Appendix PALEO

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project Paleontological Resources Assessment Report

ESA

GOETZ ROAD POTABLE WATER STORAGE TANK AND TRANSMISSION PIPELINE PROJECT, RIVERSIDE COUNTY, CALIFORNIA

Paleontological Resources Assessment Report

Prepared for

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92572

August 2019

ESA

GOETZ ROAD POTABLE WATER STORAGE TANK AND TRANSMISSION PIPELINE PROJECT, RIVERSIDE COUNTY, CALIFORNIA

Paleontological Resources Assessment Report

August 2019

Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92572

Prepared by:
ESA

Principal Investigator and Report Author:
Joe D. Stewart, Ph.D.

Project Manager:
Sara Dietler, B.A.

Project Location:
Romoland (CA) USGS 7.5 minute Topographic Quad; Township 5 South, Range 3 West, Sections 17, 18, and 20

Acreage: Approximately 2.85-acres

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300
www.esassoc.com

Bend	Oakland	San Francisco
Camarillo	Orlando	Santa Monica
Delray Beach	Pasadena	Sarasota
Destin	Petaluma	Seattle
Irvine	Portland	Sunrise
Los Angeles	Sacramento	Tampa
Miami	San Diego	

D190581.00

OUR COMMITMENT TO SUSTAINABILITY | ESA helps a variety of public and private sector clients plan and prepare for climate change and emerging regulations that limit GHG emissions. ESA is a registered assessor with the California Climate Action Registry, a Climate Leader, and founding reporter for the Climate Registry. ESA is also a corporate member of the U.S. Green Building Council and the Business Council on Climate Change (BC3). Internally, ESA has adopted a Sustainability Vision and Policy Statement and a plan to reduce waste and energy within our operations. This document was produced using recycled paper.

TABLE OF CONTENTS

Goetz Road Potable Water Storage Tank and Transmission Pipeline

Page

EXECUTIVE SUMMARY **2**

Introduction and Project Description **4**
- Project Location 4
- Project Description 7

Regulatory Framework **8**

Methods and Results **12**

Conclusions and Recommendations **17**

References **19**

Appendices

A. Personnel Qualifications

B. Records Search Results (*Confidential and not Included Herein*)

List of Figures

1 Regional Location 5

2 Project Location 6

3 Geology Map 14

4 Survey Area 16

Tables

1 Typical Pipeline Construction Requirements and Progress Rates 7

EXECUTIVE SUMMARY

Goetz Road Potable Water Storage Tank and Transmission Pipeline - Paleontological Resources Assessment Report

Environmental Science Associates (ESA) has been retained by Eastern Municipal Water District (EMWD) to prepare a Paleontological Resources Assessment in support of an Environmental Impact Report (EIR) for the Goetz Road Potable Water Storage Tank and Transmission Pipeline Project (Project) in the City of Menifee and City of Perris, California. The Project would address a number of deficiencies within EMWD's 1627 pressurized zone, including low pressure, deficient storage, and insufficient pumping capacities. The Project would involve construction and operation of an 8-million-gallon (MG) potable water storage tank on 2.85 acres of EMWD-owned land at the northwest corner of Sotelo Road and Goetz Road in the City of Perris. A disinfection facility would be constructed adjacent to the storage tank. The Project would also include construction and operation of a 5,490-foot transmission pipeline along Thorton Avenue and proposed rights-of-way in the City of Menifee. The pipeline would connect the storage tank to the existing distribution system within Murrieta Road in the City of Menifee. An alternative pipeline alignment is being considered by EMWD and is included in this assessment. The overall area of permanent disturbance for the tank and disinfection facility would be 2.85 acres. All facilities would be constructed on property owned by EMWD or within planned or existing rights-of-way. EMWD is the lead agency pursuant to the California Environmental Quality Act (CEQA). The Project area is located in Sections 17, 18 and 20 of the Romoland USGS 7.5' Quadrangle, Township 5 South, Range 3 West.

EMWD prepared an Initial Study/Mitigated Negative Declaration (IS/MND) for the Project which was released for public review in October 2015. Subsequent to that release, EMWD decided that an EIR would be the most appropriate document to satisfy requirements of the California Environmental Quality Act (CEQA), and released a Notice of Preparation (NOP) in November 2015. The IS/MND was not adopted by the EMWD Board of Directors.

A paleontological records search was conducted for the Project by the Natural History Museum of Los Angeles County (LACM) on June 13, 2019. The results indicate no known fossil localities on the Project area; however, older Quaternary Alluvium deposited during the Pleistocene epoch[1] can contain significant fossil vertebrate remains. There are three fossil localities within 6 miles southwest of the Project area, which have produced fossil horses and camel. The surficial geology

[1] Defined by the ICS as 2,588,000 years ago to 11,700 years ago to the present (ICS 2017).

of the Project area consists of Pleistocene-aged alluvial fan deposits, quartz-rich rocks of Mesozoic age, and Gabbro of Jurassic age. A review of geologic mapping and the scientific literature indicates that the surficial Quaternary Alluvium has high sensitivity for paleontological resources. Therefore, the Quaternary alluvial fan sediments underlying the Project area are characterized as having high paleontological sensitivity[2]. ESA provides recommendations for paleontological impact mitigation in order to ensure that potential impacts remain less than significant. These recommendations are provided in the Conclusions and Recommendations section at the end of this report.

[2] The known potential to produce significant fossils.

