

PALEOSERVICES
SAN DIEGO NATURAL HISTORY MUSEUM

Paleontological Resource Assessment

CBX OTN Parking (Project No. 553953)

City of San Diego

San Diego County, California

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Executive Summary

This paleontological resource assessment was prepared for the CBX OTN Parking Project (Project) site in the south central portion of the Otay Mesa Neighborhood within the Otay Mesa Community Plan Area of the City of San Diego, San Diego County, California. The purpose of this report is to identify and summarize paleontological resources that occur in the vicinity of the Project, identify Project elements (if any) that may negatively impact paleontological resources, and provide recommendations to reduce any potential negative impacts to less than significant levels. The report includes the results of an institutional paleontological records search conducted at the San Diego Natural History Museum (SDNHM) and a paleontological field survey.

The approximately 29 acre Project site is located along the south side of Siempre Viva Road between Las Californias Drive to the west and La Media Road to the east, and lies just north of the United States-Mexico international border. The purpose of the proposed Project is to construct a surface parking lot with access from Siempre Viva Road, including improvements to Siempre Viva Road; to construct an onsite storm drain system, including two biofiltration basins; and to install onsite landscaping. Earthwork will presumably include relatively shallow grading (removal and recompaction) of the site, trenching for storm drains, and excavation of the biofiltration basins.

Published geologic mapping reports that the Project site is underlain by the Pleistocene-age Lindavista Formation (about 1.5 to 0.5 million years old). The records search indicates that there are no known fossil localities within a 1-mile radius of the Project site. The literature review, meanwhile, indicates that the Lindavista Formation has yielded limited fossil remains of nearshore marine invertebrates (e.g., clams, scallops, snails, barnacles, and sand dollars), as well as sparse remains of sharks and baleen whales in southwestern San Diego County. The paleontological field survey confirmed the presence of probable Pleistocene-age nearshore marine to fluvial deposits on site, consisting of pale red to brown pebbly fine- to coarse-grained sandstone and pale red massive silty sandstone. These deposits are tentatively assigned to the Lindavista Formation. Following guidelines provided by the City of San Diego, a moderate paleontological sensitivity is assigned to the Lindavista Formation.

Based on a review of the Project plans, it appears that earthwork will involve shallow grading of the site and deeper trenching for associated storm drain infrastructure and excavation of biofiltration basins. As a general rule, earthwork extending less than 5 feet below existing surface grade is considered to be unlikely to significantly impact paleontological resources, primarily due to the small volume of impacted strata. In addition, the uppermost several feet of strata are commonly weathered as a result of chemical and/or physical processes associated with soil development, groundwater penetration, and exposure to the elements. However, should earthwork extend more than 5 feet below existing surface grade, a paleontological mitigation program centered around paleontological monitoring should be implemented, as outlined in the provided Mitigation Measures 1–7. Implementation of the paleontological mitigation program will reduce Project-related impacts to paleontological resources to a level that is less than significant.

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1.0 Introduction

1.1 Project Description

This technical report provides an assessment of paleontological resources at the CBX OTN Parking project (Project) site in the south central portion of the Otay Mesa Neighborhood within the Otay Mesa Community Plan Area of the City of San Diego, San Diego County, California (Figure 1). The approximately 29 acre Project site is located along the south side of Siempre Viva Road between Las Californias Drive to the west and La Media Road to the east, and lies just north of the United States-Mexico international border.

The purpose of the proposed Project is to construct a surface parking lot with access from Siempre Viva Road, including improvements to Siempre Viva Road; to construct an onsite storm drain system, include two biofiltration basins; and to install onsite landscaping. Earthwork will presumably include relatively shallow grading of the site, trenching for storm drains, and excavation of the biofiltration basins.

1.2 Scope of Work

This paleontological assessment report is being completed due to a review of maps that indicate the Project site is underlain by sedimentary deposits previously assigned a moderate paleontological sensitivity (City of San Diego, 2011; Deméré and Walsh, 1993). The report is intended to summarize existing paleontological resource data at the Project site, discuss the significance of these resources, determine whether construction of the Project will impact paleontological resources, and develop measures to protect paleontological resources during site development should they be negatively impacted by site improvements.

