
Paleontological Resources Report

East Indio Employment Corridor Annexation Study

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Prepared for:

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1 Introduction

1.1 Project Overview

The East Indio Employment Corridor Annexation Study (Project) is a focused planning study to analyze the potential annexation of approximately 4,609 acres of unincorporated County of Riverside land into the City of Indio's (City) boundary. The Project Area is part of the City's Eastern Sphere of Influence (SOI) that is located adjacent to the City's eastern city boundary and envisioned for potential future annexation per the City's General Plan. The Project Area, as shown in **Figure 1**, is largely passive open space, with a limited amount of existing commercial development and resource extraction. The City envisions this area as a future employment hub with a mix of employment-generating uses, such as a business park with light industrial and logistics, office, retail, in addition to workforce housing and open space, to support job creation and diversification, enhance services, and promote investment in the city. The City's goal for the Project is to identify the portion of the Project Area for annexation through a series of supportive analyses and ongoing outreach and engagement with interested parties, as well as to prepare the required Riverside Local Agency Formation Commission (LAFCO) application to facilitate a request for annexation.

1.2 Purpose of this Report

Paleontological resources are the remains or traces of plants and animals that are preserved in the Earth's crust, and per SVP (2010) guidelines, are older than written history or older than approximately 5,000 years, which approximates the middle Holocene (Cohen et al. 2024). To determine the paleontological sensitivity of the Project Area, Dudek performed a paleontological resources desktop review in compliance with the California Environmental Quality Act (CEQA) and the Society of Vertebrate Paleontology ([SVP] 2010). The inventory consisted of a paleontological records search through the Natural History Museum of Los Angeles County (NHMLA) and the Western Science Center in Hemet (WSC), an unofficial records search through the American Museum of Natural History (AMNH) online collections database, and a review of geological mapping and geological and paleontological literature.

While the Project is not in the CEQA phase of work, Dudek has conducted an evaluation that is pursuant to the requirements of CEQA and SVP (2010) guidelines to determine the presence of, and potential impacts related to, paleontological resources associated with proposed construction or development within the Project Area (**Figure 1** and **Table 1**). Note that this report should be reviewed in concert with other desktop reports, including Land Use and Community Profile, Cultural Resources, Biological Resources, Public Services and Utilities, Transportation, and Geotechnical, to understand the full opportunities and constraints to the Project Area.

1.3 Key Issues and Opportunities

Table 1. Paleontological Resources Potential

Topic	Description
Issue	
<p>Paleontological Sensitivity of Project Area</p>	<p>High paleontological sensitivity areas have been mapped within the southern portion of the Project Area. These areas are either coterminous with high sensitivity areas mapped by the County of Riverside and/or are areas where the paleontologically sensitive Ocotillo Formation are mapped at the surface, Table 2 and Figure 2 outline these sensitivities and show where they are mapped within the Project Area.</p> <p>Therefore, the Project Area has the potential to produce significant paleontological resources during ground disturbing activities. Ground-disturbing activities associated with construction of the proposed Project, such as grading during site preparation, large diameter (two-foot or greater) augering, and trenching for utilities, have the potential to destroy a unique paleontological resource or site. As such, the Project Area is considered to be potentially sensitive for paleontological resources, and without mitigation, the potential damage to paleontological resources during construction associated with the Project is considered a potentially significant impact.</p>
<p>Potential Additional Paleontological Sensitivity</p>	<p>The NHMLA reported over one dozen nearby fossil localities from the same sedimentary deposits that underlie the Project Area on the surface or at depth, and the WSC in Hemet has one fossil locality just outside the Project’s one-mile radius buffer. Given the proximity of past fossil discoveries in the surrounding area from Lake Cahuilla deposits and the Ocotillo Formation, the Project Area is highly sensitive for supporting paleontological resources below the depth of fill and weathered Lake Cahuilla deposits and the Ocotillo Formation.</p> <p>Within the Project Area, the potential Lake Cahuilla deposits are not differentiated from other Quaternary alluvial deposits, mapped surficially as Quaternary alluvium (Qa), which are all the low sensitivity deposits indicated on Figure 2. Lake Cahuilla deposits have high paleontological sensitivity whereas Quaternary alluvial deposits generally have low paleontological sensitivity that increases to high sensitivity with depth. Each potential construction project should be evaluated by a qualified paleontologist on a project-by-project basis.</p>
Opportunity	
<p>Negative Paleontological Records</p>	<p>Although there is the potential for paleontological resources to occur within the Project Area, the results of the paleontological records searches were negative for paleontological resources within the Project Area and within a one-mile radius buffer of the Project Area boundary.</p> <p>In addition, the Project Area is not anticipated to be underlain by unique geologic features.</p>

