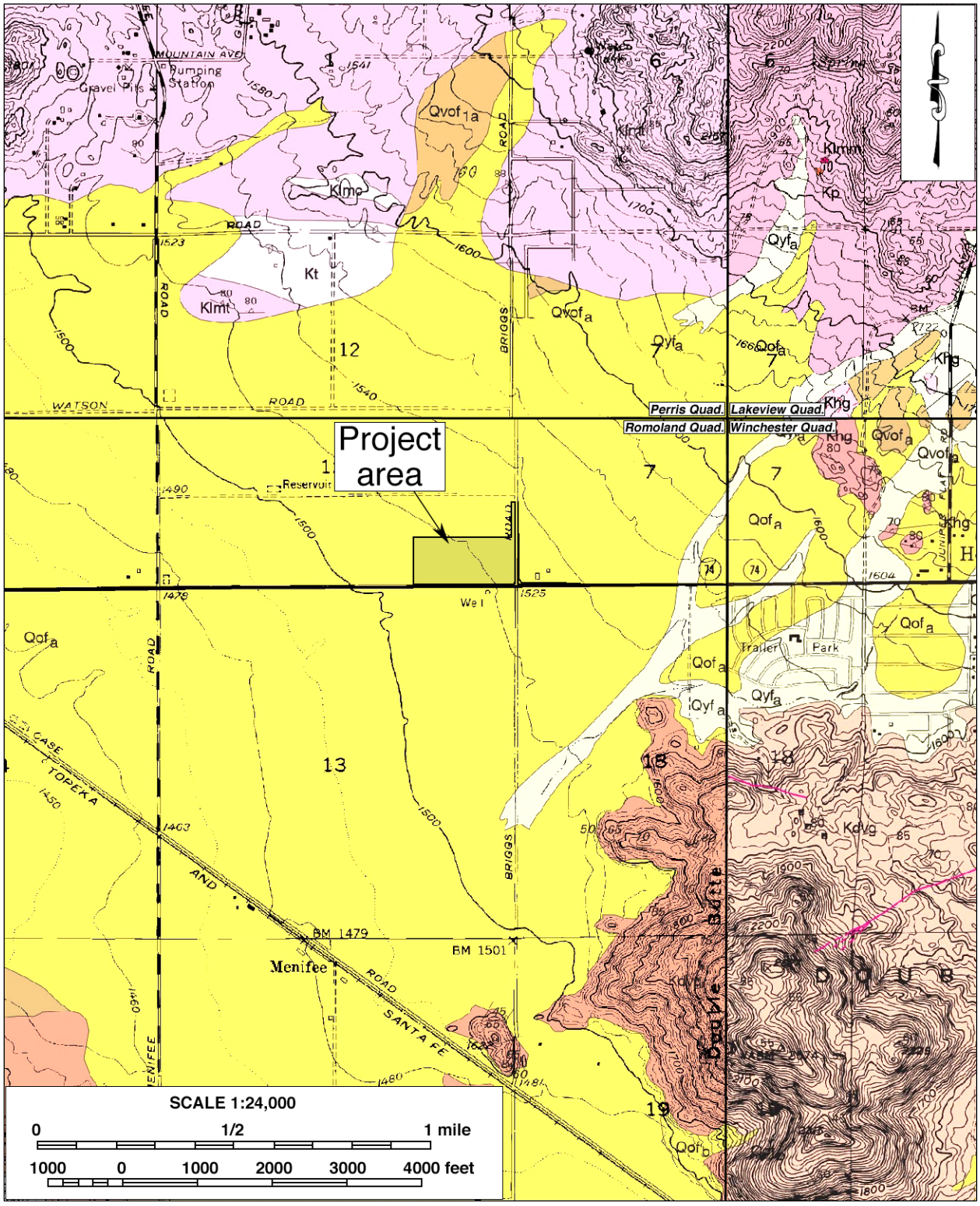

Figure 5. Geologic map of the project vicinity. (Based on Morton and Matti 2001; Morton 2003a-2003c)

late to middle Pleistocene age, which Morton described as "reddish brown, gravel and sand deposits; indurated, commonly slightly dissected" that in places include "thin alluvial fan deposits of Holocene age."

Knecht (1971:Map Sheet 109) mapped the surface soils at the project location as **GyA** and **RaA**. The **GyA** soils belong to the Greenfield Series and develop on alluvial fans and terraces (*ibid*.:38-39). The **RaA** soils belong to the Ramona Series and develop on alluvial fans consisting mainly of granitic material (*ibid*.: 53-54).

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 consists of former agricultural field and portions of paved public roadways, the surface soils have clearly been disturbed to various extents by past farming operations and road construction activities.

DISCUSSION

The results of the records search and the literature research indicate that the surface soils in the project area are mostly sedimentary materials of late Pleistocene or early Holocene age. However, the younger alluvial sediments are known to rest directly atop older Pleistocene sediments in many areas, but usually at depths greater than five feet. Irish et al. (2003:18) reported that most of the fossils recovered from similar situations were found at depths greater than 10 feet, although some could be found as shallow as three feet near the base of hills.