The assessment includes the results of a literature review, a formal search of paleontological collections records at the San Diego Natural History Museum (SDNHM), and a paleontological field survey of the Project site. This report was written by Katie M. McComas and Thomas A. Deméré of the Department of PaleoServices, 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 about 11,000 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) can also be considered to represent fossils (SVP, 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.

1.3.1 Definition of Scientifically Significant Fossils

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 (SVP) 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” (SVP, 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 Project site is located within the City of San Diego in San Diego County, California. As such, state and local regulations are applicable to the Project.

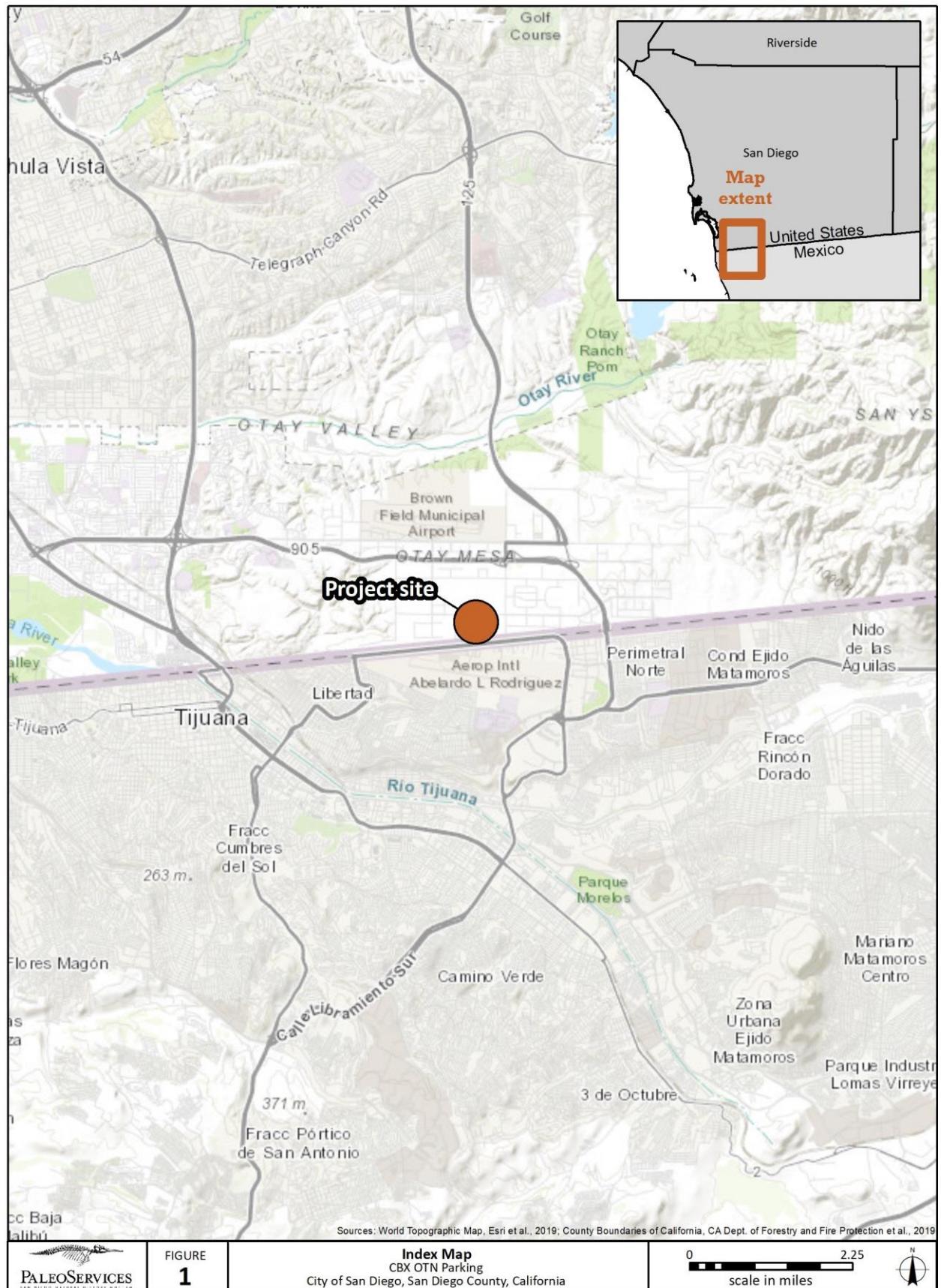
1.4.1 State: California Environmental Quality Act