INTRODUCTION AND PROJECT DESCRIPTION

Introduction

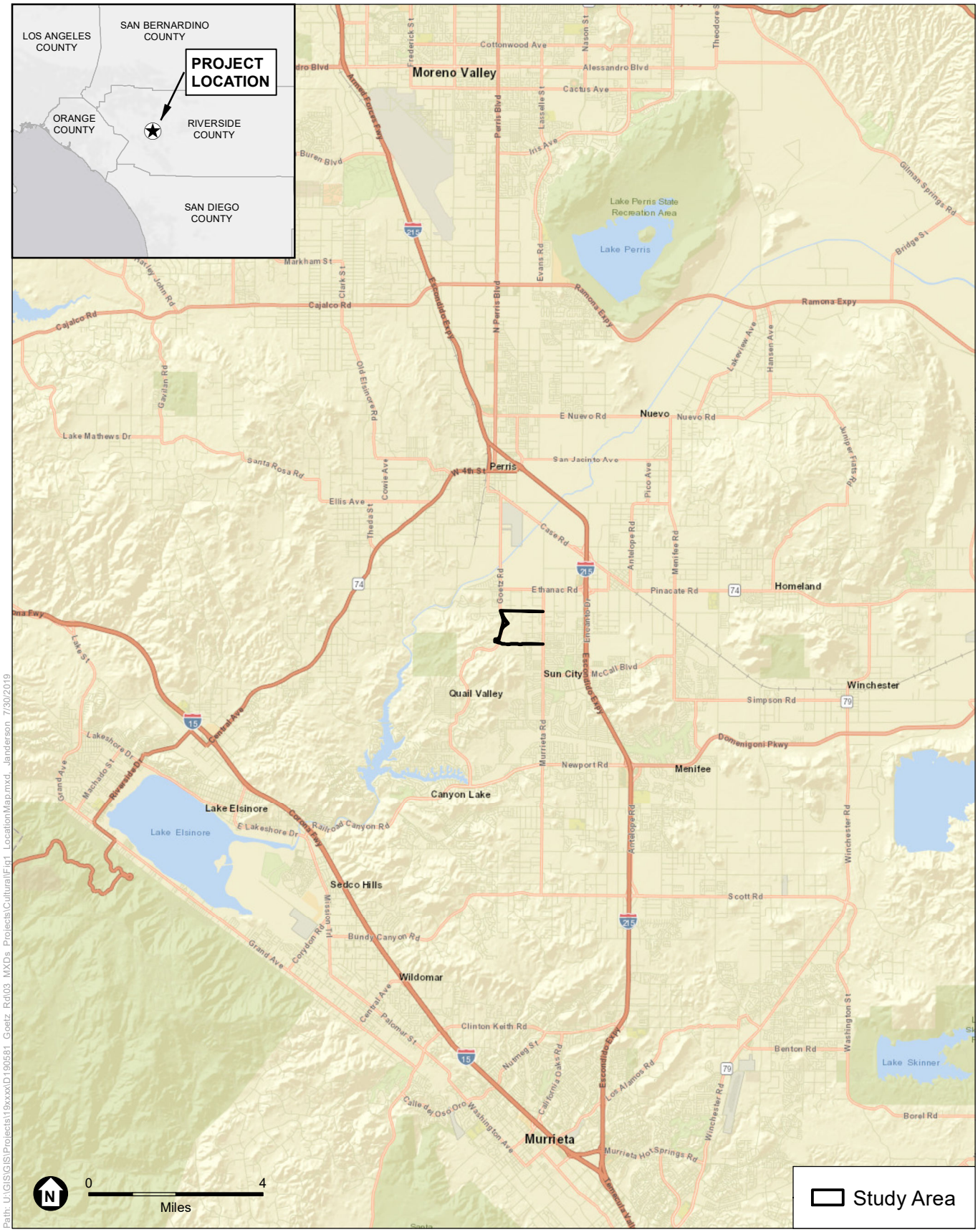
Environmental Science Associates (ESA) has been retained by Eastern Municipal Water District (EMWD) to prepare a Paleontological Resources Assessment in support of an Environmental Impact Report (EIR) for the Goetz Road Potable Water Storage Tank and Transmission Pipeline Project (Project) in the City of Menifee and City of Perris, California. The Project would address a number of deficiencies within EMWD's 1627 pressurized zone, including low pressure, deficient storage, and insufficient pumping capacities. The Project would involve construction and operation of an 8-million-gallon (MG) potable water storage tank at the northwest corner of Sotelo Road and Goetz Road in the City of Perris. A disinfection facility would be constructed adjacent to the storage tank. The Project would also include construction and operation of a 5,490-foot transmission pipeline along Thorton Avenue and proposed rights-of-way in the City of Menifee. The pipeline would connect the storage tank to the existing distribution system within Murrieta Road in the City of Menifee. An alternative pipeline alignment is being considered by EMWD and is included in this assessment. The overall area of permanent disturbance for the tank and disinfection facility would be 2.85 acres. All facilities would be constructed on property owned by EMWD or within planned or existing rights-of-way. EMWD is the lead agency pursuant to the California Environmental Quality Act (CEQA).

EMWD prepared an Initial Study/Mitigated Negative Declaration (IS/MND) for the Project which was released for public review in October 2015. Subsequent to that release, EMWD decided that an EIR would be the most appropriate document to satisfy requirements of the California Environmental Quality Act (CEQA), and released a Notice of Preparation (NOP) in November 2015. The IS/MND was not adopted by the EMWD Board of Directors.

ESA personnel involved in the preparation of this report are as follows: Monica Strauss, M.A., Project Director; Sara Dietler, B.A., Project Manager; Joe D Stewart, Ph.D., report author; and Jessie Lee, GIS specialist. Resumes of key personnel are included in **Appendix A**.

Project Location

The proposed water storage tank and chlorination disinfection facility would be constructed on a 2.85-acre parcel owned by EMWD in the City of Perris. A new transmission pipeline is proposed in the City of Perris near the proposed storage tank, and primarily within the City of Menifee along Thorton Avenue and proposed rights-of-way to connect the existing 1627 transmission pipeline within Murrieta Road. An alternative pipeline alignment located within the rights-of-way of Goetz Road and McLaughlin Road is also included in this analysis. Collectively, these areas makeup the Project area (**Figure 1**). Specifically, the Project area is located in Section 17, 18 and 20 of Township 5 South, Range 3 West, of the Romoland 7.5-minute USGS topographic quadrangle (**Figure 2**).