Table 1. Paleontological Resources Potential

Topic	Description
<p>Potential Mitigation Measures Reduce Impacts to Below a Level of Significance</p>	<p>Upon implementation of the following mitigation measure, impacts would be reduced to below a level of significance.</p> <ul style="list-style-type: none"> • Mitigation would require a qualified paleontologist to prepare and implement a Paleontological Resources Impact Mitigation Program (PRIMP). The PRIMP would require Worker Environmental Awareness Training for construction personnel at a preconstruction meeting and paleontological monitoring within undisturbed Lake Cahuilla deposits and the Ocotillo Formation. The PRIMP would also detail paleontological resource discovery protocols. <ul style="list-style-type: none"> - Prior to commencement of any grading activity on-site, the applicant shall retain a qualified paleontologist to prepare a Paleontological Resources Impact Mitigation Program (PRIMP). - The qualified paleontologist shall attend the preconstruction meeting, and a qualified paleontological monitor shall be on-site during all rough grading and other significant ground-disturbing activities (including augering) in previously undisturbed Lake Cahuilla deposits and the Ocotillo Formation. - In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow recovery of paleontological resources. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will remove the rope and allow grading to recommence in the area of the find. Any costs associated with laboratory work and curation fees at the Western Science Center, or another appropriate repository are the responsibility of the Project applicant.
<p>Potential New Species</p>	<p>Discovery of significant paleontological resources during Project construction can result in a new species, extend the geographical range of known fossil species, or assist in our understanding of the geology, paleontology, and paleoclimate of the region.</p>

2 Paleontological Technical Section

2.1 Analysis Methodology

Establishment of the Project Area’s existing paleontological conditions have been informed by site-specific paleontological records searches, a review of several online collections databases, and a review of published geological maps and published and unpublished reports to identify geological units located on the Project Area and determine their paleontological sensitivity.

A paleontological records search request was sent to the NHMLA and WSC on September 3, 2024. The records search area included the Project Area originally conceived for this project in 2024 and a one-mile radius buffer, which includes the current and expanded Project Area as of June 2025. The purpose of the records search was to determine whether there are any known fossil localities in or near the Project Area to aid in determining whether a paleontological mitigation program is warranted to avoid or minimize potential adverse effects of construction on paleontological resources.

2.2 Paleontological Resources

Paleontological resources are the remains or traces of plants and animals that are preserved in the Earth’s crust, and per SVP (2010) guidelines, are older than written history or older than approximately 5,000 years, which approximates the middle Holocene (Cohen et al. 2024). They are limited, nonrenewable resources of scientific and educational value and are afforded protection under state laws and regulations. This analysis complies with guidelines and significance criteria specified by CEQA and SVP (2010). **Table 2**, Paleontological Resource Sensitivity Criteria, provides definitions for high, low, and undetermined paleontological resource potential, or sensitivity, as set forth in and by the County of Riverside, Riverside County Information Technology (RCIT) (2024). **Figure 2** is the paleontological sensitivity map for the Project that corresponds to the sensitivity definitions as listed in **Table 2**.