CEQA (Public Resources Code Section 21000 *et seq.*) requires the identification of environmental impacts of a proposed project, the determination of significance of the impacts, and the identification of alternative and/or mitigation measures to reduce adverse environmental impacts. The Guidelines for the Implementation of CEQA (Title 14, Chapter 3, California Code of Regulations: 15000 *et seq.*) outline the necessary procedures for complying with CEQA. Paleontological resources are specifically included as a question in the CEQA Environmental Checklist (Section 15023, Appendix G): “Will the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.” Also applicable to paleontological resources is the checklist question: “Does the project have the potential to... eliminate important examples of major periods of California history or pre-history.” As discussed in Section 1.3, fossils are important examples of California’s prehistory.

If significant paleontological resources may be impacted within a given project site, CEQA provides that “a lead agency shall identify potentially feasible measures to mitigate significant adverse changes in the significance of an historical resource. The lead agency shall ensure that any adopted measures to mitigate or avoid significant adverse changes are fully enforceable through permit conditions, agreements, or other measures” (Section 15064.5, [b][4]).

1.4.2 Local: City of San Diego

The City of San Diego has developed specific guidelines for the implementation of CEQA regarding the management of paleontological resources within the City’s boundaries (City of San Diego, 2011). Specifically, the City provides Initial Study Questions and Significance Thresholds to determine whether a proposed project will significantly impact paleontological resources. If it is determined that a project may impact paleontological resources, the City provides guidelines for the mitigation of these impacts, most commonly through implementation of a monitoring program.



2.0 Methods

2.1 Paleontological Literature Review and Records Search

A review was conducted of relevant published geologic maps (e.g., Tan and Kennedy, 2002; Todd, 2004), published geological and paleontological reports (e.g., Kennedy, 1973), and other relevant literature (e.g., field trip guidebooks, theses and dissertations, unpublished paleontological mitigation reports, unpublished geotechnical reports). This approach was followed in recognition of the direct relationship between paleontological resources and the geologic formations within which they are entombed. Knowing the geologic history of a particular area and the fossil productivity of geologic formations that occur in that area, it is possible to predict where fossils will, or will not, be encountered.

In addition, a paleontological records search was conducted at the SDNHM in order to determine if any documented fossil collection localities occur within the Project site or immediately surrounding area. The records search involved examination of the SDNHM paleontological database for any records of known fossil collection localities within a 1-mile radius of the proposed Project site.

2.2 Paleontological Field Survey

A paleontological field survey was conducted on May 9, 2019 by Patrick J. Sena of the Department of PaleoServices, SDNHM, in order to confirm the mapped geology, to field check the results of the literature review and records search, and to evaluate the paleontological sensitivity of strata present in the vicinity of the Project site. The field survey involved inspection of sedimentary deposits exposed at the Project site in order to collect stratigraphic data (e.g., bedding type, thickness, geologic contacts) and detailed lithologic descriptions of strata (e.g., color, sorting of grains, texture, sedimentary structures, and grain size of sedimentary rocks), and to prospect for any fossilized remains present at the surface. The field paleontologist was equipped with standard field equipment (e.g., rock hammer, camera, hand lens, tape measure) and a Garmin Handheld GPS unit.

