PALEOSERVICES
SAN DIEGO NATURAL HISTORY MUSEUM

Paleontological Resources Technical Report

LS Power Grid California
Power the South Bay
Cities of Fremont, Milpitas, Santa Clara, and San José, California

January 31, 2024

Prepared for:

LS Power Development, LLC
Chesterfield, Missouri

Under contract to:

kp environmental
1038 Dewitt Avenue
Encinitas, California 92024

Prepared by:

Department of PaleoServices
San Diego Natural History Museum
P.O. Box 121390
San Diego, California 92112-1390

Katie M. McComas, M.S., Paleontological Report Writer & GIS Specialist
Thomas A. Deméré, Ph.D., Principal Paleontologist

the nat | SAN DIEGO NATURAL HISTORY MUSEUM

Executive Summary

This Paleontological Resources Technical Report was prepared for the proposed LS Power Grid California ("LS Power"), Power the South Bay project ("Proposed Project"), located in the cities of Fremont, Milpitas, Santa Clara, and San José, California. The purpose of this report is to identify and summarize existing conditions of paleontological resources that potentially occur within the Proposed Project area, identify individual Proposed Project construction elements that may negatively impact paleontological resources, and provide recommendations to minimize any potential negative impacts.

The Proposed Project includes the construction of two new high-voltage direct-current (HVDC) converter terminals ("HVDC terminal") and associated transmission lines between the existing Silicon Valley Power's (SVP) Northern Receiving Station (NRS) substation and the existing Pacific Gas and Electric Company's (PG&E) Newark substation.

The Proposed Project site lies within the Santa Clara Valley, a depositional basin receiving sediment derived primarily from erosion of the Santa Cruz Mountains to the west and south, with minor amounts of sediment derived from the Diablo Range to the northeast, and opening to the northwest into the south end of San Francisco Bay. Based on published geologic mapping, the Proposed Project area is underlain at the surface by artificial fill and an assortment of Holocene-age alluvial, fluvial, and estuarine deposits. Based on published literature, the Holocene-age alluvial and fluvial deposits in the Santa Clara Valley transition at relatively shallow depths into older Pleistocene-age alluvial deposits.

The results of the paleontological records searches and literature review indicate that one documented fossil collection locality lies within a one-mile radius of the Proposed Project. At this locality (UCMP V4916), an upper molar of *Bison* sp. was discovered at a depth of two feet below ground surface (bgs) west of Milpitas near the Coyote Creek channel—however, the age of this occurrence is described as "Recent or Pleistocene" and is therefore only tentatively included here. The nearest recorded confirmed Pleistocene vertebrate fossil localities are located approximately 0.8 miles southeast of the US 101/Lawrence Expressway interchange (UCMP V91128) and along the Guadalupe River north of the San José Mineta International Airport (UCMP V99597 and UCMP V99891). UCMP V91128 was discovered in "sandy gravel deposits 15 feet above sea level and nine feet below the modern surface" during residential construction, and produced a partial pelvis of a mammoth (*Mammuthus* sp.) (Maguire and Holroyd, 2016, p. 2). UCMP V99597 and UCMP V99891 produced a partial skull and skeletal elements of a juvenile mammoth (*Mammuthus columbi*) and dental and skeletal elements of a variety of land mammals (extinct horse *Equus* sp., extinct pronghorn *Capromeryx?*, extinct camel *Camelops* sp., extinct bison *Bison* sp., Harlan's ground sloth [*Paramylodon harlani*], and an unidentified proboscidean). Additional Pleistocene-age vertebrate fossils have been documented in other locations within the Santa Clara Valley at depths as shallow as seven feet bgs.

Following the paleontological potential criteria developed by the Society of Vertebrate Paleontology, Pleistocene-age alluvial deposits are assigned a high paleontological potential, while Holocene-age alluvial and fluvial deposits are assigned a low paleontological potential, and artificial fill is assigned no paleontological potential. Accordingly, any Proposed Project-related earthwork that extends greater than approximately seven feet bgs has the potential to impact paleontological resources preserved within Pleistocene-age alluvial deposits. Development and implementation of a project-specific Paleontological Resources Mitigation and Monitoring Plan (PRMMP), as outlined in APM PALEO-1, is recommended to mitigate potentially adverse impacts to paleontological resources through the recovery and conservation of any fossils that are unearthed during construction. In addition, APM PALEO-2 is provided to address possible inadvertent fossil discoveries made during construction.

Contents

1.0 Introduction

1.1 Proposed Project Description

LS Power Grid California, LLC ("LS Power"), a designated California Public Utility, is proposing the Power the South Bay Project ("Proposed Project"). The Proposed Project includes the construction of two new high-voltage direct-current (HVDC) converter terminals ("HVDC terminal") and associated transmission lines between the existing Silicon Valley Power's (SVP) Northern Receiving Station (NRS) substation and the existing Pacific Gas and Electric Company's (PG&E) Newark substation. The Proposed Project is located in the Cities of Fremont, Milpitas, Santa Clara, and San José, California (Figure 1).

Proposed Project components are described below and depicted in Figure 2.

1.1.1 HVDC Terminals

The northern HVDC terminal site is the proposed Albrae terminal, which is located north of Weber Road and west of Boyce Road, approximately 0.8 miles west of Interstate 880 (I-880). Specifically, the proposed Albrae terminal site consists of approximately 7 acres and is located adjacent to PG&E property, approximately 0.2 miles northeast of the Newark substation.

The southern HVDC terminal site is the proposed Baylands terminal, which is located approximately 0.5 miles north of State Route 237 (SR-237), approximately 1.8 miles west of I-880, and approximately 1.77 miles northeast of the existing SVP NRS substation. Specifically, the proposed Baylands terminal consists of approximately 9.3 acres and is located south of Los Esteros Road, west of the San José-Santa Clara Regional Wastewater Facility.

The proposed HVDC terminals (the Albrae and Baylands Terminals) would convert AC to DC and the reverse. To facilitate this conversion, each new HVDC terminal would include Voltage Source Converter (VSC) HVDC equipment, an AC switchyard using gas-insulated switchgear (GIS) in a breaker-and-a-half (BAAH) configuration, and three singe phase transformers (and one on-site spare).

All major HVDC terminal equipment (e.g., VSC HVDC equipment, GIS, power transformers, cooling equipment, etc.) would be installed on concrete foundations. Foundations are planned to be a combination of deep, reinforced drilled shaft foundations and slab foundations with spread footings. Below-ground work would include the construction of the foundations for the substation equipment and oil containment for transformers. The depth of ground disturbance is anticipated to be up to 50 feet below ground surface (bgs) for the substation equipment (drilled shafts) foundations.

Work areas for the two HVDC terminals would be confined to the terminal property boundaries. During construction, the terminals would be secured with fencing similar to the staging yards. The terminal sites would also be utilized for construction staging and laydown, as needed (refer to description of laydown yards provided below in Section 1.1.5).

The main components of the two proposed HVDC terminals are described below.

Albrae Terminal

The proposed Albrae terminal would be constructed adjacent to the north of the PG&E property, approximately 0.2-miles from the Newark substation within a 7-acre site (portion of Assessor Parcel Number [APN] 531-165-38-4) that would be owned by LS Power. Construction of the Albrae terminal would permanently disturb approximately 5.8 acres of the 7-acre site. The proposed Albrae terminal would include 230 kV GIS, bus-work, and termination equipment as well as three single-phase 230 kV transformers with an on-site spare.