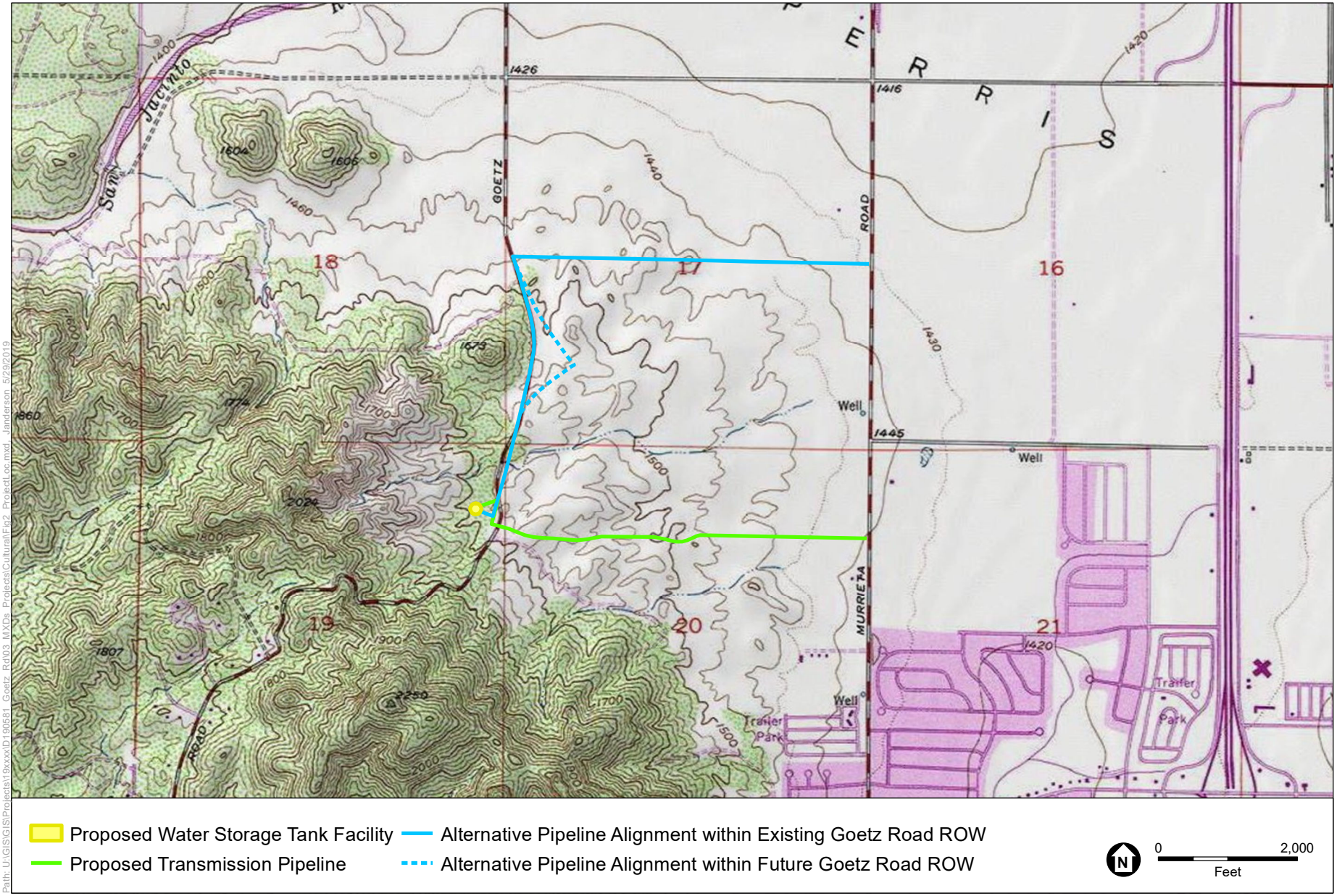


SOURCE: ESRI

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 1
Location Map

ESA



SOURCE: Romoland Topoquad; ESA, 2019.

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 2
Project Location Map

ESA

Project Description

The proposed potable water storage tank would be constructed to store up to 8 MG of potable water on the northwest corner of Goetz Road and Sotelo Road. The tank would be approximately 190 feet in diameter and approximately 42 feet in height above ground. Grading and excavation would be required to construct the tank foundation that would extend approximately 6 feet to 20 feet below ground surface (bgs). The tank would be comprised of pre-stressed concrete, allowing the tank sidewalls to be buried up to 13-feet deep along parts of the tank walls to help conceal the tank from surrounding properties. An on-site chlorination system would be constructed to allow additional treatment to take place. Proposed water storage tank appurtenances include a booster pump to support an internal tank washdown system, a 1-horsepower motor to support water mixing within the tank, an exterior circumferential stairway, lighting, and an antenna tower (40 feet high by 4 feet wide). Additionally, a proposed Southern California Edison (SCE) transformer and meter will be installed on the proposed water storage tank site to power the facility. Due to large predicted storm flows through the site, offsite drainage facilities adjacent to the site that would allow the 100-year storm event to be conveyed around the site without impacting the tank and other site facilities, or creating additional runoff that could impact adjacent properties. Staging areas for construction of the water storage tank and the pipeline alignment would be located within the 2.85-acre tank site.

A 30-inch transmission pipeline would be installed to connect the water storage tank to the existing 1627 pressure zone pipeline on Murrieta Road. The pipeline would be installed entirely within existing and future public rights-of-way along Thornton Avenue, Goetz Road, and Murrieta Road. The pipeline would be approximately 5,490 feet in length and would be installed up to approximately 72 inches bgs. An alternative pipeline alignment located within the rights-of-way of Goetz Road and McLaughlin Road is also being considered by EMWD. Trench width, depth, depth of cover and progress per day estimates are included in **Table 1**. The construction corridor would be wide enough to accommodate the trench and to allow for staging areas and vehicle access.

TABLE 1
TYPICAL PIPELINE CONSTRUCTION REQUIREMENTS AND PROGRESS RATES

Pipeline Size	Depth of Cover Over Pipeline (Feet)	Typical Depth of Excavation[1] (Feet)	Typical Width of Construction Area[2] (Feet)	Typical Rate of Progress[3] (Feet per Day)
Up to 30-inch	4.5 to 6	9 to 10.5	15 to 25	80 to 120

1 The trench would be excavated approximately 0.5-feet below the bottom (invert) of the pipeline for bedding installation. Depths are typical for industry. The actual depth will vary as it highly depends on above ground features, soil conditions, design complexity, appurtenances, number of utilities, and location of utilities.

2 The width noted above is typical and the minimum amount of width necessary based on ideal conditions for construction. The actual width will vary as it highly depends on available space in public rights-of-way, above ground features, property ownership location and type, terrain, alignment location, soil conditions, design complexity, required appurtenances, number of utilities, and location of utilities.

3 The actual progress will vary as it highly depends on soil conditions, traffic conditions, design complexity, appurtenances, number of utilities, and location of utilities.

Operation of the Project would not involve any ground-disturbing activities.

REGULATORY FRAMEWORK

State and Local Regulations

The Regulatory Framework for the Project can be found in the 2015 Cultural Resources Study (see Appendix A) (Rincon Consultants 2015). In addition to the regulations identified in the 2015 Cultural Resources Study, the following includes regulations from the County of Riverside General Plan and the Society for Vertebrate Paleontology and apply to the Project.

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value that are afforded protection under state laws and regulations. The following section summarizes the applicable state laws and local regulations, as well as professional standards provided by the Society of Vertebrate Paleontology (SVP).

Local Regulations

County of Riverside – General Plan

The County of Riverside's General Plan recognizes the CEQA Guidelines Section 15064.5 as a threshold for the identification and protection of historic resources, archaeological and paleontological resources as well as the determination of significant impacts on those resources. In addition, the County's General Plan includes several Multipurpose Open Space policies to reduce or minimize the effects of development on historic, archaeological and paleontological resources (County of Riverside 2015). Among them are:

> OS 19.8. "Whenever existing information indicates that a site proposed for development may contain biological, paleontological, or other scientific resources, a report shall be filed stating the extent and potential significance of the resource that may exist within the proposed development and appropriate measures through which the impacts of development may be mitigated."
>
> OS 19.9. "This policy requires that when existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor grading activities with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate repository, and file a report with the Planning Department documenting and paleontological resources that are found during the course of site grading."

The County of Riverside has provided a paleontological sensitivity map to assist in determining a property's sensitivity. It shows most of the Project area rated low with some High B paleontological sensitivity near the hills. A rating of High B indicates that there is a high likelihood that a project could disturb significant paleontological resources, but that they are a few feet beneath the ground surface.