2.3 Paleontological Resource Assessment Criteria

The Society of Vertebrate Paleontology (SVP, 2010) has developed mitigation guidelines for paleontological resources that conform with industry standards and were developed with input from a variety of federal and state land management agencies (Murphey et al., 2019). These guidelines recognize that 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 are designed to evaluate the 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. This procedure assigns ranks to units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils (SVP, 2010).

The City of San Diego follows the SVP guidelines, with the exception of the use of a “Moderate Sensitivity” category in place of an “Unknown Potential” category (City of San Diego, 2011). Specific criteria for each paleontological sensitivity rating are outlined below.

2.3.1 High sensitivity

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 sensitivity include, but are not limited to, sedimentary rocks and some volcanoclastic rocks (e.g., ashes, tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rocks temporally or lithologically suitable for the preservation of fossils (e.g., middle Holocene and older, fine-grained fluvial sandstones, paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones). Paleontological sensitivity consists of both the potential for yielding abundant or significant vertebrate fossils, or for yielding a few significant 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 sensitivity.

2.3.2 Moderate sensitivity

Geologic units from which vertebrate, invertebrate, plant, or trace fossils are known but are poorly preserved, common elsewhere, or stratigraphically unimportant are considered to have moderate sensitivity. Moderate sensitivity can also be assigned to geologic units for which little information is available concerning their paleontological content, geologic age, and depositional environment.

2.3.3 Low sensitivity

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 and the presence of fossils is the exception not the rule, e.g., basalt flows or Recent colluvium. Geologic units with low sensitivity typically will not require impact mitigation measures to protect fossils.

2.3.4 No sensitivity

Some geologic 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). Geologic units with no sensitivity require no protection nor impact mitigation measures relative to paleontological resources.

2.4 Paleontological Impact Analysis

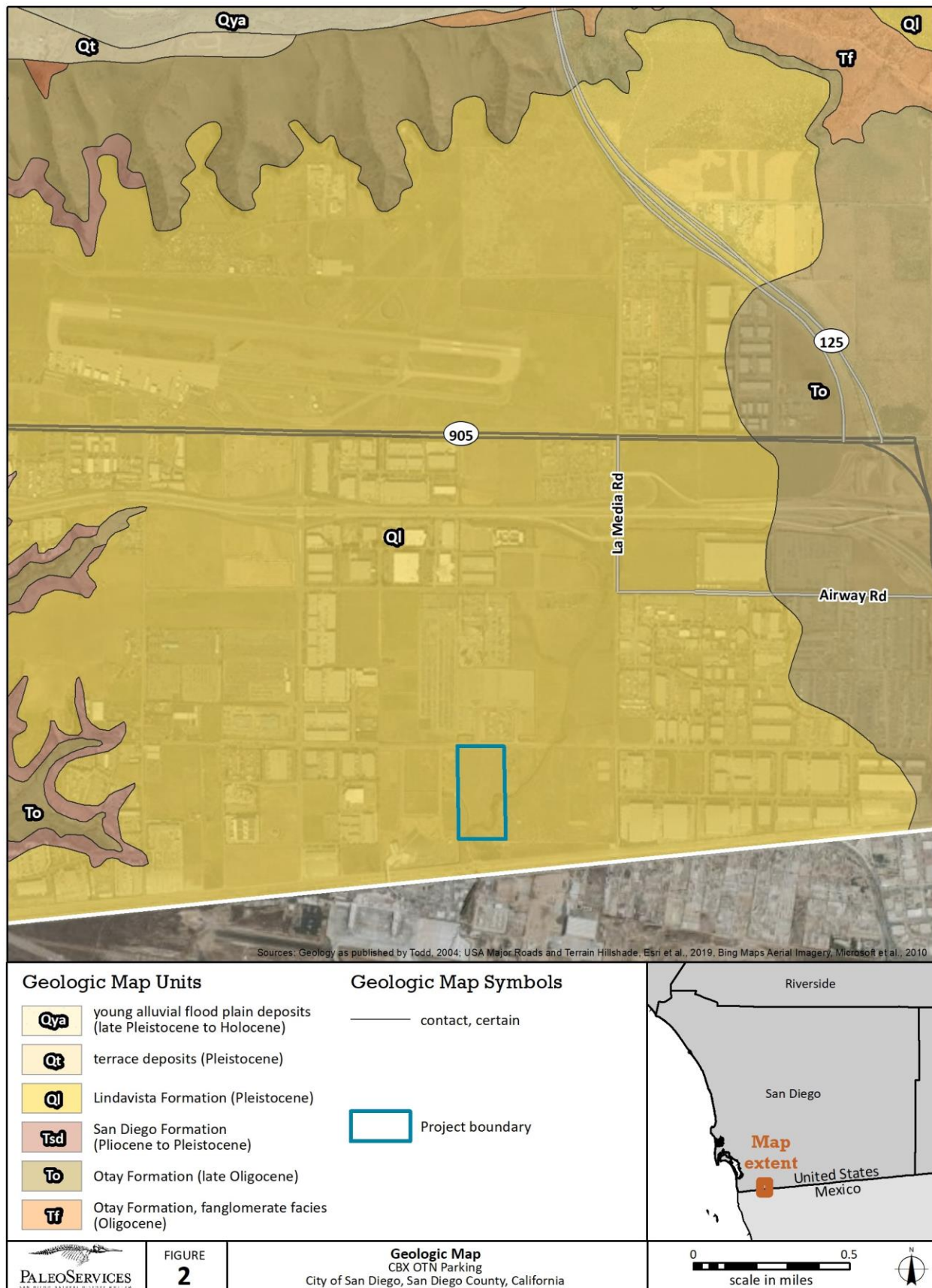
Direct impacts to paleontological resources occur when earthwork activities (e.g., grading, trenching), cut into the geologic formations within which fossils are buried, and physically destroy the fossil remains. As such, only earthwork activities that will disturb potentially fossil-bearing geologic units (i.e., those rated with a high or moderate paleontological sensitivity) have the potential to significantly impact paleontological resources. Under California Environmental Quality Act and City of San Diego guidelines, paleontological mitigation typically is recommended to reduce any negative impacts to paleontological resources to less than significant levels.