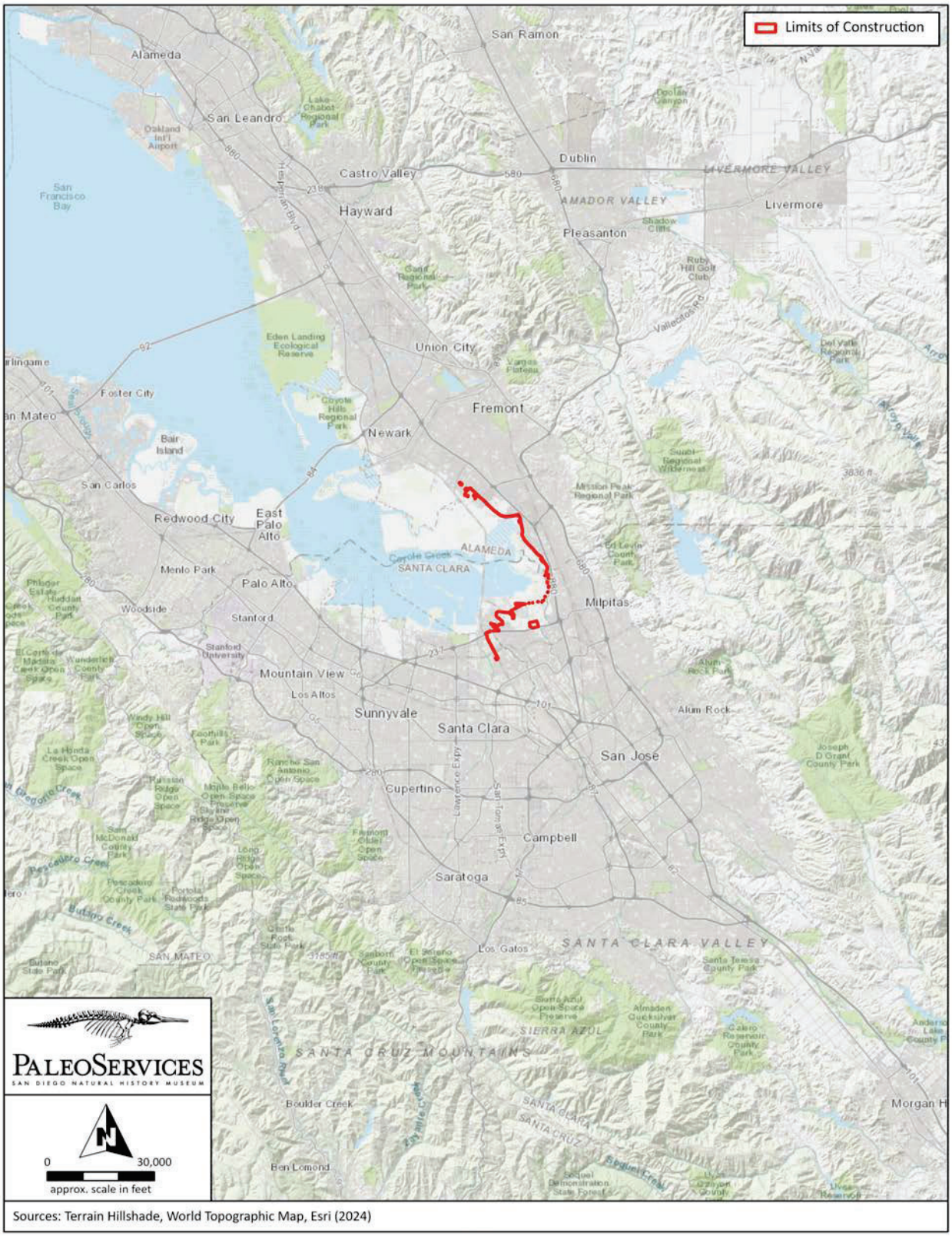

Figure 1. Proposed Project overview map.

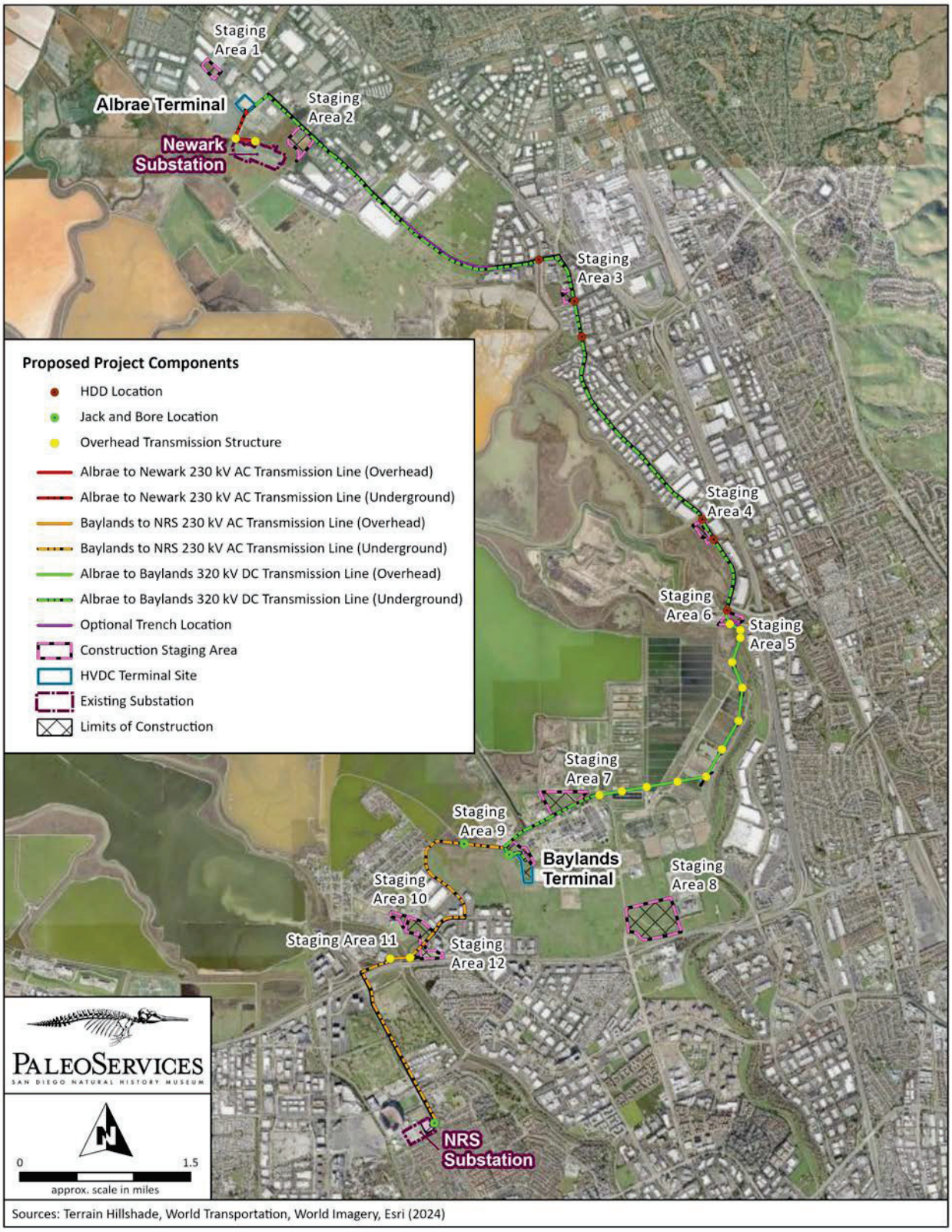

Figure 2. Proposed Project detail map.

The new Albrae terminal would be interconnected with the existing PG&E Newark substation via an approximately 0.2-mile new overhead 230 kV transmission line, the majority of which would be located on PG&E-owned land. In order to facilitate the 230 kV transmission line PG&E would need to move existing structures within their property to accommodate the new connection. Additionally, to provide a point of interconnection for the new 230 kV transmission line, PG&E needs to add electrical infrastructure to support the termination of the new transmission line within the existing Newark substation. Within the existing Newark substation, PG&E would add a new 230 kV bay with the associated grounding, conduits and wiring, foundations, support structures, bus work, breakers, disconnect switches, jumpers, and protection and control equipment to the existing 230 kV substation yard.

Baylands Terminal

The proposed Baylands terminal would be constructed approximately 1.8 miles northeast of the existing SVP NRS substation within a 9.3-acre site (APN 015-31-063) that would be leased by LS Power. Construction of the Baylands substation would permanently disturb the entirety of the approximately 9.3-acre site. The proposed Baylands substation would include 230kv GIS, bus-work, and termination equipment as well as three single-phase 230 kV transformers with an on-site spare.

To provide a point of interconnection for the new 230 kV transmission line, SVP needs to add electrical infrastructure to support the termination of the new transmission line within the NRS substation. SVP would add a new 230 kV bay with the associated grounding, conduits and wiring, foundations, support structures, bus-work, breakers, disconnect switches, jumpers, and protection and control equipment to the existing 230 kV substation yard.

1.1.2 Transmission Lines

The proposed Albrae to Baylands 320 kV DC transmission line is located within the Cities of Fremont, Milpitas, and San José, and would connect the new Albrae terminal to the new Baylands terminal. The underground portion of this transmission line would be located within existing roadways including Weber Road, Boyce Road, Cushing Parkway, Fremont Boulevard, McCarthy Boulevard, and Los Esteros Road. The overhead portion of this transmission line would begin south of McCarthy Boulevard (approximately 0.1 mile south from its intersection with Dixon Landing Road) spanning across the San José-Santa Clara Regional Wastewater Facility's (RWF) existing wastewater drying ponds to Los Esteros Road where it transitions back underground until reaching the Baylands Terminal. The overhead segment of the transmission line is approximately two miles long and the combined underground segments total approximately 6.5 miles. Approximately 5.7 miles of this alignment is located in the City of Fremont, 0.2 mile is located in the City of Milpitas, and 2.9 miles is located in the City of San José.

The new Newark to Albrae 230 kV Transmission Line would be an approximately 0.4-mile-long alignment connecting the proposed Albrae terminal to the existing PG&E Newark substation. The proposed transmission line would leave the Albrae terminal in an underground position and would then transition to an overhead position to enter into the Newark substation. This proposed transmission line would be located within the City of Fremont.

The proposed Baylands to NRS 230 kV Transmission Line would leave the Baylands Terminal underground in Los Esteros Road, which it would follow into Grand Boulevard and Disk Drive before turning into Norteck Parkway. The line would follow Nortech Parkway into private land comprising of a parking lot and undeveloped land until it reaches the Guadalupe River. The line would transition above ground at the Guadalupe River for one span (approximately 750 feet long) before transitioning back underground within private property. The line would continue underground through private property consisting of a parking lot and undeveloped land until it reaches Lafayette Street where it would

continue south until reaching SVP's existing NRS substation. Approximately 2.3 miles of this alignment is located in the City of San José and approximately 1.2 miles is located in the City of Santa Clara.

Underground transmission line work areas are typically 15 feet on each side of the trench. For the Proposed Project, the underground transmission lines are being installed within existing public and private roadways, such as Cushing Parkway and Fremont Boulevard. In these cases, the construction work areas are limited to the public/roadway right of way (ROW).