At least the top two feet of soil in the project area have been disturbed by past agricultural operations, and the portions within the public rights-of-way are typically disturbed to the depth of five to six feet. Based on available information, older sediments that may be present beneath the surface should occur deeper than five feet below ground surface but could occur as shallow as two feet.

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 appears to be low in the coarse-grained and disturbed surface sediments but high in the finer-grained, older Pleistocene sediments potentially present at depth. 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 below the depth of two feet on APN 327-320-013 or the depth of five feet within the public right-of-way should be monitored for any evidence of significant, nonrenewable paleontological resources. 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:

1. Earth-moving operations reaching a depth of two feet or more should be monitored by a qualified paleontological monitor. The monitor should be prepared to quickly salvage paleontological remains as they are unearthed to avoid construction delays and must have the power to temporarily halt or divert construction equipment to allow for the removal of abundant or large specimens.
2. Samples of sediments should be collected and processed to recover small fossil remains.
3. Recovered specimens should be identified and curated at a repository with permanent retrievable storage that would allow for further research in the future.
4. 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 City of Menifee would signify completion of the mitigation program.

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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
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.

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.
2010-	Naturalist, Newport Bay Conservancy, Newport Beach, California.
2006-2009	Technical Publishing Specialist, CH2M HILL, Santa Ana, California.

APPENDIX 2

RECORDS SEARCH RESULTS

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

tel 213.763.DINO
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NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

23 January 2018

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

Attn: Nina Gallardo, Project Archaeologist

re: Paleontological resources for the proposed Briggs & 74 Project, CRM Tech No. 3300P, in the City of Menifee, 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 Briggs & 74 Project, CRM Tech No. 3300P, in the City of Menifee, Riverside County, project area as outlined on the portion of the Romoland USGS topographic quadrangle map that you sent to me via e-mail on 9 January 2018. 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.

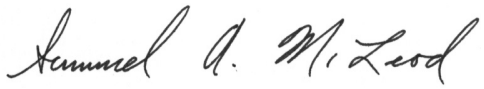
The entire proposed project area has surface material composed of older Quaternary Alluvium, derived as alluvial fan deposits from the Lakeview Mountains to the northeast. These Quaternary alluvial fan deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, and we have no fossil vertebrate localities very nearby from these types of deposits, but they may have pockets of finer-grained sediments, particularly at depth, that may well contain significant vertebrate fossil 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 sediments is LACM 7261, south-southeast of 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. Our next closest vertebrate fossil locality from similar older Quaternary deposits is LACM 8008, just east of south of the proposed project area, and west-southwest of locality LACM 7261, just north of Tucalota Creek, that produced a fossil specimen of mammoth, *Mammuthus*, at a depth of 48 feet below the surface.

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,



Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

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www.SBCounty.gov

SAN BERNARDINO COUNTY

San Bernardino County Museum
Division of Earth Sciences

Ian Gilbert
Curator of Earth Sciences

email:
igilbert@sbcm.sbcounty.gov

24 January, 2018

CRM TECH
Attn: Nina Gallardo
1016 East Cooley Drive
Colton, CA 92324

PALEONTOLOGY LITERATURE / RECORDS REVIEW, Briggs and Highway 74 Project (CRM TECH No. 3300P

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 development project is located in the City of Menifee, at the northwest corner of Briggs Road and Highway 74, portion of Assessor's Parcel Number 327-320-013, in the southeast quadrant of Section 12, Township 5 South, Range 3 West, San Bernardino Base and Meridian, as seen on the Romoland, California 7.5 minute United States Geological Survey (USGS) topographic quadrangle map (1953 edition: photorevised 1979).

Previous geologic mapping of the proposed project property by Morton and Miller (2006) indicates that the proposed project solely traverses surface and subsurface rocks of Late to Middle Pleistocene-aged Old Alluvial Fan Deposits (**Qof_a**) (fig. 1). These Pleistocene-aged sediments have high potential to contain significant nonrenewable paleontological resources, and so are assigned as having 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-aged 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 reason, Pleistocene-aged sediments in this region have demonstrated high potential to yield significant nonrenewable paleontological resources subject to adverse impact during development related excavation, and are therefore assigned high paleontological sensitivity.

Riverside County's Paleontological Resource Sensitivity Map (RCPTSM) indicates that the project is located on sedimentary rocks that have a high potential (High B) to produce nonrenewable paleontological resources. This category indicates fossils that are likely to be encountered at or below 4 feet of depth and may be impacted during construction activities.