The purpose of the impact analysis is to determine whether proposed Project-related earthwork may disturb potentially fossil-bearing geologic formations, and where and at what depths this earthwork will occur. The paleontological impact analysis involved analysis of all available Project documents (e.g., project description, project plans), and comparison with geological and paleontological data gathered during the records search, literature review, and field survey.

3.0 Existing Conditions: Geologic Setting

The Project site is located along the coastal plain of San Diego County, within the Peninsular Ranges Geomorphic Province of California. Along the coastal plain, basement rocks of the Jurassic-Cretaceous-age Santiago Peak Volcanics and the Cretaceous-age Peninsular Ranges Batholith are nonconformably overlain by a “layer cake” sequence of sedimentary strata of late Cretaceous, Eocene, Oligocene, Miocene, Pliocene, and/or Pleistocene age (Givens and Kennedy, 1979; Hanna, 1926; Kennedy, 1975; Kennedy and Moore, 1971; Kennedy and Peterson, 1975; Peterson and Kennedy, 1974; Walsh and Deméré, 1991).

In the vicinity of the Project site, the sedimentary rocks are mapped by Todd (2004) as the Pleistocene-age Lindavista Formation (about 1.5–0.5 million years old) (Figure 2), while Tan and Kennedy (2002) map these same rocks as unnamed Quaternary very old alluvial deposits. Following deposition of the Lindavista Formation, falling global sea levels combined with local and regional uplift (e.g., Artim and Pinckney, 1973; Kennedy, 1975; Kern and Rockwell, 1992) led to the exposure of Lindavista Formation sediments at the Project site. Eventually, erosion by the Otay River and its tributaries led to the creation of valleys and canyons nearby, exposing the older sediments of the underlying San Diego Formation and Otay Formation in canyon walls to the east, north, and west of the Project site.