Overhead transmission line work areas are typically 110 feet by 200 feet around each pole structure location. The overhead transmission line is proposed to be installed across the RWF existing drying ponds and across the Guadalupe River.

Stringing sites are anticipated to be required for all overhead transmission line sections. Stinging sites would be in direct line with the direction of the overhead conductors and require a length approximately three times the height of the adjacent structure. The dimensions of each stringing site would be approximately 100 feet by 400 feet.

During overhead stringing operations, boom trucks or temporary guard structures would be used to assure that the lead lines and conductors do not present a hazard to passing motor vehicles and/or pedestrians. This activity would occur at road crossings, water crossings, and walking paths.

Guard structures commonly consist of directly embedded wood poles with a cross-beam attached to the embedded wood poles. Where direct embedded wood poles are used, an auger would be used to excavate a hole that would be up to 3 feet in diameter and 10 feet deep. A crane or line truck would lift the poles into place and the excavated soil would be backfilled around the pole. Excess excavated soils would be temporarily stockpiled. No concrete foundations would be required to set the guard poles; no grading or other site work is anticipated. The temporary wooden guard poles would be removed following the completion of conductor stringing and the holes would be backfilled with the excavated soil.

Albrae to Baylands 320 kV DC Transmission Line

The Proposed Project includes the new Albrae to Baylands 320 kV DC transmission line connecting the proposed Albrae Terminal to the proposed Baylands Terminal. The 320 kV DC transmission line would be approximately 8.8 miles in length and includes both overhead and underground segments. The underground alignment starts at the proposed Albrae terminal and continues southeast for approximately 5.8 miles, including an approximate 0.3-mile span of transmission line that would be mounted under the existing Cushing Bridge. The overhead alignment would be approximately 2.0 miles in length starting south of McCarthy Boulevard (approximately 0.1 mile south from its intersection with Dixon Landing Road) and would continue in a south/southwest direction towards Los Esteros Road to span across the San José-Santa Clara Regional Wastewater Facility's (RWF) existing wastewater drying ponds. The alignment transitions back to underground within Los Esteros Road for approximately 0.9 mile to its terminus at the proposed Baylands terminal site.

The 320 kV DC underground transmission line would be encased within a duct bank proposed to have five smaller internal conduits: three eight-inch conduits for conductor (including one spare) and two two-inch conduits for fiber optic cables. The typical depth for the underground transmission line duct bank is approximately five feet, with the top of the duct bank being located approximately three feet beneath the surface. The splice vaults would be installed approximately every 1,500 feet along the underground segment and would be approximately 30 feet long, 10 feet wide, and 10 feet deep. After construction, all road surfaces would be restored to their original condition, matching thickness and type in kind or in compliance with local requirements.

The 320 kV DC overhead transmission line structures would predominately be direct embed tubular steel monopoles with a horizontal conductor configuration and two overhead optical ground wires (OPGWs). Dead-end structures would be self-supported tubular steel poles with a vertical conductor configuration supported by deep, reinforced drilled shaft foundations. The overhead transmission line segment would include 12 total tubular steel poles. Structure foundations would have a maximum diameter of 12 feet at the ground line, with a maximum height of 160 feet. The span length would range from 645 feet to 1,200 feet, with an average span of approximately 850 feet.

Newark to Albrae 230 kV Transmission Line

The Newark to Albrae 230 kV Transmission Line would be constructed to connect the proposed Albrae terminal to the existing PG&E Newark substation. This new 230 kV transmission line would be approximately 0.4-mile in length (approximately 0.22 mile of underground and 0.18 mile of overhead). Starting from the Albrae terminal, the new transmission line would exit in an underground position and would follow Weber Road south, until turning east and transitioning to an overhead position until connecting with the Newark substation. The 230 kV overhead transmission line would include two new tubular steel poles which would support the overhead conductor over existing PG&E transmission lines. One new cable pole structure would be constructed to transition the line from underground to overhead and would be located approximately 50 feet northeast of the Newark substation entrance at the end of Weber Road. The second new structure would be a dead-end pole located approximately 40 feet north of the Newark substation wall and 740 feet east of the new cable pole. It is anticipated that both new overhead transmission structures would be tubular steel poles supported by deep, reinforced drilled shaft foundations with a maximum depth of approximately 60 feet. The overhead transmission line structures would have an approximate pole height of 100 feet. Structures and foundations would have a maximum diameter of 12 feet at the ground line. The proposed Newark to Albrae 230 kV transmission line would be rated at 1,044 MW.

Baylands to NRS 230 kV Transmission Line

The Baylands to NRS 230 kV Transmission Line would be constructed to connect the Baylands terminal to the existing SVP NRS substation. This new 230 kV transmission line would consist of approximately 0.1 miles of overhead alignment and approximately 3.3 miles of underground alignment. The underground portions of the transmission line would be located mainly within existing roads, parking lots, and other disturbed or developed areas. The overhead transmission line would span over the Guadalupe River and would consist of two tubular steel cable poles with a delta configuration and two OPGWs. These poles would be supported by deep, reinforced drilled shaft foundations. The maximum foundation depth is expected to be approximately 60 feet. Structures and foundations would have a maximum diameter of 12 feet at the ground line. The maximum height would be approximately 160 feet.

The typical underground transmission line would be encased in a duct bank with seven internal conduits, comprised of four for conductor, two for fiber, and one for a ground wire. One internal conductor conduit would serve as a spare. The typical width for the underground transmission duct bank is approximately 3 feet. Splice vaults would be installed approximately every 1,500 feet along the underground segment. The splice vaults would be approximately 30 feet long by 10 feet wide by 10 feet deep. The proposed Baylands to NRS 230 kV transmission line would be rated at 593 MW.

1.1.3 Below-Ground Conductor/Cable Installations

The typical depth for the underground transmission line duct banks is approximately 5 to 6 feet, with the top of the duct bank being located approximately 3 to 4 feet beneath the surface. The splice vaults would be approximately 10 feet deep. LS Power would install cables in the duct bank once the duct bank and splice vaults are installed. Cable installation activities would occur at all splice vault locations and

near the substation termination structures. Splice vaults would generally be installed along the transmission line alignment about every 1,000 to 2,000 feet to facilitate installation of the underground cables.

1.1.4 Access Roads

The existing and primary access to the Proposed Project locations for both construction and operations and maintenance would be from existing public roads. The existing and primary access to the Albrae terminal for both construction and operation and maintenance would be from Weber Road via Boyce Road. Boyce Road is an existing four-lane minor arterial road and Weber Road is an existing two-lane local street, approximately 22 feet wide. No improvements are expected to be required along Weber Road and Boyce Road.

The existing and primary access to the Baylands terminal for both construction and operation and maintenance would be from Los Esteros Road via Zanker Road. Zanker Road and Los Esteros Road are existing paved public two-lane collector roads, approximately 26 feet wide. No improvements are expected to be required along Zanker Road and Los Esteros Road.

Access to the overhead portion of the Albrae to Baylands 320 kV DC line would be on existing private access roads within the San José-Santa Clara Regional Wastewater Facility (RWF). These roads range from approximately 15 to 70 feet wide and are unpaved but regularly maintained. No improvements to these roads are anticipated as part of the Proposed Project.

The Proposed Project includes one new permanent access road for each of the two HVDC terminals. The access road for the Albrae terminal would be from Weber Road to provide ingress/egress to the site and would be 20 feet wide and approximately 50 feet long. The proposed access road for the Baylands terminal would be provided from Los Esteros Road and would be 20 feet wide and approximately 1,000 feet long. Construction of these access roads would include grading and rocking per the final Proposed Project design. Permanent gates would be installed at both new terminal driveways along the perimeter wall that would align with the internal access road.

1.1.5 Laydown Yards and Staging Areas

The Proposed Project includes 12 potential temporary construction laydown yards (not including the yards within the two terminal sites) resulting in a total area of approximately 100 acres. While the Proposed Project includes these 12 locations, ultimately only between 2 and 4 sites will be used, in addition to the terminal sites. Additional staging areas have been identified because site availability cannot be ensured for an extended period of time prior to construction. The staging areas would be located along the project alignment. The staging areas would be fenced and/or gated during the construction phase of the Proposed Project.

Preparation of the staging area would involve clearing, grubbing, and limited grading, as needed. Gravel may be used to line the ground at the staging area to avoid the creation of unsafe conditions and unnecessary sediment transport off site. Perimeter fencing would be installed around the outer limits of the work area and lighting would also be installed for security purposes.

1.1.6 Other Potentially Required Facilities

A temporary distribution line would be tapped into from the existing nearby PG&E and SVP overhead lines to provide power for construction for the proposed terminal sites and staging areas. The temporary distribution lines would typically be installed in an overhead position. If temporary power lines are unavailable in a timely manner, diesel generators would be utilized.

At the existing PG&E Newark substation, existing facilities would be modified to allow the interconnection of the new Newark to Albrae 230 kV transmission line. LS Power's scope for the new Newark to Albrae 230 kV transmission line is proposed to stop at the new cable (Structure AC-2). PG&E would be responsible for bringing the new circuit from that point to the termination within the existing Newark substation which would require an additional new dead-end structure within PG&E owned property. The required work at the substation includes construction of a new 230 kV bay with associated breakers, disconnect switches, capacitive coupled voltage transformers, deadend structure, steel support structures, buses, grounding, conduits and wiring, foundations, communication systems, jumpers, protection and control equipment, and an expanded perimeter wall.