Society for Vertebrate Paleontology

The SVP has established standard guidelines (SVP, 1995, 2010) that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological resource-specific Laws, Ordinances, Regulations, and Standards (LORS) accept and use the professional standards set forth by the SVP.

As defined by the SVP (1995:26), significant nonrenewable paleontological resources are:

> Fossils and fossiliferous deposits here restricted to vertebrate fossils and their taphonomic and associated environmental indicators. This definition excludes invertebrate or paleobotanical fossils except when present within a given vertebrate assemblage. Certain invertebrate and plant fossils may be defined as significant by a project paleontologist, local paleontologist, specialists, or special interest groups, or by lead agencies or local governments.

As defined by the SVP (1995:26), significant fossiliferous deposits are:

> A rock unit or formation which contains significant nonrenewable paleontologic resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontologic resources are considered to be older than recorded history and/or older than 5,000 years BP [before present].

Based on the significance definitions of the SVP (1995), all identifiable vertebrate fossils are considered to have significant scientific value. This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered to be "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either directly or indirectly disturb or destroy fossil remains. Paleontological sites indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the

entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case (SVP 1995).

Fossils are contained within surficial sediments or bedrock, and are therefore not observable or detectable unless exposed by erosion or human activity. In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside of the study area), a similar geologic unit, or based on whether the unit in question was deposited in a type of environment that is known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts to these resources.

Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources," the SVP (2010:1-2) defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

- **High Potential.** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).

- **Low Potential.** Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

- **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a

qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

- **No Potential.** Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

For geologic units with high potential, full-time monitoring is generally recommended during any project-related ground disturbance. For geologic units with low potential, protection or salvage efforts will not generally be required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontologic potential of the rock units present within the study area.

Paleontological Resources Significance Criteria

Fossils are considered to be significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends 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 interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; 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.

Significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer 2003; Scott et al. 2004).

METHODS AND RESULTS

Archival Research

The Project area was the subject of thorough background research and analysis. The research included a paleontological records search from the Natural History Museum of Los Angeles County (LACM), as well as geologic map and literature reviews. The Project area has also been the subject of a geotechnical study (Converse Consultants 2014).

Geologic Setting

The Project area is located on the Perris Block, a fault-bounded tectonic block within the Peninsular Ranges Physiographic Province. The Peninsular Ranges Province is positioned south of the Transverse Ranges Physiographic Province, west of the Colorado Desert Physiographic Province, and east of the Pacific Ocean. The immediate area is low hills of Mesozoic gabbro and metamorphosed quartz-rich rocks separated by alluvium.

Geologic Map & Literature Review

There is historic disagreement over the surficial geology of the Project area. Morton et al. (2003) map the surficial sediments of the Project area as very old alluvial fan (mid to early Pleistocene). Dibblee (2008) maps all the surrounding surficial sediment as Holocene Quaternary alluvium (Qa). Based on the geotechnical report (Converse Consultants 2014) and survey observation, which will be explored below, the Morton et al., 2003 map of the geology of the Project vicinity is the appropriate mapping and is provided in **Figure 3**.

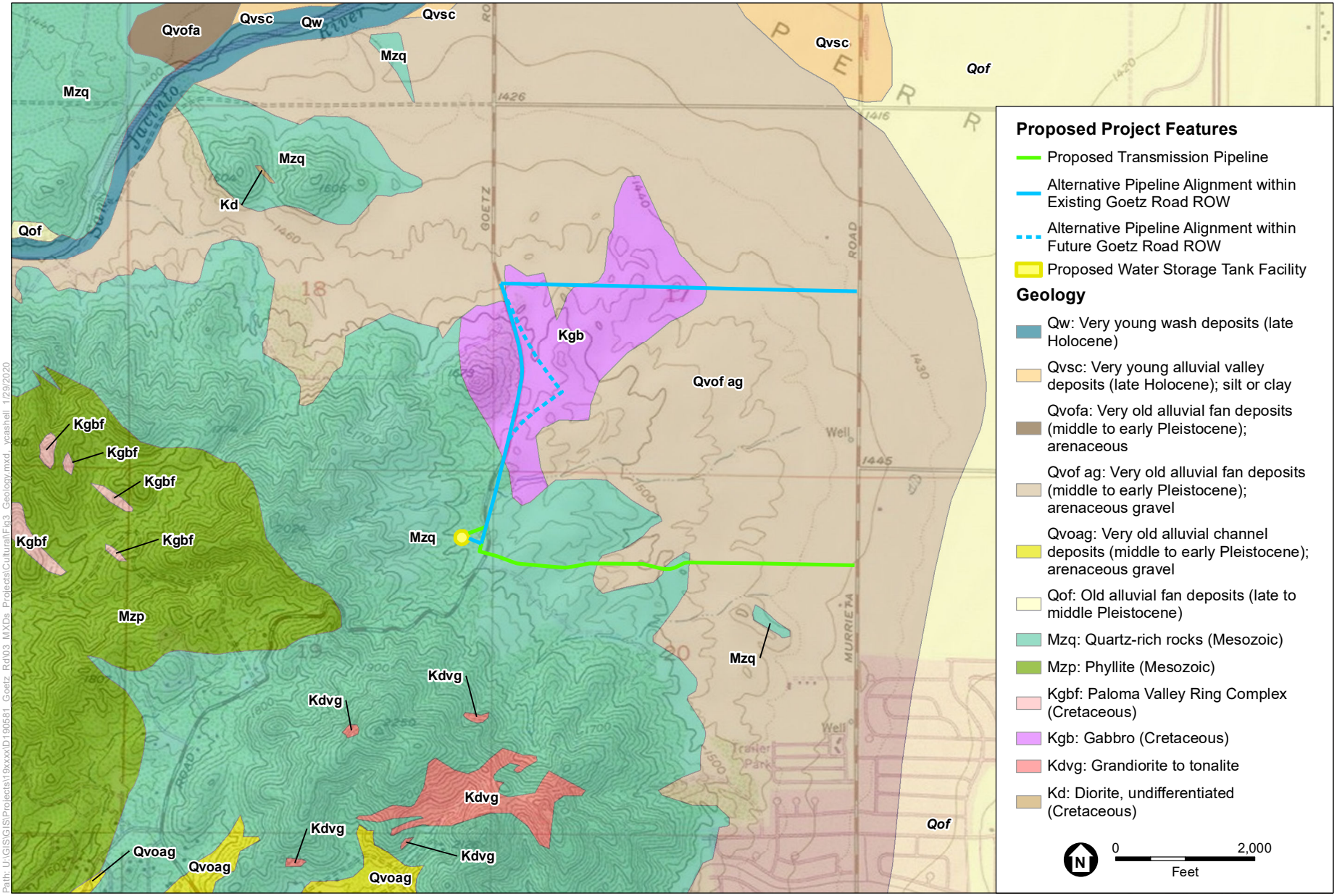
The site is underlain by approximately 3 inches to 5 feet of loose surface soils (Converse Consultants 2014). The surficial soils generally consist of mixtures of silt, sand, and gravel. The surficial soils contain numerous cobbles, and scattered boulders up to approximately 18 inches in size. These thick surficial soil deposits were encountered along the northwest side of the site (Converse Consultants 2014). The soil thins to the west, and is absent in some areas along the western boundary of the proposed 2.85-acre water storage tank site.