Table 2. Paleontological Resource Sensitivity Criteria

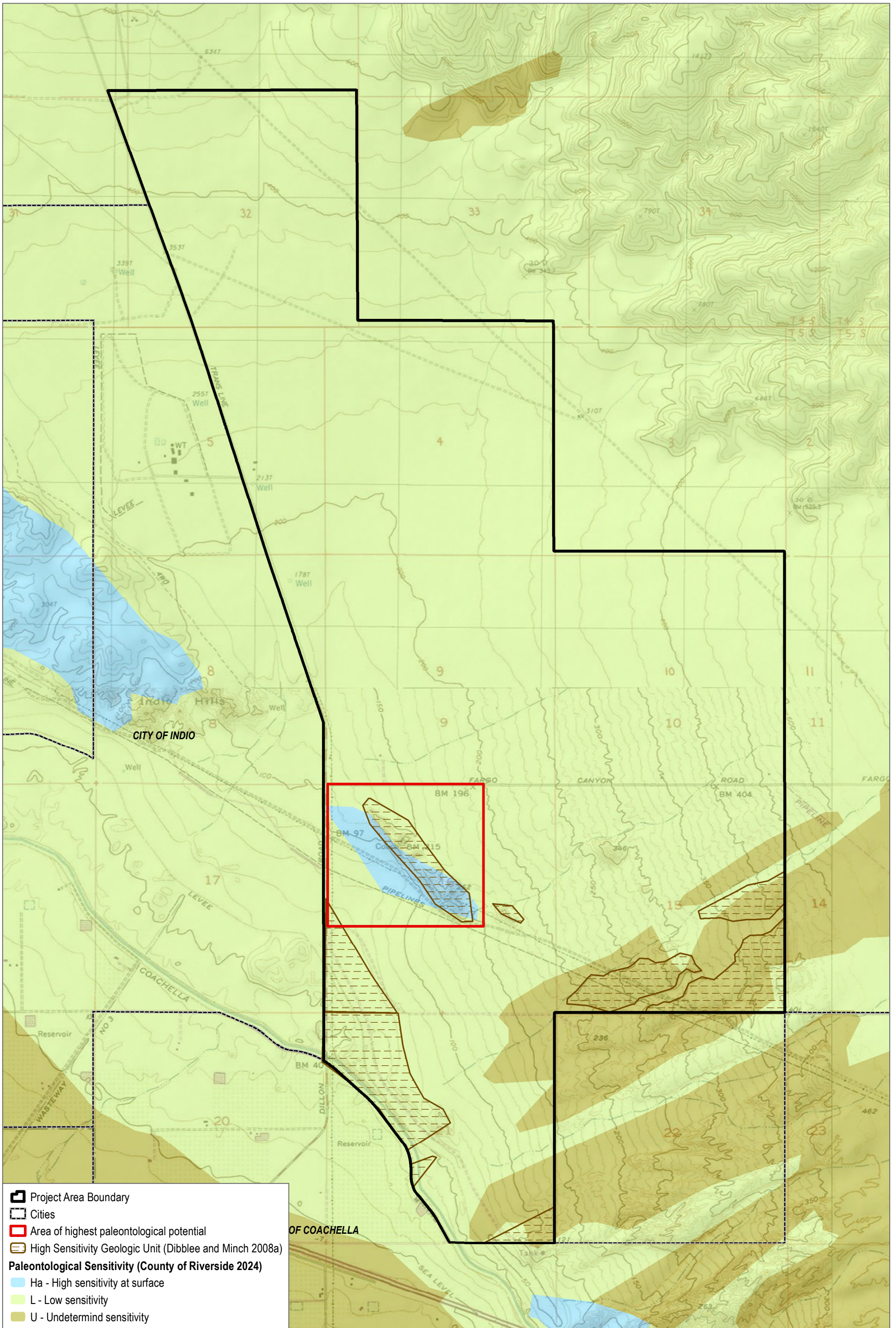
Resource Sensitivity/Potential	Definition
High (H)	Formations or rock units that are known to contain or have the correct age and depositional conditions to contain paleontologic resources. High Sensitivity formations can be further classified: Ha: Areas where nonrenewable paleontological resources are known from surface outcrops. Hb: Areas of high sensitivity where sediments containing paleontological resources are expected at depth. The depth at which these sediments occur must be determined by developing cross sections and/or reviewing geotechnical boring logs that locate such sediments.
Low (L)	Determined by a qualified vertebrate paleontologist conducting a literature and records review as well as a field survey. Low sensitivity cannot be determined by simply looking for rock unit descriptions on

Table 2. Paleontological Resource Sensitivity Criteria

Resource Sensitivity/Potential	Definition
Undetermined (U)	a geologic map. Areas underlain by sedimentary rocks about which literature and unpublished studies are not available and which, therefore, must be evaluated by field studies and then designated Ha, Hb, or L.