The existing SVP NRS substation facilities would also be modified to allow the interconnection of the new Baylands to NRS 230 kV transmission line. LS Power's scope for the new Baylands to NRS 230 kV transmission line is proposed to stop at a point within 100 feet of the NRS substation property line. SVP would be responsible for bringing the new circuit from that point to the termination within the existing NRS substation. The required work at the substation includes construction of a new 230 kV bay with associated switches, transformers (removal of existing and installation of new), line positions, foundations, communication systems, jumpers, protection and control equipment.

1.2 Scope of Work

The Proposed Project site is located in an area underlain by native geologic units that are undisturbed at depth. For this reason, an assessment of paleontological resources was undertaken to determine whether construction of the Proposed Project has the potential to negatively impact paleontological resources preserved within these units. This report is intended to summarize existing paleontological resource data in the vicinity of the Proposed Project site, discuss the significance of these resources, examine potential Proposed Project-related impacts to paleontological resources, and, if necessary, suggest mitigation measures to reduce any potential impacts to paleontological resources to less than significant levels. This report was written by Katie M. McComas and Thomas A. Deméré of the Department of PaleoServices, San Diego Natural History Museum (SDNHM).

1.3 Definition of Paleontological Resources

As defined here, paleontological resources (i.e., fossils) are the buried remains and/or traces of prehistoric organisms (i.e., animals, plants, and microbes). Body fossils such as bones, teeth, shells, leaves, and wood, as well as trace fossils such as tracks, trails, burrows, and footprints, are found in the geologic units/formations within which they were originally buried. The primary factor determining whether an object is a fossil or not is not how the organic remain or trace is preserved (e.g., "petrified"), but rather the age of the organic remain or trace. Although typically it is assumed that fossils must be older than ~11,700 years (i.e., the generally accepted end of the last glacial period of the Pleistocene Epoch), organic remains older than recorded human history and/or older than middle Holocene (about 5,000 radiocarbon years) are now also considered to represent fossils (Society of Vertebrate Paleontology, 2010).

Fossils are considered important scientific and educational resources because they serve as direct and indirect evidence of prehistoric life and are used to understand the history of life on Earth, the nature of past environments and climates, the membership and structure of ancient ecosystems, and the pattern and process of organic evolution and extinction. In addition, fossils are considered to be non-renewable resources because typically the organisms they represent no longer exist. Thus, once destroyed, a particular fossil can never be replaced.

Finally, paleontological resources can be thought of as including not only the actual fossil remains and traces, but also the fossil collecting localities and the geologic units containing those localities. The locality includes both the geographic and stratigraphic context of fossils—the place on the earth and stratum (deposited during a particular time in earth's history) from which the fossils were collected. Localities themselves may persist for decades, in the case of a fossil-bearing outcrop that is protected from natural or human impacts, or may be temporarily exposed and ultimately destroyed, as is the case for fossil-bearing strata uncovered by erosion or construction. Localities are documented with a set of coordinates and a measured stratigraphic section tied to elevation detailing the lithology of the fossil-bearing stratum as well as overlying and underlying strata. This information provides essential context for any future scientific study of the recovered fossils.

1.3.1 Definition of Significant Paleontological Resources

The California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) dictates that a paleontological resource is considered significant if it "has yielded, or may be likely to yield, information important in prehistory or history" (Section 15064.5, [a][3][D]). The Society of Vertebrate Paleontology has further defined significant paleontological resources as consisting of "fossils and fossiliferous deposits[…]consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information" (Society of Vertebrate Paleontology, 2010).

1.4 Regulatory Framework

Paleontological resources are considered scientifically and educationally significant nonrenewable resources; they are protected under a variety of laws, regulations, and ordinances. The Proposed Project is located within the Cities of Fremont, Milpitas, Santa Clara, and San José. As such, state and local regulations are applicable to the Proposed Project.

1.4.1 State: California Environmental Quality Act

The California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) addresses paleontological resources in the context of an environmental review for a discretionary state or local agency action. Guidelines for the Implementation of CEQA are included in the California Code of Regulations (CCR), sections 15000 *et seq*. Within the CCR, paleontological resources are specifically addressed in the Environmental Checklist (CCR Section 15023, Appendix G): "Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature."

CEQA does not provide a definition for a "unique paleontological resource" in the Environmental Checklist (CCR Section 15023, Appendix G), nor does it include specific guidelines for the mitigation of paleontological resources under Section 15126.4, Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects. Therefore, most CEQA lead agencies follow the definitions and guidelines provided by the Society of Vertebrate Paleontology (2010), which are in line with industry standards (e.g., Murphey et al., 2019; and see Section 1.3.1). The Society of Vertebrate Paleontology (2010) additionally provides criteria for determining the significance of paleontological resources (see sections 1.3.1 and 2.2), and for appropriate measures to minimize impacts to paleontological resources. As advised by the Society of Vertebrate Paleontology (2010), impacts to paleontological resources can be minimized to a level below the threshold of significance through: 1.) the permanent preservation of a fossil locality and its contained fossil resources or 2.) the implementation of a paleontological mitigation program that would reduce any adverse impacts to a level below the threshold of significance through the salvage and permanent storage of any salvaged fossils in an established scientific institution.

1.4.2 Local: City of Fremont

The City of Fremont prepared an EIR for its 2011 General Plan Update, and included one mitigation measure designed to mitigate potentially significant impacts to paleontological resources (City of Fremont, 2011), which is included below.

- **Mitigation CUL-3: Halt Work/Paleontological Evaluation/Site-Specific Mitigation.** Should paleontological resources be encountered during construction or site preparation activities, such works shall be halted in the vicinity of the find. A qualified paleontological shall be contacted to evaluate the nature of the find and determine if mitigation is necessary. All feasible recommendations of the paleontologist shall be implemented. Mitigation may include, but is not limited to, in-field documentation and recovery of specimen(s), laboratory analysis, the preparation of a report detailing the methods and findings of the investigation, and curation at an appropriate paleontological collection facility. (p. 4-285)

1.4.3 Local: City of Milpitas

The City of Milpitas' 2040 General Plan (City of Milpitas, 2021) addresses paleontological resources in the Conservation and Sustainability Element. Under Goal CON-4 (Preserve and protect prehistoric, historic, archaeological, and paleontological resources in Milpitas), Action CON-4b states: "If construction or grading activities result in the discovery of significant historic or prehistoric archaeological artifacts or unique paleontological resources, all work within 100 feet of the discovery shall cease, the Planning Department shall be notified, the resources shall be examined by a qualified archaeologist, paleontologist, or historian for appropriate protection and preservation measures; and work may only resume when appropriate protections are in place and have been approved by the Planning Department."

1.4.4 Local: City of Santa Clara

The City of Santa Clara's 2010-2035 General Plan (City of Santa Clara, 2010) addresses paleontological resources with multiple goals and policies, as outlined below:

- **Goal 5.6.3-G1:** Protection and preservation of cultural resources, as well as archaeological and paleontological sites.
- **Goal 5.6.3-G2:** Appropriate mitigation in the event that human remains, archaeological resources or paleontological resources are discovered during construction activities.
- **Policy 5.6.3-P1:** Require that new development avoid or reduce potential impacts to archaeological, paleontological and cultural resources.
- **Policy 5.6.3-P2:** Encourage salvage and preservation of scientifically valuable paleontological or archaeological materials.
- **Policy 5.6.3-P4:** Require that a qualified paleontologist/archaeologist monitor all grading and/or excavation if there is a potential to affect archeological or paleontological resources, including sites within 500 feet of natural water courses and in the Old Quad neighborhood.
- **Policy 5.6.3-P5:** In the event that archaeological/paleontological resources are discovered, require that work be suspended until the significance of the find and recommended actions are determined by a qualified archaeologist/paleontologist.

1.4.5 Local: City of San José

The City of San José's 2040 General Plan (City of San José, 2011) addresses paleontological resources in Chapter 3: Environmental Leadership. Under Goal ER-10 (Archaeology and Paleontology), Policy ER-10.1

states: “For proposed development sites that have been identified as archaeologically or paleontologically sensitive, require investigation during the planning process in order to determine whether potentially significant archeological or paleontological information may be affected by the project and then require, if needed, that appropriate mitigation measures be incorporated into the project design.” Policy ER-10.3 additionally states: “Ensure that City, State, and Federal historic preservation laws, regulations, and codes are enforced, including laws related to archaeological and paleontological resources, to ensure the adequate protection of historic and pre-historic resources.”

2.0 Methods

2.1 Paleontological Literature Review and Records Searches

Paleontological records searches of the paleontological collections at the SDNHM and University of California Museum of Paleontology (UCMP) were conducted in order to identify any known fossil collection localities in the vicinity of the Proposed Project site. In addition, a literature review was conducted to gain a greater understanding of the geologic history of the area surrounding the Proposed Project site, as well as to determine the types of fossils that the specific geologic units underlying the Proposed Project site have produced. The literature review included examination of relevant published geologic maps and reports, peer-reviewed papers, and other relevant literature (e.g., field trip guidebooks, unpublished theses and dissertations, archived paleontological mitigation reports). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic units within which they are entombed. Knowing the geologic history of a particular area and the fossil productivity of geologic units that occur in that area, it is possible to predict where fossils may or may not be encountered.