The surficial site soils are underlain by a fine to coarse-grained meta-sandstone bedrock to the maximum depth explored of 7.5 feet below ground surface (bgs). The bedrock is intensely weathered near the surface and becomes less weathered with depth. The bedrock is exposed at the surface in the shallow slope along the western boundary of the proposed 2.85-acre water storage tank site.

The compendia of Pleistocene vertebrate fossil localities in California (Jefferson 1991a, 1991B) do not list any sites from the Perris/Menifee area. Diamond Alley Reservoir is located approximately six miles east of the Project area. Construction of that reservoir produced hundreds

of vertebrate fossils ((Anderson et al. 2002; Springer and Scott 1994; Springer et al. 1998, 1999, 2009)

Recent discoveries in Riverside County indicate that Pleistocene fossil soils (paleosols) contain vertebrate fossils in some locations in and near Riverside County (Stewart et al. 2012; Raum et al. 2014). There are no published findings of fossils from paleosols in the Perris area, however, Pleistocene paleosols have been observed by the author in other locations within Riverside and San Bernardino Counties including, Menifee, Grand Terrace (San Bernardino County), and Moreno Valley. No definite paleosols were seen in the pedestrian survey for this Project, but the possibility exists that they could encountered during ground disturbance.



SOURCE: USGS 7.5' Topo Quad Romoland 1976, 1980; USGS National Geologic Map Database

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 3
Geology

ESA

Natural History Museum of Los Angeles County Records Search

On May 30, 2019, ESA requested a database search from the LACM for records of fossil localities in and around the Project area. The purpose of the museum records search was to: (1) determine whether any previously recorded fossil localities occur in the Project area, (2) assess the potential for disturbance of these localities during construction, and (3) evaluate the paleontological sensitivity in the Project area. The records search returned no known localities within the Project area, however a number of vertebrate fossils are known from similar sedimentary deposits in the vicinity (McLeod 2019). The LACM has records of vertebrate fossil localities in late Pleistocene sediments (Older quaternary alluvium) near Railroad Canyon Reservoir and Lake Elsinore. These localities produced horse (*Equus* sp.) and camel (*Camelops hesternus*) fossils (McLeod 2019).

Paleontological Sensitivity Analysis

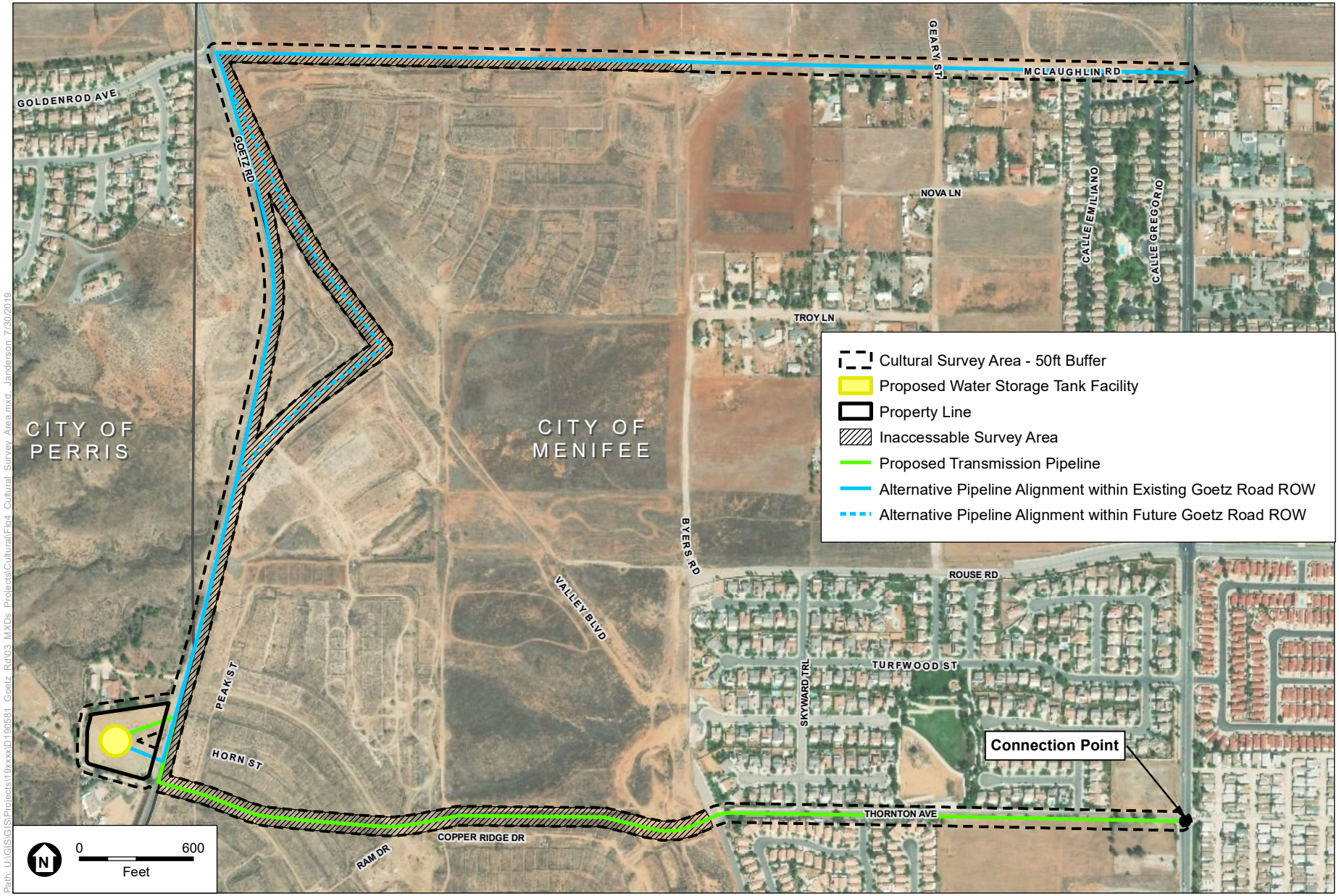
The review of the scientific literature and geologic mapping, as well as the records search from the LACM, was used to assign paleontological sensitivities following the guidelines of the SVP (1995, 2010) to the geologic units that are present at the surface or in the subsurface of the Project area and will be impacted by ground-disturbing activities associated with the Project:

- **Very old alluvial fan deposits (Qvof) –** Surficial sediments; **high sensitivity**, increasing with depth. These potential fossils include a wide variety of Ice Age animals.
- **Quartz-rich rocks (Mesozoic) (Mzq) –** Surface and subsurface, **low sensitivity.** Morton et al. (2003) describe them as quartzite and quartz-rich metaquartzite. As these are altered sedimentary rocks, their potential for paleontological resources is slight.
- **Gabbro (Cretaceous) (Kgb)** – Surface and subsurface, no potential. Gabbro is an igneous rock and has no potential to produce paleontological resources.