4.0 Results

4.1 Results of the Literature Review and Records Search

The Lindavista Formation (Kennedy, 1975) is composed of marine and/or non-marine terrace deposits of early to middle Pleistocene age (approximately 1.5–0.5 million years old). Typical exposures of the formation consist of rust-red, coarse-grained, pebbly sandstones and pebble conglomerates with locally common deposits of green claystone. These deposits primarily accumulated on a flat, wave-cut platform (i.e., sea floor) during a period of dropping sea levels. Today, these deposits form the extensive mesa surfaces characteristic of the Otay Mesa, San Diego Mesa, Linda Vista Mesa, Kearny Mesa, and Mira Mesa areas of the County.

Geotechnical exploratory work conducted in 2011 for the Cross Border Facility located immediately west of the Project Site found that the geology of that area consists of a layer-cake series of sedimentary deposits including a surficial veneer of undocumented artificial fill (up to 5 feet thick), underlain by up to 35 feet of unnamed Pleistocene terrace deposits, which in turn overlie sandstones of the Oligocene-age Otay Formation (Kleinfelder West, Inc., 2011). The unnamed Pleistocene terrace deposits include an upper, 8 to 9 foot thick layer of brown to gray sandy clay and a lower, perhaps 25 to 30 foot thick layer of reddish brown, clayey sands with abundant gravel, cobbles, and even boulders. It is likely that these subsurface conditions extend to the east and into the Project site.

A records search of paleontological collections data at the SDNHM indicates there are no known fossil localities within a 1-mile radius of the Project site. However, by expanding the search radius to 5 miles, 182 fossil localities are known, four of which are from the Lindavista Formation. Thus, it is possible that the negative result obtained from a 1-mile radius records search is due to an absence of paleontological study of the area immediately surrounding the Project site rather than an actual absence of paleontological resources. Fossil localities are somewhat rare in the Lindavista Formation, and typically consist of remains of nearshore marine invertebrates including clams, scallops, snails, barnacles, and sand dollars, as well as sparse remains of sharks and baleen whales (Kennedy, 1973; SDSNH unpublished paleontological collections data).

4.2 Results of the Paleontological Field Survey

The ground surface at the Project site is mostly flat-lying or gently sloping to the south, and is crossed by two small drainages that run from the east-central and west-central sides of the site to converge in the southwestern corner of the site. The Project site is heavily overgrown with vegetation, particularly in the western and easternmost portions of the site, and does not appear to have been previously developed, with the exception of some restoration work along the drainages running through the southern half of the Project site and some disturbance indicated by piles of presumably imported fill located in the center of the site. Several natural and man-made exposures of sedimentary deposits were identified during the paleontological field survey, including the banks of the drainages and tailings presumably derived from previous geotechnical work.

The paleontological field survey confirmed the presence of probable Pleistocene-age nearshore marine to fluvial deposits on site. These deposits generally consisted of pale red to brown, pebbly, fine- to coarse-grained sandstone (Figure 3). Additional observed sedimentary deposits consisted of pale red, massive, silty sandstone; mottled red and green, laminated, pebbly, coarse-grained sandstone; and brown, poorly sorted, muddy, coarse-grained sandstone. These strata are tentatively assigned to the Lindavista Formation, as mapped by Todd (2004).

No fossils were observed in exposed sedimentary deposits during the paleontological field survey.



Figure 3. Exposures of sedimentary deposits at the Project site that were examined during the paleontological field survey. **Top:** Overview of the Project site, facing southwest, with pale red pebbly sandstone visible at the surface. **Bottom:** Outcrop of pale red and gray, pebbly, fine-grained sandstone located in the southwestern portion of the Project site.

4.3 Results of the Paleontological Resource Assessment

The Lindavista Formation is assigned a moderate paleontological sensitivity based on the occurrence of sparse but significant fossils known from the Lindavista Formation in San Diego County (Figure 4).

As mapped by Todd (2004), deposits of the Lindavista Formation are exposed at the surface across the entire Project site. The paleontological field survey generally confirmed these conditions, where visible.