2.2 Paleontological Resource Assessment Criteria

The Society of Vertebrate Paleontology (2010) has developed mitigation guidelines for paleontological resources that conform with industry standards (Murphey et al., 2019) and were developed with input from a variety of federal and state land management agencies. As described in Section 1.4.1, use of the Society of Vertebrate Paleontology (2010) guidelines is common practice by CEQA lead agencies.

The Society of Vertebrate Paleontology (2010) guidelines recognize that significant paleontological resources are considered to include not only actual fossil remains and traces, but also the fossil collecting localities and the geologic units containing those fossils and localities, and thus evaluate paleontological potential (or paleontological sensitivity) of individual geologic units within a project area. Paleontological potential is determined based on the existence of known fossil localities within a given geologic unit, and/or the potential for future fossil discoveries, given the age and depositional environment of a particular geologic unit. The Society of Vertebrate Paleontology guidelines include four classes of paleontological potential: High Potential, Undetermined Potential, Low Potential, or No Potential (Society of Vertebrate Paleontology, 2010). A summary of the criteria for each paleontological potential ranking is outlined below.

2.2.1 High Potential

Geologic 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. Geologic units classified as having high potential include, but are not limited to, some volcaniclastic formations (e. g., ashes or tephras), some low-grade metamorphic rocks which contain

significant paleontological resources anywhere within their geographical extent, and geologic units temporally or lithologically suitable for the preservation of fossils (e. g., deposits aged middle Holocene and older consisting of fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential includes both the potential for yielding abundant or significant vertebrate fossils or for yielding significant invertebrate, plant, or trace fossils, as well as the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Geologic units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and geologic units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

2.2.2 Undetermined Potential

The definition for undetermined potential provided by the Society of Vertebrate Paleontology (2010) has been expanded for the purposes of this report in order to add more information related specifically to the management of paleontological resources in the context of mitigation paleontology. Geologic units are assigned an undetermined potential if there is little information available concerning their paleontological content, geologic age, and depositional environment. Further field study of the specific formation is necessary to determine if these geologic units have high or low potential to contain significant paleontological resources. For planning purposes, this class of resource potential represents a conservative assessment that assumes an undetermined geologic unit is fossiliferous until proven otherwise.

In the context of mitigation paleontology, gaining additional information about a geologic unit assigned an undetermined potential in order to refine the resource potential ranking (e.g., to high potential or low potential) can be accomplished in several ways depending on the nature of the geologic unit and whether it is exposed at the surface. Field surveys (e.g., a pre-construction survey as part of a paleontological resource assessment) can be conducted when a geologic unit is well exposed at the ground surface, allowing paleontologists to physically search for fossils while also studying the stratigraphy of the unit. In cases where the geologic unit is not exposed at the surface (e.g., is covered by disturbed areas such as concrete or agricultural topsoil, or occurs in the subsurface underlying another geologic unit), strategically located excavations into subsurface stratigraphy may be conducted to gain additional information (e.g., geotechnical investigation boreholes or trenches). Paleontological monitoring of excavations into a geologic unit with an undetermined potential as part of a paleontological monitoring program may also allow for refinement of the resource potential ranking of the unit over the course of the monitoring program. In this case, the results of the monitoring program are used to routinely reevaluate the resource potential ranking of the geologic unit.

2.2.3 Low Potential

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

2.2.4 No Potential

Geologic units with no potential are either entirely igneous in origin and therefore do not contain fossil remains, or are moderately to highly metamorphosed and thus any contained fossil remains have been destroyed. Artificial fill materials also have no potential, because the stratigraphic and geologic context

of any contained organic remains (i.e., fossils) has been lost. For projects encountering only these types of geologic units, paleontological resources can generally be eliminated as a concern, and no further action taken.

2.3 Paleontological Impact Analysis

Direct impacts to paleontological resources occur when earthwork operations cut into the geologic units within which fossils are buried and physically destroy the fossil remains. As such, only those project-related excavations that will disturb potentially fossil-bearing geologic units have the potential to significantly impact paleontological resources. As described above, potentially fossil-bearing geologic units are those rated with a high potential. Taking a conservative approach, geologic units with an undetermined potential are also considered to be potentially fossil-bearing until proven otherwise. Although impact avoidance is possible through relocation of a proposed action, paleontological monitoring during construction is typically recommended to reduce any negative impacts to paleontological resources to less than significant levels.

The purpose of the impact analysis is to determine which (if any) of the Proposed Project-related earthwork activities may disturb potentially fossil-bearing geologic units, and where and at what depths these impacts are likely to occur. The paleontological impact analysis involved analysis of available Project documents and comparison with geological and paleontological data gathered during the records searches and literature review.

3.0 Results

The Proposed Project site is located in the central portion of the Coast Ranges Geomorphic Province of California (California Geological Survey, 2002). The Coast Ranges are characterized by a more or less continuous linear series of northwest-trending mountain ranges and intervening valleys that dominate the coastal region of California from the Topatopa Mountains in Ventura County to the Klamath Mountains near the Oregon border. The Coast Ranges are characterized by complex geologic structural features that today are largely dominated by the San Andreas Fault Zone and related northwest trending faults and folds.

The Proposed Project site lies within the Santa Clara Valley, a depositional basin receiving sediment derived primarily from erosion of the Santa Cruz Mountains to the west and south, with minor amounts of sediment derived from the Diablo Range to the northeast. To the northwest, this depositional basin opens into the south end of San Francisco Bay (Anderson et al., 2016). Several northwest-trending faults border the Santa Clara Valley—the San Andreas Fault transects the Santa Cruz Mountains to the southwest of the valley, and the Calaveras and Hayward faults extend along its northeastern margin bordering the Diablo Range. The Santa Cruz Mountains to the southwest of the San Andreas fault consist primarily of granitic and mafic crystalline basement rocks, while the basement rocks to the northeast of the fault primarily consist of accreted Franciscan Complex rocks overlain by rocks of the Coast Range ophiolite and Mesozoic marine clastic rocks (Wentworth et al., 1999). During the Pleistocene and Holocene, a series of transgressive sedimentary sequences of alluvial fan, alluvial flood plain, alluvial delta, and bay deposits have filled the Santa Clara Valley with sediment over the course of at least 800,000 years (Andersen et al., 2016). Today, numerous rivers and streams draining from the surrounding mountain ranges have incised the surficial Pleistocene and Holocene deposits and transported the eroded sediments into San Francisco Bay.

As mapped by Helley and Graymer (1997), the Proposed Project alignment is underlain at the surface by artificial fill deposits and an assortment of Holocene-age alluvial, fluvial, and estuarine deposits (Figure 3). Based on published literature, the Holocene-age alluvial and fluvial deposits in this region transition at relatively shallow depths into older Pleistocene-age alluvial deposits.

3.1 Paleontological Literature Review and Records Searches

3.1.1 Artificial fill

Artificial fill mapped along the Proposed Project alignment includes historic artificial fill (af) placed in large volumes along the east side of the bay, artificial levee fill (alf) supporting man-made levees, and artificial stream channel deposits (Qhasc) associated with modified stream channels. Artificial fill is also likely present elsewhere within the Proposed Project area in developed areas. Artificial fill consists of previously disturbed deposits associated with human activities and is often composed of sedimentary materials mined in close vicinity to a project site (e.g., adjacent hillslopes). However, artificial fill can also be imported to a project site and may be from a distant location. Artificial fill is typically used to change the topography of a location, such as during the creation of flat housing pads, level roadbeds, or earthen sound berms.

Because artificial fill has been previously disturbed and likely imported to its current location, any fossils found in these deposits have lost their original stratigraphic context, and are thus not considered to be scientifically significant.

3.1.2 Holocene alluvial, fluvial, and estuarine deposits

Holocene-age (generally less than 11,700 years old) sediments deposited in a variety of natural settings underlie the majority of the Proposed Project alignment at the surface (as mapped by Helley and Graymer, 1997). The mapped Holocene units include: basin deposits (Qhb) and salt affected basin deposits (Qhbs), bay mud deposits (Qhbm; associated with marshlands and tidal mud flats), floodplain deposits (Qhfp), and natural levee deposits associated with the Guadalupe River and Coyote Creek. Dibblee and Minch (2005) map this area as Holocene-age alluvial gravel, sand, and clay intermixed with alluvial fan deposits; alluvial clay soil intermixed with bay mud; and bay mud. The Holocene-age sediments in this area are generally unconsolidated and range in composition from clay, silty clay, clayey silt, and sandy silt to silty sand, sand, and sandy gravel with minor pebbles, cobbles, and boulders, depending on their depositional setting.

The records searches at the SDNHM and UCMP found no documented fossil collection localities from Holocene alluvial, fluvial, or estuarine deposits within a one-mile radius of Proposed Project components (SDNHM paleontological collections data; UCMP paleontological collections data).

The Holocene age of these deposits generally suggests that they are too young to contain fossil remains. However, it has been well documented in the south San Francisco Bay region that Pleistocene-age sedimentary deposits are present in the relatively shallow subsurface (Maguire and Holroyd, 2016). The occurrence of Pleistocene-age fossils in the San Francisco Bay region is described in greater detail in the following section.