Pedestrian Survey

An updated paleontological resources survey of the Project area was conducted on June 13, 2019 by ESA paleontologist Joe Stewart, Ph.D. The objective was to identify paleontological resources within the Project area, plus a 50-foot buffer. Areas with visible ground surface were subject to pedestrian survey using transect intervals spaced no more than 5 meters (approximately 15 feet) apart. Survey coverage is shown in **Figure 4**. Areas not surveyed include private property/inaccessible areas as noted on Figure 4 where access was not obtained. No subsurface investigation was performed as part of the survey.

The Project area includes minor areas of artificial fill, and some disturbed areas. In general, the alluvium is a dark red, indicating intense weathering with consequent oxidation of iron in the sediments. No *in situ* pedogenic carbonates were detected; these would have indicated the presence of a paleosol. This heavily weathered state disproves the mapping of these sediments as Holocene alluvium (Dibblee 2008). Thus, the mapping of Morton *et al.* (2003) is the one adopted for this report and shown on Figure 3. No paleontological resources were observed in the alluvium.



Path: U:\GIS\GIS\Projects\19xxxx\D190581_Goetz_Rd\03_MXDs_Projects\Cultural\Fig4_Cultural_Survey_Area.mxd, Janderson, 7/30/2019

SOURCE: ESRI, 2019; ESA, 2019.

Goetz Road Potable Water Storage Tank and Transmission Pipeline Project

Figure 4
Survey Area Map

ESA

CONCLUSIONS AND RECOMMENDATIONS

This study concluded that the surficial sediments underlying the Project area, identified as Very old alluvial fan deposits (Qvof), have a high sensitivity. The proposed Project features to be constructed within these sediments include portions of the proposed transmission pipeline and the alternate pipeline alignment (see Figure 4). The trenching for the pipelines could occur up to depths of 10.5 feet and could encounter paleontological resources in the Qvof alluvial fan sediments.

Portions of the proposed alternative pipeline alignment would be installed within the gabbro bedrock. The gabbro bedrock is an igneous unit, and has no potential to produce paleontological resources. Therefore, no mitigation measures are proposed in these sediments.

The proposed water storage tank would be located within the Mesozoic sediment at depths up to 20 feet below ground surface, with blasting activities possible as well. The quartz-rich bedrock of Mesozoic age altered and have a low potential to produce paleontological resources. As a result, no mitigation measures are proposed in these sediments.

The following recommendations are made and would serve to reduce impacts identified above to unique paleontological resources or unique geological feature to a less than significant level:

1. A qualified paleontologist meeting the Society of Vertebrate Paleontology (SVP) Standards (SVP 2010) (Qualified Paleontologist) shall be retained prior to the approval of demolition or grading permits to produce a Paleontological Resource Monitoring and Mitigation Plan for the Project. The Plan shall include monitoring specifications based on location and sediments within the Project Site and the type of ground disturbance planned for each portion of the alignment. The plan will also include mapping of the alignment to visually highlight the locations requiring monitoring. The plan will further identify locations for sediment sampling and procedures for communication and collection and recordation protocol of findings. The Qualified Paleontologist shall provide technical and compliance oversight of all work as it relates to paleontological resources, shall attend the Project kick-off meeting and Project progress meetings on a regular basis, and shall report to the Project area in the event potential paleontological resources are encountered.

2. The Qualified Paleontologist shall conduct construction worker paleontological resources sensitivity training prior to the start of ground disturbing activities (including vegetation removal, pavement removal, etc.). In the event construction crews are phased, additional trainings shall be conducted for new construction personnel. The training session shall focus on the recognition of the types of paleontological resources that could be encountered within the Project area and the procedures to be followed if they are found. Documentation shall be retained by the Qualified Paleontologist demonstrating that the appropriate construction personnel attended the training.

3. Paleontological resources monitoring shall be performed by a qualified paleontological monitor (meeting the standards of the SVP 2010) under the direction of the Qualified Paleontologist within the Qvof alluvial fan sediments as described and mapped in the monitoring and mitigation plan. Paleontological resources monitoring shall be conducted for all ground disturbing activities in previously undisturbed alluvial fan sediments. Sediment

samples shall be tested for the presence of microvertebrate fossils. However, depending on the conditions encountered, full-time monitoring within these sediments can be reduced to part-time inspections or ceased entirely if determined adequate by the Qualified Paleontologist. The Qualified Paleontologist shall spot check the excavation on an intermittent basis and recommend whether the depth of required monitoring should be revised based on his/her observations. Monitors shall have the authority to temporarily halt or divert work away from exposed fossils or potential fossils. Monitors shall prepare daily logs detailing the types of activities and soils observed, and any discoveries.

4. Any significant fossils collected during project-related excavations shall be prepared to the point of identification and curated into an accredited repository with retrievable storage. The Qualified Paleontologist shall prepare a final monitoring and mitigation report for submittal to EMWD in order to document the results of the monitoring effort and any discoveries. If there are significant discoveries, fossil locality information and final disposition will be included with the final report which will be submitted to the appropriate repository and EMWD.

REFERENCES

Anderson, R. S., M. J. Power, S. J. Smith, K. B. Springer, and E. Scott. 2002. Paleoecology of a Middle Wisconsin deposit from the southern California Quaternary Research 58:310-317.

Converse Consultants. 2014. Geotechnical Investigations Report: 10 to 12.5 million Gallon Goetz Road Water Storage Tank 2.88 acre site Northwest of Goetz Road and Sotelo Road, City of Perris, Riverside, CA. Prepared for: Eastern Municipal Water District, 2270 Trumble Road, P.O. Box 8300, Perris, CA 92572. Prepared by: Converse Consultants, 1039 Corporate Drive, Redlands, CA 92374.

Dibblee., T. W. 2008. Geologic map of the Murrieta 15 minute quadrangle, Riverside County. California. Dibblee Geological Foundation Map DF-417. Scale 1:62,500.

Jefferson, G.T. 1991a. A catalogue of Late Quaternary Vertebrates from California: Part One, nonmarine lower vertebrate and avian taxa. Natural History Museum of Los Angeles County Technical Reports No. 5.

Jefferson, G.T. 1991b. A catalogue of Late Quaternary Vertebrates from California: Part Two, Mammals. Natural History Museum of Los Angeles County Technical Reports No. 7.