For this review, I conducted a search of the Regional Paleontological Locality Inventory (RPLI) at the SBCM and a literature review through the SBCM Earth Sciences library. The results of this search indicate that no recorded paleontological resource localities are present within the proposed project boundaries. However, 21 fossil localities (SBCM 5.6.626, 5.6.671-.683, and 5.6.868-875) are located within a mile of the proposed project boundaries in similarly mapped (Morton and Miller, 2006) stratigraphic units (fig. 1). Moreover, several fossil localities (SBCM 5.6.620-627) are located about two and a half miles to the south of the proposed project (fig. 1). In addition, numerous known localities are recorded from the Domenigoni and Diamond Valleys, located just southeast 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 development project has high potential to impact significant nonrenewable paleontological resources. Excavation into Pleistocene-aged Old Alluvial Fan Deposits, **Qof_a** (fig. 1) 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. This mitigation program should include, but not be limited to:

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_a**) (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.

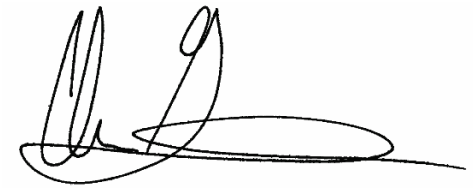
3. Preparation of recovered specimens to a point of identification and permanent preservation, including screen-washing of sediments and microscopic examination of residual materials to recover small invertebrates and vertebrates.

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.

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

Sincerely,



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

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Figures (CONFIDENTIAL)

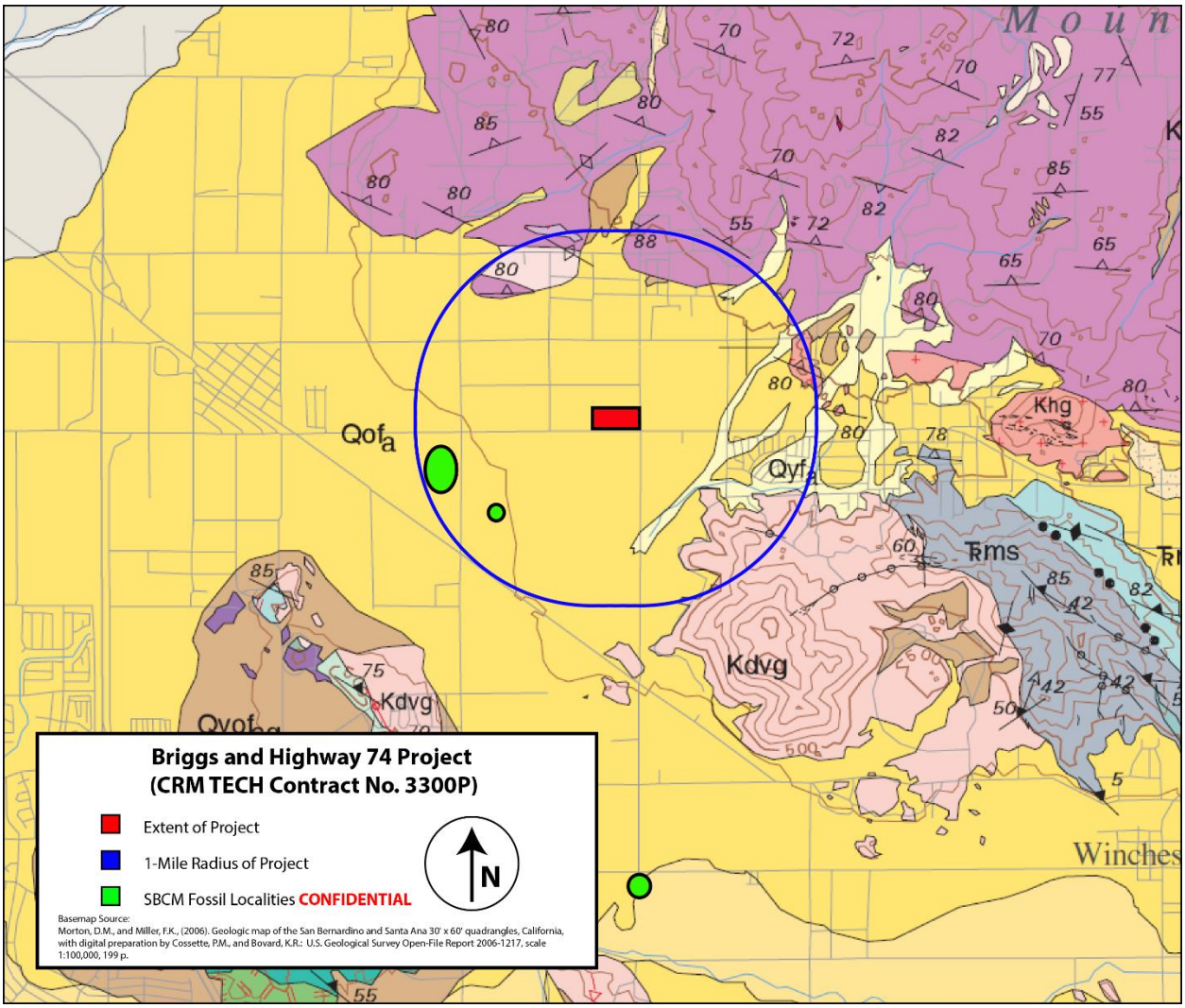

Figure 1.