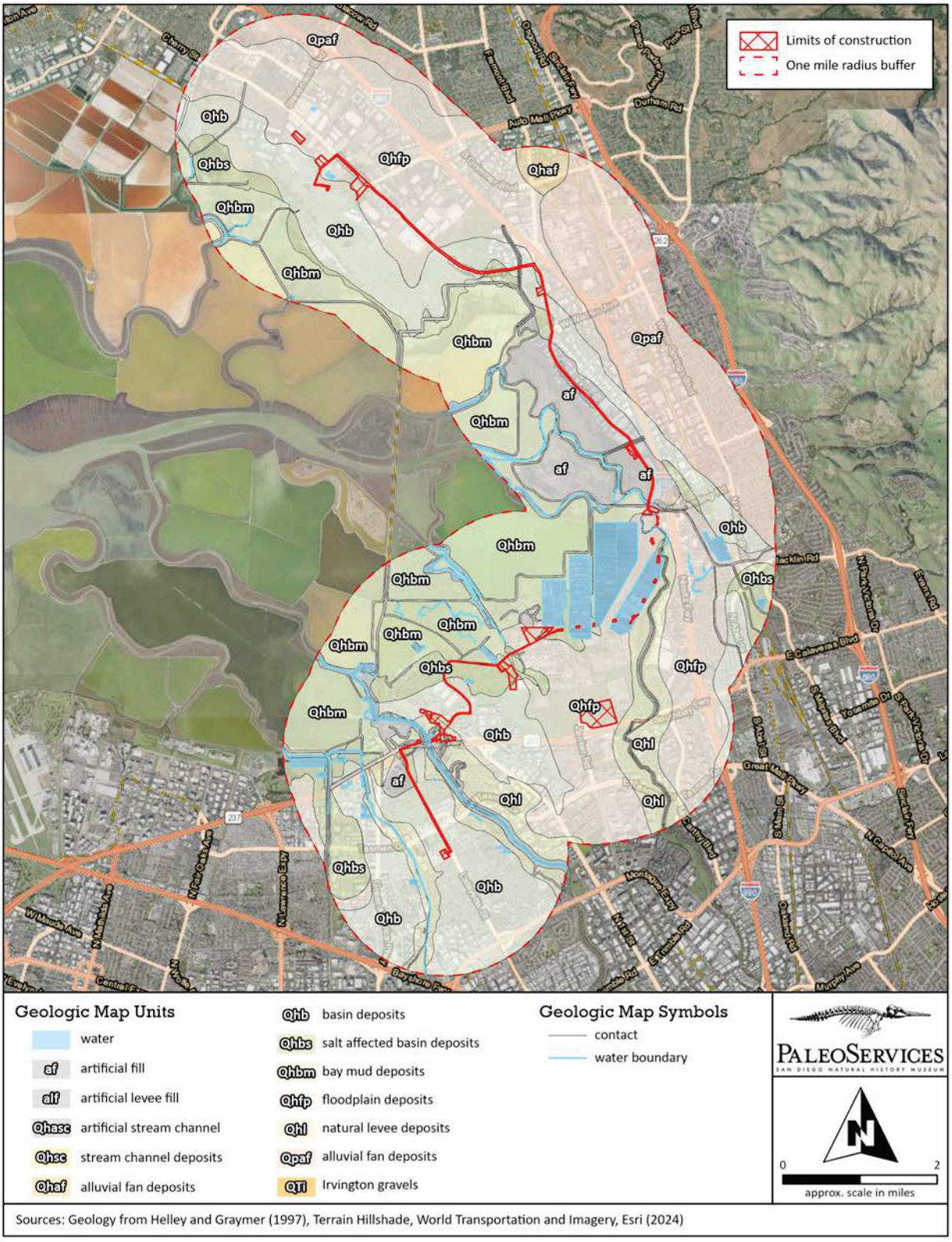

Figure 3. Overview geologic map of the Proposed Project alignment and vicinity.

3.1.3 Pleistocene alluvial deposits

Pleistocene-age alluvial deposits are not mapped at the surface along the Proposed Project alignment, but prior discoveries of late Pleistocene-age (approximately 129,000 to 11,700 years old) fossil vertebrates within the Santa Clara Valley indicate that these deposits underlie Holocene-age alluvial and fluvial deposits at relatively shallow depths (Maguire and Holroyd, 2016). Maguire and Holroyd (2016) describe the fossil-bearing deposits in the Santa Clara Valley as variably consisting of silty sand hardpan with clay-lined cracks, silty sand, sand with lenses of clay, mud, and sandy gravel. As described by Helley et al. (1994), Pleistocene alluvial deposits exposed more broadly in the Santa Clara Valley consist of "a fining upward section of alluvial gravel, sand, silt, and clay overlain at the distal margin by estuarine mud" that is capped by a thick clayey soil horizon, over which Holocene sediments have been deposited.

The records searches at the SDNHM found no documented fossil collection localities from Pleistocene alluvial deposits within a one-mile radius of Proposed Project components (SDNHM paleontological collections data). However, the UCMP records search identified one documented fossil collection locality that lies within a one-mile radius of the Proposed Project (UCMP paleontological collections data). At this locality (UCMP V4916), an upper molar of *Bison* sp. was discovered at a depth of two feet bgs west of Milpitas near the Coyote Creek channel, approximately 0.7 miles due south of proposed overhead transmission pole DC-8—however, the age of this occurrence is described as "Recent or Pleistocene" and is therefore only tentatively included here.

More broadly, however, Pleistocene-age vertebrate fossils have been documented within the Santa Clara Valley, as summarized by Maguire and Holroyd (2016). The nearest recorded Pleistocene vertebrate fossil localities are located approximately 0.8 miles southeast of the US 101/Lawrence Expressway interchange (UCMP V91128) and along the Guadalupe River north of the San José Mineta International Airport (UCMP V99597 and UCMP V99891). UCMP V91128 was discovered in "sandy gravel deposits 15 feet above sea level and nine feet below the modern surface" during residential construction, and produced a partial pelvis of a mammoth (*Mammuthus* sp.) (Maguire and Holroyd, 2016, p. 2). UCMP V99597 and V99891 produced a partial skull and skeletal elements of a juvenile mammoth (*Mammuthus columbi*; discovered eroding out of the riverbed at a depth of 11 feet below the surface of the modern flood plain) and dental and skeletal elements of a variety of land mammals including extinct horse (*Equus* sp.), extinct pronghorn (*Capromeryx?* sp.*)*, extinct camel (*Camelops* sp.), extinct bison (*Bison* sp.), Harlan's ground sloth (*Paramylodon harlani*), and an unidentified proboscidean. These vertebrate fossil remains were discovered in a mud layer approximately 20 to 40 feet downstream from the mammoth. Additional fossils have been recovered in Sunnyvale, including remains of *Bison* sp., *Camelops* sp., *Equus* sp., an unidentified bear (Ursidae), squirrel (*Urocitellus beldingi*), and pocket gopher (*Thomomys* sp.) discovered at unknown depths during sewer line excavations. Pleistocene-age fossils reported from Mountain View include remains of *Bison* sp., *Camelops* sp., deer *Odocoileus* sp., *Equus* sp., *Mammuthus columbi*, *Paramylodon harlani*, kangaroo rat (*Dipodomys* sp. cf. *D. heermanni*), and an unidentified geomyid rodent, all discovered at a depth of 23 feet bgs during landfill excavations). Pleistocene-age fossils reported from Palo Alto include remains of *Equus* sp., a felid, rabbit, squirrel, pack rat *Neotoma* sp., and harvest mouse *Reithrodontomys* sp., all discovered at unknown depths across several sites. Additional south Bay Area Pleistocene fossil discoveries include a tusk of *Mammuthus* sp. discovered at a depth of seven feet bgs near Corte Madera Creek; and a humeral diaphysis of *Bison* sp. discovered at a depth of 22 feet bgs on the Stanford University campus during excavation for the Molecular and Genetic Medicine building. The 1909 recovery of a mastodon tooth *Mammut* sp. discovered at a depth of 33 feet bgs in the Santa Clara Valley has also been reported, but the actual location of the discovery site is unknown. Taken together with radiocarbon dates ranging from ~23,000 to 13,000 years old obtained from charcoal associated with two of the fossil localities, the mammalian taxa recovered from these localities indicate a late Rancholabrean

North American Land Mammal Age (NALMA), a geologic time interval that extends from ~240,000 to 11,700 years ago (Maguire and Holroyd, 2016).

3.2 Paleontological Resource Potential Analysis

Following the Society of Vertebrate Paleontology (2010) criteria for determining paleontological potential, as outlined in Section 2.2, each of the geologic units present within the Proposed Project construction limits has been assigned a paleontological potential, as summarized in Table 1 below and depicted in Figure 4. Holocene alluvial, fluvial, and estuarine deposits are assigned a low paleontological potential based on their relatively young geologic age, but, as noted above in Sections 3.1.2 and 3.1.3, these deposits are likely underlain at shallow depths by Pleistocene alluvial deposits. Pleistocene alluvial deposits are assigned a high paleontological potential based on the documented recovery of vertebrate fossil remains from these deposits at several locations in the Santa Clara Valley. Because the depths of previously documented Pleistocene-age fossils in the Santa Clara Valley range between seven and 33 feet bgs, it is suggested that the Holocene–Pleistocene transition within the Proposed Project construction limits could occur at depths as shallow as seven feet bgs. Finally, artificial fill deposits are assigned no paleontological potential.