McLeod, S. 2019. Re: Vertebrate Paleontology Records Check for paleontological resources for the proposed Goetz Road Potable Water Storage Tank and Transmission Pipeline Project, in the City of Perris, Riverside County, project area. Letter response to Vanessa Ortiz. June 13, 2019.

Morton, D. M., K. R. Bovard, and G. Morton. 2003. Geologic Map and digital database of the Romoland 7.5' quadrangle, Riverside County, California. U.S. Geological Survey Open-File Report 2003:102. Scale 1:24,000.

Raum, J., G. I. Aron, and R. E. Reynolds. 2014. Vertebrate fossils from Desert Center, chuckwalla Valley, California. California State University Desert Symposium Proceedings 2014:68-70.

County of Riverside. 2015. General Plan, Multipurpose Open Space Element (OS). Electronically available at: https://planning.rctlma.org/Portals/14/genplan/general_Plan_2017/elements/OCT17/Ch05_MOSE_120815.pdf?ver=2017-10-11-102103-833

Scott, E. and K. Springer. 2003. CEQA and Fossil Preservation in California. The Environmental Monitor.

Scott, E., K. Springer, and J. C. Sagebiel. 2004. Vertebrate paleontology in the Mojave Desert: the continuing importance of "follow-through" in preserving paleontologic resources. *In* The human journey and ancient life in California's deserts: Proceedings from the 2001 Millennium Conference. Ridgecrest: Maturango Museum Publication 15: 65-70.

Society of Vertebrate Paleontology (SVP). 1995. Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines. Society of Vertebrate Paleontology News Bulletin 163:22-27.

Society of Vertebrate Paleontology (SVP). 2010. Standard procedures for the assessment and mitigation of adverse impacts to paleontological resources. Available at: http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx Accessed July 5, 2019.

Springer, K. B., and E. Scott. 1994. F First record of late Pleistocene vertebrates from the Domenigoni Valley, Riverside County, California. Journal of Vertebrate Paleontology 14:47A.

Springer, K. B., E. Scott. L. Murray, and W. G. Spaulding. 1998. Partial skeleton of a large individual of Mammut *americanum* from the Domenigoni Valley, Riverside County, California. Journal of Vertebrate Paleontology 18:78A.

Springer, K. B., E. Scott. J. D. Sagebiel, and K. M. Scott. 1999. A late Pleistocene lake edge vertebrate assemblage from the Domenigoni Valley, Riverside County, California. Journal of Vertebrate Paleontology 19:77A.

Springer, K. B., E. Scott. J. D. Sagebiel, and L. K. Murray. 2009. The Diamond Valley Lake Local Fauna: late Pleistocene vertebrates from inland southern California. Pp. 217-235 In: L. Albright III (ed.), Papers on Geology, Vertebrate Paleontology, and Biostratigraphy in Honor of Michael O. Woodburne. Museum of Northern Arizona Bulletin 66.

Stewart, J. D., and M. E. Hakel. 2016. Pleistocene paleosol developed on ancestral Mojave River sediments near Hinkley, California. PaleoBios 33 Supplement: 15.

Stewart, J. D., and M. E. Hakel. 2017. First record of vertebrate fossils in the Searles Basin in another desert paleosol. California State University Desert Symposium Proceedings 2017:341

Stewart, J. D., and M. E. Hakel. 2019. The first Pleistocene paleosol vertebrate fossils in Ridgecrest, Kern County, CA. Desert Symposium Proceedings 2019:204-205.

Stewart, J. D., M. Williams, M. Hakel, and S. Musick. 2012. Was it washed in? New evidence for the genesis of Pleistocene fossil vertebrate remains in the Mojave Desert of southern California. California State University Desert Symposium Proceedings 2012:140-143.

APPENDIX A

Personnel Qualifications

Sara Dietler

Senior Cultural Resources Specialist

EDUCATION

BA. Anthropology, San Diego State University

20 YEARS OF EXPERIENCE

CERTIFICATIONS/ REGISTRATION

California BLM Permit, Principal Investigator, Statewide

Nevada BLM Permit, Paleontology, Field Agent, Statewide

PROFESSIONAL AFFILIATIONS

Society for American Archaeology (SAA)

Society for California Archaeology (SCA)

Sara is a senior archaeology and paleontology lead with 20 years of experience in cultural resources management in Southern California. As a senior project manager, she manages technical studies including archaeological and paleontological assessments and surveys, as well as monitoring and fossil salvage for many clients, including public agencies and private developers. She is a cross-trained paleontological monitor and supervisor, familiar with regulations and guidelines implementing the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), and the Society of Vertebrate Paleontology guidelines. She has extensive experience providing oversight for long-term monitoring projects throughout the Los Angeles Basin for archaeological, Native American, and paleontological monitoring compliance projects and provides streamlined management for these disciplines.

Relevant Experience

San Pedro Plaza Park, San Pedro, Los Angeles, CA. *Senior Cultural Resources Project Manager.* Provided archaeological and paleontological monitoring support for the San Pedro Plaza Park Project. The project area is located in the City of Los Angeles port district of San Pedro, approximately 26 miles south of downtown Los Angeles for the City of Los Angeles, Bureau of Engineering, Environmental Management Group, Sara provided quality control oversight for the archaeological and paleontological mitigation. During monitoring on the project, archaeological materials were recovered include refuse associated with park use since it opened in 1889, and historic building debris likely associated with the Carnegie Library which formerly stood on site. Provided recommendations for commemoration and protection of the find.

City of Los Angeles Department of Public Works BOE, Alameda Street Widening Between Harry Bridges Boulevard and Anaheim Street Project, Los Angeles, CA. *Project Manager.* The project included upgrades to Alameda Street and adjoining streets with improved infrastructure to accept increased traffic from existing and proposed projects located primarily within the Port of Los Angeles and the Wilmington Industrial Park and to adequately deal with storm flows. Conducted a CHRIS record search of the project area for archaeological and paleontological resources and produced technical documents regarding the findings and recommendations for construction activities during the proposed project. In addition, provided archaeological/paleontological monitoring for geotechnical testing and further recommendations based on the results of the testing. Sara provided senior oversight of the reporting and survey and served as project manager.

Long Beach Courthouse Project; Long Beach, CA. *Senior Project Archaeologist and Project Manager.* Under contract to Clark Construction Sara directed the

paleontological and archaeological monitoring for the construction of the New Long Beach Courthouse. She supervised monitors inspecting excavations up to 25 feet in depth. Nine archaeological features were recovered. Sara completed an assessment of the artifacts and fossil localities in a technical report at the completion of the project.

Venice Dual Force Main Project, Venice, CA. *Cultural Resources Lead.* The Venice Dual Force Main Project is an $88 million sewer force main construction project spanning 2 miles within Venice, Marina del Rey, and Playa del Rey. Contracted to Vadnais Trenchless Services and reporting to the City of Los Angeles, Bureau of Engineering, Environmental Management Group, ESA is serving as the project's environmental resource manager. Sara provides quality control oversight for the archaeological and paleontological mitigation.