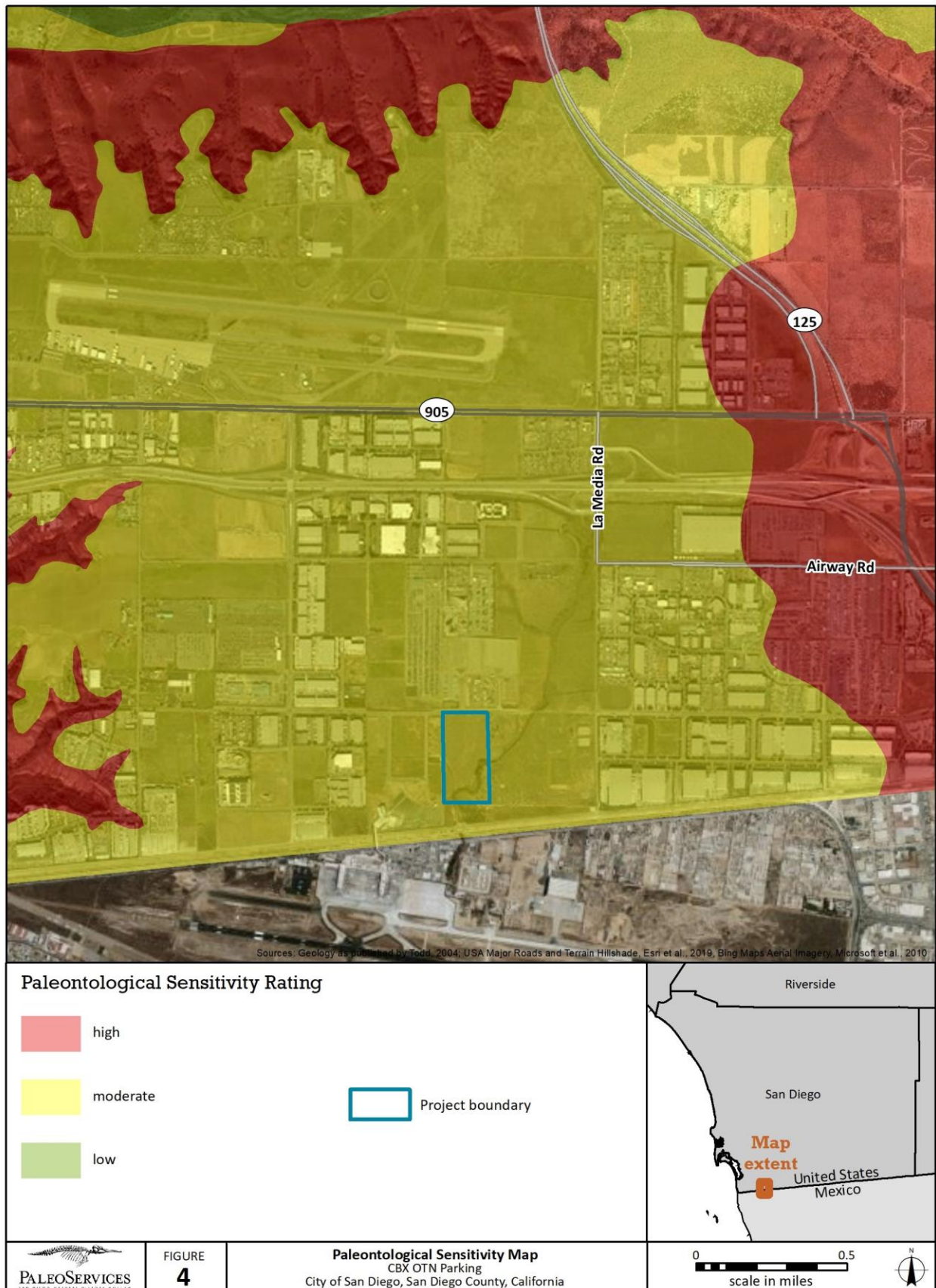
4.4 Results of the Paleontological Impact Analysis

As discussed above, current geologic mapping of the Project site indicates that it is immediately underlain by moderate paleontological sensitivity deposits of the Lindavista Formation.