Table 1. Summary of paleontological potential of the geologic units underlying the Proposed Project site.

Geologic unit	Age (years old)	Paleontological potential
Artificial fill	Recent	No potential
Holocene alluvial, fluvial, and estuarine deposits	Holocene (less than 11,700)	Low potential
Pleistocene alluvial deposits	Late Pleistocene (129,000 to 11,700)	High potential

3.3 Paleontological Impact Analysis

As discussed above, the vast majority of the Proposed Project area is underlain at the surface by Holocene-age alluvial, fluvial, and estuarine deposits, which likely transition at depths as shallow as seven feet bgs to Pleistocene-age alluvial deposits. Artificial fill is mapped along portions of the Proposed Project alignment and is also likely present elsewhere in the Proposed Project area in association with previous development, including roadway construction. The thickness of artificial fill is unknown, but it is conservatively estimated that Pleistocene-aged alluvial deposits could be present at depths as shallow as seven feet bgs. The same rule is applied for areas with water mapped at the surface (e.g., the San José -Santa Clara RWF wastewater drying ponds).

Impacts to paleontological resources may occur only during excavations that will disturb Pleistocene-aged alluvial deposits. Therefore, excavations extending less than seven feet bgs throughout the Proposed Project area are unlikely to impact paleontological resources, while excavations extending greater than about seven feet bgs in these areas have the potential to impact paleontological resources.

Project components and construction methods, as currently proposed, will require varying degrees of ground disturbance, ranging from no or only superficial ground disturbance, to shallow excavation, to deeper excavation. The anticipated ground disturbance associated with each Proposed Project component and its potential to impact paleontological resources is outlined below and summarized in Table 2.

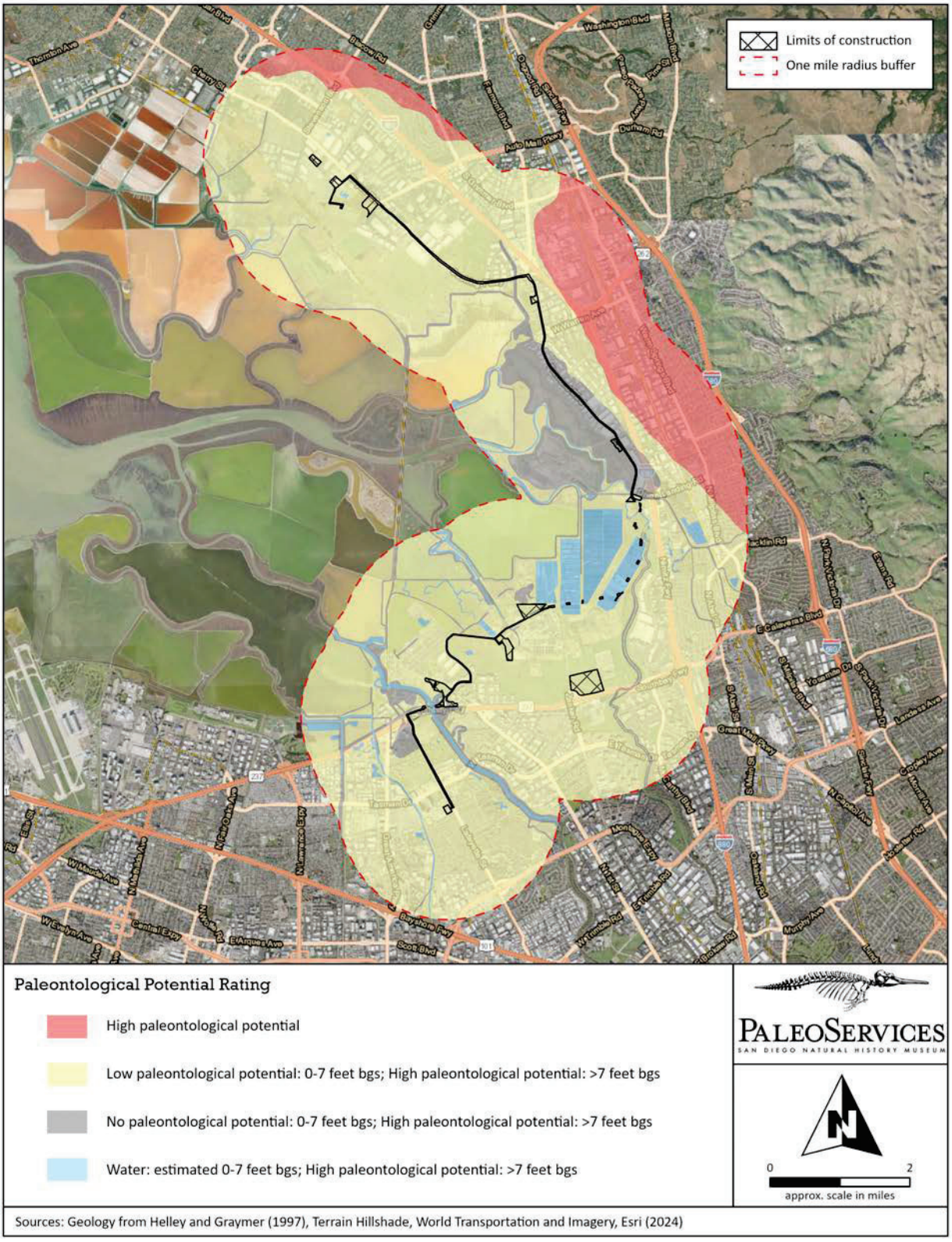

Figure 4. Paleontological potential map of the Proposed Project alignment and vicinity.

Table 2. Summary of anticipated ground disturbance associated with Proposed Project components and paleontological monitoring recommendations for this work.

Proposed Project component	Anticipated ground disturbance	Monitoring recommended?
HVDC Terminals		
Grading and excavation for slab foundations or footings in new substations	Shallow excavation (<7 feet deep)	No
Excavation for transformer oil containment basins	Deeper excavation possibly extending >7 feet bgs	**Yes, if >7 feet bgs**
Excavation for drilled shaft foundations	Deep augering (up to 50 feet deep)	**Yes**
Transmission Lines		
Trenching for underground transmission line duct bank	Shallow trenching (<5 feet deep)	No
Excavation for splice vaults	Deeper trenching (10 feet deep)	**Yes**
Jack-and-bore/HDD trenchless horizontal boring/drilling	Horizontal boring at depths of 10 feet or more	No, monitoring not feasible
Excavation of sending/receiving pits for trenchless techniques	Deeper excavation (10 to 15 feet deep)	**Yes**
Installation of tubular steel poles on deep, reinforced drilled shaft foundations	Deeper augering (15 to 60 feet deep)	**Yes**
Use of boom trucks during overhead stringing operations	No excavations anticipated	No
Installation of temporary guard structures during overhead stringing operations	Deeper augering (10 feet deep)	**Yes**
Below-Ground Conductor/Cable Installations		
Installation of cable in underground duct banks	No new excavations anticipated	No
Access Roads		
New permanent access road construction	Shallow grading (<7 feet deep)	No
Laydown Yards and Staging Areas		
Limited grading	Superficial and/or shallow grading (<7 feet deep)	No
Other Potentially Required Facilities		
Connection to temporary distribution line from the existing PG&E and SVP overhead lines; use of generators	No excavations anticipated	No
Modification of existing PG&E Newark substation facilities	Deeper augering (up to 50 feet deep)	**Yes**
Modification of existing SVP NRS substation facilities	Deeper augering (up to 50 feet deep)	**Yes**

3.3.1 HVDC Terminals

Earthwork proposed for construction of the Albrae and Baylands terminals includes excavation for foundations, which will be constructed as a combination of deep, reinforced drilled shaft foundations and slab foundations with spread footings, and excavation for an oil containment system around the transformer.

- Grading and excavation for slab foundations supported on spread footings is anticipated to be shallow in nature and unlikely to impact paleontological resources.
- Excavation for deep, reinforced drilled shaft foundations is anticipated to extend up to 50 feet deep and excavation for the oil containment systems may also extend deeper than seven feet bgs. This deeper excavation has the potential to result in impacts to paleontological resources that can be successfully mitigated.

3.3.2 Transmission Lines

Earthwork proposed for the underground portions of the Albrae to Baylands 320 kV DC transmission line, the Newark to Albrae 230 kV transmission line, and the Baylands to NRS 230 kV transmission line is anticipated to require open cut excavation of trenches measuring three feet wide by five feet deep and excavation for the installation of splice vaults measuring 10 feet deep by 10 feet wide by 30 feet long.

- Trenching for underground transmission duct bank is anticipated to be limited to five feet or less in depth and is unlikely to impact paleontological resources.
- Excavation for splice vaults is anticipated to extend ten feet in depth. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

For the Albrae to Baylands 320 kV DC transmission line and the Baylands to NRS 230 kV transmission line, trenchless construction methods are proposed for several locations, and may involve the use of jack-and-bore or horizontal directional drilling (HDD) construction techniques to install conduit. The jack-and-bore technique involves concurrently pushing a casing pipe through the trenchless crossing and removing the spoils inside the casing with a rotating auger, with sending and receiving pits located on either side of the features to be crossed. The sending pit for the jack-and-bore would measure approximately 15 by 40 feet and the receiving pit would measure approximately 15 by 25 feet. HDD installation uses an auger with a drill and spray nozzle on the end to bore to a specific depth and route under an obstruction, with sending and receiving pits located on either side of the features to be crossed. The sending pit for the HDD would measure approximately ten by ten feet and the receiving pit would measure approximately ten by ten feet.