Advanced Water Treatment Facility Project Groundwater Reliability Improvement Project, Pico Rivera, CA. *Project Manager.* ESA is providing environmental compliance monitoring for the Water Replenishment District to ensure compliance with the conditions contained in the Mitigation and Monitoring Reporting Programs associated with three environmental documents, including the Final EIR, a Mitigated Negative Declaration, and a Supplemental EIR, pertaining to three infrastructure components associated with the project. ESA provides general compliance monitoring at varying rates of frequency depending on the nature of the activities and is sometimes on-site for 4-hour spot checks and other times for full 24-hour rotations. The project is located near a residential neighborhood and adjacent the San Gabriel River. Issues of concern include noise, vibration, night lighting, biological resources, cultural resources, and air quality. Sara provides quality assurance and oversight of the field monitoring, and day-to-day response to issues. She oversees archaeological and Native American monitoring for ground disturbance and coordinates all sub-consultants for the project. She provides daily, weekly, and quarterly reporting on project compliance to support permitting and agency oversight.

Southern California Edison On-Call Master Services Agreement for Natural and Cultural Resources Services; *Cultural Resources Task Manager*. Sara provides project management and senior archaeological support for an on-call Master Services Agreement with Southern California Edison for cultural and natural resources consulting services. This contract has included numerous surveys and monitoring projects for pole replacements and small- to mid-size reconductoring projects, substation maintenance, and construction projects. Sara has served as project manager for more than 25 projects under this contract. She is the go-to person for all water, gas, and power projects occurring in the city of Avalon on Santa Catalina Island. Sara is responsible for oversight of archaeological and paleontological monitors, serving as report author and report manager.

Scattergood Olympic Transmission Line, Los Angeles, CA. *Report Author*. The Los Angeles Department of Water and Power is proposing to construct and operate approximately 11.4 miles of new 230 kilovolt (kv) underground transmission line that would connect the Scattergood Generation Station and Olympic Receiving Station. The project includes monitoring of construction

activities occurring in street rights-of-way. Sara is providing final reporting for the long-term monitoring and QA/QC of the field data.

ESA PCR

JD Stewart, PhD

Paleontologist

EDUCATION

Ph.D., Systematics & Ecology, University of Kansas

M.A., Systematics and Ecology, University of Kansas

B.A. Degree, Biology, University of Kansas,

30 YEARS EXPERIENCE

PROFESSIONAL AFFILIATIONS

Society of Vertebrate Paleontology

Research Associate, Natural History Museum of Los Angeles County

J. D. Stewart has more than 40 years of experience in the field of paleontology, with 30 years of experience in California. He has authored or co-authored 40 peer-reviewed articles for scientific journals and books. Within these, he has authored or co-authored descriptions of three new genera and three new species.

He is a recognized authority on fossil fishes of Cretaceous rocks of North America and Cenozoic rocks of the western coast of North America. As a result, Dr. Stewart is often called upon to identify paleontological and archaeological specimens. He has served as expert witness for the U.S. Department of Justice.

Relevant Experience

Dr. Stewart has extensive experience finding and excavating fossils for county, state, and provincial institutions. His field work includes projects in cooperation with the U.S. Bureau of Land Management, National Parks Service, U.S. Army Corps of Engineers, U.S. Navy, U. S. Department of Energy, Federal Aviation Administration, California Energy Commission, Caltrans, and California State Parks. The Bureau of Land Management's national website features one of his excavations from 2004. He has supervised monitoring of construction activity in numerous California counties and municipalities. In addition to fieldwork, he has experience in the supervision of preparators, surveyors, curatorial assistants, and excavators. He also has extensive experience preparing fossils, and has processed, recovered, and identified thousands of microvertebrate fossils.

Path 15 500 kV Power Transmission Line Between Los Banos and Gates substations, Merced and Fresno Counties, CA. Dr. Stewart supervised paleontological monitoring during construction of an 80-mile, high-voltage transmission line in the San Joaquin Valley. Dr. Stewart's team located an extensive bonebed in Middle Miocene sediments, dating back approximately 15 million years. Dr. Stewart and his team excavated and prepared over 1,200 vertebrate fossils, deposited them at the University of California Museum of Paleontology, and preserved the site for future research. They also discovered a smaller bonebed of late Miocene age (ca. 7 million years). As a result of his diligent analysis, the project schedule was maintained and there were no delays in construction.

Heritage Fields/Great Park Paleontological Review, Orange County, CA. Dr. Stewart conducted Phase I and II paleontological assessments at the Heritage Fields / Great Park in Orange County, California where he and his team discovered significant portions of a Miocene-aged (15 million years ago) whale fossil, and a Pleistocene microvertebrate fauna dating to before 28,000 years ago.

Calnev Pipeline Project, San Bernardino County, CA, and Clark County, NV. Directed paleontological survey of 234-mile long project area in San Bernardino County, California and Clark County, Nevada and wrote the paleontological assessment.

Starwood-Midway Peaking Power Plant Project, Fresno County, CA Dr .Stewart wrote the paleontological resources section of the Application for Certification, wrote the mitigation plan for paleontological resources, supervised monitoring for paleontological resources, and wrote the paleontological resources final report.

BrightSource Rio Mesa Solar Electric Generation Facility Project, Riverside County, CA. Dr. Stewart supervised a survey of 1,850 acres for paleontological resources, supervised excavations, documented tortoise eggshells ranging in age from 14,000 to 44,000 years, identified the fossils, and wrote the final report.

Marsh Landing Generating Station, Contra Costa County, CA. Dr. Stewart wrote the paleontological resources section of the Application for Certification, wrote the mitigation plan for paleontological resources, supervised monitoring for paleontological resources, and wrote the paleontological resources final report.

SR-91 Corridor Improvement Project, Riverside County, CA. Dr. Stewart **w**rote the Paleontological Mitigation Plan, supervised paleontological monitoring and mitigation of construction activities, supervised preparation of the fossils, and wrote the final report.

Downs Project, Kern and San Bernardino Counties, CA. Dr Stewart supervised the monitoring for paleontological resources during this pole replacement and substation upgrade project. He also wrote the final report. Pleistocene vertebrate fossils were recovered on the west side of Searles Lake and they date to around 15,000 years ago.

Newport Bay Mesa at East Bluff Drainage Repair Project, Newport Beach, CA. Dr. Stewart wrote the paleontological resource monitoring and mitigation plan, supervised the monitoring for paleontological resources, supervised the processing of more than 6,000 pounds of sediment, identified the fossils, and wrote the final report.

North Shore Solar Facility Project, City of Mecca, Riverside County, CA. Dr. Stewart supervised the monitoring of construction activities for paleontological resources. He also identified the recovered fossils and wrote the final report.

APPENDIX B

Record Search Results (Confidential)