Based on a review of the preliminary Project plans, it appears that earthwork will involve shallow grading of the site and deeper trenching for associated storm drain infrastructure and excavation of two biofiltration basins. As a general rule, earthwork extending less than 5 feet below existing surface grade in this area of San Diego is considered to be unlikely to significantly impact paleontological resources, primarily due to the small volume of impacted strata and the likely occurrence of surficial artificial fill. In addition, the uppermost several feet of strata are commonly weathered as a result of chemical and/or physical processes associated with soil development, groundwater penetration, and exposure to the elements. However, should earthwork extend more than 5 feet below existing surface grade, they will likely impact previously undisturbed and unweathered deposits of the Lindavista Formation. In the event that this occurs, a paleontological mitigation program should be implemented to reduce these impacts to below significant levels.

Table 1. Summary of geologic units underlying the Project site and paleontological monitoring recommendations for the Project, as currently outlined.

Geologic Unit	Age	Paleontological Sensitivity	Type of Earthwork	Monitoring Recommended
Lindavista Formation	early to middle Pleistocene	moderate	shallow grading, trenching for storm drains, excavation of biofiltration basins	No (depths < 5 ft.); Yes (depths > 5 ft.)



5.0 Recommendations & Conclusions

Taking into consideration the shallow nature of planned site mass grading, the weathered nature of exposed surficial sedimentary deposits, and the likely occurrence of areas of artificial fill, it is suggested that paleontological monitoring of general mass grading activities is unnecessary. However, implementation of a paleontological mitigation program, in the form of paleontological monitoring, is recommended for earthwork at the Project site that extends more than 5 feet below existing surface grade (e.g., deep utility trenching and biofiltration basin grading). Implementation of the following mitigation measures will reduce Project-related impacts to paleontological resources to a level that is less than significant.

5.1 Mitigation Measures

1. **Pre-construction (personnel and repository):** Prior to the commencement of construction, a qualified Project Paleontologist shall be retained to oversee the mitigation program (a Project Paleontologist is a person with a Ph.D. or Master's Degree in Paleontology or related field, and who has knowledge of San Diego County paleontology and documented experience in professional paleontological procedures and techniques). In addition, a regional fossil repository shall be designated to receive any discovered fossils (because the Project is in the City of San Diego, the recommended repository is the San Diego Natural History Museum).
2. **Pre-construction (meeting):** The Project Paleontologist should attend the pre-construction meeting to consult with the grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues.
3. **During construction (monitoring):** A paleontological monitor (working under the direction of the Project Paleontologist) should be on-site on a full-time basis during all earthwork extending more than 5 feet below existing surface grade impacting previously undisturbed deposits of the Lindavista Formation (moderate paleontological sensitivity) to inspect exposures for unearthened fossils. Monitoring may be reduced or terminated at the discretion of the Project Paleontologist, based on the results of initial monitoring.
4. **During construction (fossil recovery):** If fossils are discovered, the Project Paleontologist (or paleontological monitor) should recover them. In most cases, fossil salvage can be completed in a short period of time. However, some fossil specimens (e.g., a bone bed or a complete large mammal skeleton) may require an extended salvage period. In these instances, the Project Paleontologist (or paleontological monitor) has the authority to temporarily direct, divert, or halt grading to allow recovery of fossil remains in a timely manner.
5. **Post-construction (treatment):** Fossil remains collected during monitoring and salvage should be cleaned, repaired, sorted, and cataloged as part of the mitigation program.
6. **Post-construction (curation):** Prepared fossils, along with copies of all pertinent field notes, photos, and maps, should be deposited (as a donation) in the designated fossil repository. Donation of the fossils shall be accompanied by financial support for initial specimen storage.
7. **Post-construction (final report):** A final summary paleontological mitigation report should be completed that outlines the results of the mitigation program. This report should include discussions of the methods used, stratigraphic section(s) exposed, fossils collected, inventory lists of catalogued fossils, and significance of recovered fossils.

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