- For both the jack-and-bore and HDD techniques, horizontal boring/drilling eliminates the ability to observe the geographic and stratigraphic context of spoils produced during excavation for conduit. For this reason, impacts to paleontological resources are possible *but* cannot feasibly be mitigated.
- Excavation of the sending and receiving pits is anticipated to extend ten to 15 feet bgs. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

Earthwork proposed for the overhead portions of the Albrae to Baylands 320 kV DC transmission line, the Newark to Albrae 230 kV transmission line, and the Baylands to NRS 230 kV transmission line is anticipated to include excavation of holes to support new tubular steel poles on deep, reinforced drilled shaft foundations. The excavated holes are anticipated to measure approximately five to 12 feet in

diameter and 15 to 60 feet deep. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

Guard structures installed during overhead stringing operations would utilize boom trucks or temporary guard structures.

- Use of boom trucks would not require any excavation, and is therefore unlikely to impact paleontological resources.
- Installation of temporary guard structures would require the use of an auger to excavate a hole measuring up to three feet in diameter and ten feet deep. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

3.3.3 Below-Ground Conductor/Cable Installations

Installation of cables within underground transmission line duct banks is not anticipated to require any additional excavation and is therefore unlikely to impact paleontological resources.

3.3.4 Access Roads

The Proposed Project will utilize existing access roads and also require construction of one new permanent access road for each of the two HVDC terminals. The existing access roads are not anticipated to require any improvements. Construction of new access roads would involve grading and rocking to accommodate construction equipment and O&M vehicles. This work is anticipated to be relatively shallow and is therefore unlikely to impact paleontological resources.

3.3.5 Laydown Yards and Staging Areas

Preparation of laydown yards and staging areas is anticipated to involve clearing, grubbing, and limited grading. This work is anticipated to be superficial and/or shallow in nature and is unlikely to impact paleontological resources.

3.3.6 Other Potentially Required Facilities

Connection to a temporary distribution line from the existing PG&E and SVP overhead lines and/or the use of diesel generators for construction power would not require any excavation and is therefore unlikely to impact paleontological resources.

Modification of the existing PG&E Newark substation would require earthwork associated with construction of drilled and pier foundations, which could extend up to 50 feet deep. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

Modification of the existing SVP NRS substation would require earthwork associated with construction of foundations, which could extend up to 50 feet deep. This work has the potential to result in impacts to paleontological resources that can be successfully mitigated.

4.0 Recommendations & Conclusions

For the Proposed Project, earthwork extending greater than seven feet bgs has the potential to impact paleontological resources preserved within Pleistocene-age alluvial deposits (Table 2, Figure 4). Development and implementation of a project-specific Paleontological Resources Mitigation and Monitoring Plan (PRMMP), as outlined in Applicant Proposed Measure (APM) PALEO-1 below, is recommended to mitigate potentially adverse impacts to paleontological resources during construction

through the discovery, recovery, and conservation of any fossils that are unearthed during construction. APM PALEO-2 is recommended to account for any inadvertent discoveries made when a paleontological monitor is not on site.

Standard elements of a PRMMP include a description of the project earthwork to be monitored for paleontological resources (e.g., specific areas, depths of excavation, and/or project components), proposed methods for paleontological monitoring, procedures for fossil discoveries and determining the significance of a discovery, proposed field methods for fossil salvage, proposed laboratory methods for preparation and curation of recovered fossils, reporting requirements, and a curatorial agreement with a designated regional repository.

The following measures are recommended for the Proposed Project. Implementation of these measures will reduce potential adverse impacts to paleontological resources to less that significant through the recovery and conservation of fossils that are unearthed during construction.

APM PALEO-1: Prior to the start of construction, a Qualified Paleontologist shall be retained to prepare and oversee the Paleontological Resources Mitigation and Monitoring Plan (PRMMP) for the Proposed Project. The PRMMP shall contain monitoring procedures, define areas and types of earthwork to be monitored, and provide methods for determining the significance of fossil discoveries. The PRMMP shall direct that a qualified paleontological monitor (working under the supervision of the Qualified Paleontologist) shall monitor all excavations or grading at depths exceeding seven feet bgs where potentially fossil-bearing alluvial deposits of Pleistocene age may be present. The duration and timing of paleontological monitoring shall be determined by the Qualified Paleontologist based on the construction plans and construction schedule, and may be modified based on the initial results of monitoring. The PRMMP shall state that any fossils that are collected shall be prepared to the point of curation, identified to the lowest reasonable taxonomic level, and curated into a recognized professional repository (e.g., SDNHM, UCMP), along with associated field notes, photographs, and compiled fossil locality data. The repository shall be contracted prior to the start of earthwork to curate and store any discovered and recovered fossils. Such an institution shall be a recognized paleontological specimen repository with a permanent curator, such as a museum or university. Donation of the fossils shall be accompanied by financial support for initial specimen curation and storage.

Following the completion of the above tasks, the Qualified Paleontologist shall prepare a final mitigation report that outlines the results of the mitigation program. This report shall include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, and significance of recovered fossils. The report shall be submitted to appropriate agencies, as well as to the designated repository.

APM PALEO-2: If paleontological resources are encountered during ground disturbing activities when the Qualified Paleontologist (or qualified paleontological monitor) is not on site (an inadvertent discovery), earthwork within the vicinity of the discovery shall immediately halt, and the Qualified Paleontologist shall be notified to evaluate the significance of the fossil discovery. If the fossil discovery is deemed significant, the fossil shall be recovered using appropriate recovery techniques based on the type, size, and mode of preservation of the unearthed fossil. Earthwork may resume in the area of the fossil discovery once the fossil has been recovered and the Qualified Paleontologist deems the discovery site has been mitigated to the extent necessary.

5.0 References

Andersen, D.W., N.C. Shostak, K.M. Locke, N.P. Ramstetter, and E.P. Metzger. 2016. Composition of sediment records late Quaternary paleogeographic evolution of Santa Clara Valley, California. Geosphere 12(2), doi:10.1130/GES01259.1.

California Geological Survey. 2002. California Geomorphic Provinces. CGS Note 36. https://www.conservation.ca.gov/cgs/Documents/Publications/CGS-Notes/CGS-Note-36.pdf.

City of Fremont. 2011. Draft Environmental Impact Report, State Clearinghouse Number: 2010082060, Fremont Draft General Plan Update. Accessible at: https://www.fremont.gov/home/showpublisheddocument/825/637750631748000000.

City of Milpitas. 2021. General Plan 2040, City of Milpitas. Adopted March 9, 2021. Accessible at: https://static1.squarespace.com/static/57277b461d07c02f9c2f5c2c/t/60906e6349539311604cae70/1620078198914/Milpitas+General+Plan_Final_online+version.pdf.

City of San José. 2011. Envision San José 2040 General Plan. Accessible at: https://www.sanjoseca.gov/home/showpublisheddocument/22359/637928744399330000.

City of Santa Clara. 2010. City of Santa Clara, 2010-2035 General Plan. Adopted November 16, 2010. Accessible at: https://www.santaclaraca.gov/home/showpublisheddocument/56139/636619791319700000.

Dibblee, T.W., and J.A. Minch. 2005. Geologic map of the Milpitas quadrangle, Alameda & Santa Clara Counties, California. Dibblee Geological Foundation, Dibblee Foundation Map DF-153, scale 1:24,000.

Helley, E.J., R.W. Graymer, G.A. Phelps, P.K. Showalter, and C.M. Wentworth. 1994. Quaternary geology of Santa Clara Valley, Santa Clara, Alameda, and San Mateo Counties, California. U.S. Geological Survey Open-File Report OF-94-231, scale 1:50,000.

Helley, E.J., and R.W. Graymer. 1997. Quaternary Geology of Alameda County and Parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California. U.S. Geologic Survey, Open File Report OF-97-97. Scale 1:100,000. Available at: https://ngmdb.usgs.gov/Prodesc/proddesc_18708.htm

Maguire, K.C., and P.A. Holroyd. 2016. Pleistocene vertebrates of Silicon Valley (Santa Clara County, California). PaleoBios 33: 1–14.

Murphey, P.C., G.E. Knauss, L. H. Fisk, T.A. Deméré, and R.E. Reynolds. 2019. Best practices in mitigation paleontology. San Diego Society of Natural History, Proceedings 47: 1-43.

SDNHM paleontological collections data, accessed by K. McComas on 1 June 2023.

Society of Vertebrate Paleontology. 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines.pdf

UCMP paleontological collections data, accessed by P. Holroyd on 15 June 2023.

Wentworth, C.M., M.C. Blake, Jr., R.J. McLaughlin, and R.W. Graymer. 1999. Preliminary Geologic Map of the San Jose 30 X 60 Minute Quadrangle, California: A Digital Database. U.S. Geological Survey, Open File Report OF-98-795. Scale 1:100,000.