Source: County of Riverside RCIT (2024).

In conjunction with **Table 1**, as shown above, **Figure 2**, below, shows the areas with the most potential to produce paleontological resources within the Project Area. These areas are as follows: 1. Highlighted blue to represent the County of Riverside’s determination of “High (Ha)” paleontological sensitivity/ potential. 2. Areas represented by brown cross-hatching to show where geologic units of High sensitivity are mapped surficially within the Project Area. 3. Areas highlighted in brown represent the County of Riverside’s determination of “Undetermined (U)” paleontological sensitivity/potential, which require a field survey to assign a sensitivity of high or low to those areas. 4. Areas highlighted in green the County of Riverside has designated as “Low (L)” paleontological sensitivity/potential, but still requires a field survey in support of this determination.



SOURCE: USGS 7.5-Minute Series Quadrangles; County of Riverside 2024; Dibblee and Minch 2008a;

2.3 Regulatory Framework

The California Environmental Quality Act

While the project is not in the CEQA phase of work, this paleontological resources evaluation was completed to the standards of CEQA Guidelines as a best practice. The CEQA Guidelines require that all private and public activities not specifically exempted be evaluated against the potential for environmental impacts, including effects to paleontological resources. Paleontological resources, which are limited, nonrenewable resources of scientific, cultural, and educational value, are recognized as part of the environment under these state guidelines. This study satisfies Project requirements in accordance with CEQA (13 PRC [Public Resources Code], 15000 et seq.).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the “Environmental Checklist Form,” which addresses the potential for adverse impacts to “unique paleontological resource[s] or site[s] or ... unique geological feature[s].” This provision covers scientifically significant fossils, which include, but are not limited to, newly discovered species or genera, fossils exhibiting morphological features not previously recognized for a given animal group, fossils that increase the temporal range of a species, fossils discovered from geological units within which they were previously unknown, fossils that expand the biogeographic range of a species, and/or localities that yield fossils significant in their abundance, diversity, and preservation.

California Public Resources Code Section 5097.5

In addition to CEQA’s requirements, Public Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792) regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

Riverside County General Plan Multipurpose Open Space Element (2017)

The Multipurpose Open Space Element of the Riverside County General Plan discusses policies regarding paleontological resources (Riverside County 2017). In particular, it discusses the county inventory of fossils, and the corresponding paleontological sensitivities assigned to particular areas within the county. These sensitivities are to be used in the environmental assessment of development proposals and the determination of mitigation impacts. The following policies are to ensure that paleontological resources are appropriately considered.

OS 19.6: Whenever existing information indicates that a site proposed for development has high paleontological sensitivity as shown on Figure OS-8, a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist prior to site grading. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.

OS 19.7: Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown on Figure OS-8, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall be retained by the Project proponent. The paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

OS 19.8: Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-8, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources prior to approval of that department.

OS 19.9: Whenever paleontological resources are found, the County Geologist shall direct them to a facility within Riverside County for their curation, including the Western Science Center in the City of Hemet.

2.4 Environmental Setting

Geological Literature and Map Review

The Project Area lies in the northern and westernmost edge of the Colorado Desert Geomorphic Province, which is located between the Mojave Desert and Peninsular Ranges geomorphic provinces and occupies the plate boundary. It is characterized as being the on-land extension of the Gulf of California, is largely below sea level, and is an arid basin consisting mostly of the Salton Sea and ancient lake beds. It is tectonically active and has numerous geothermal features in its southern section as a result (California Geological Survey 2002).

According to surficial geological mapping by Dibblee and Minch (2008 a,b) at a 1:62,500 scale, the proposed Project Area is underlain by late Holocene to middle Holocene (recent to 8,200 years ago; Cohen et al. 2024) surficial sediments (mapped as Qa) and the late Pliocene (2.58 million years ago to 3.6 million years ago; Cohen et al. 2024) Ocotillo Formation upper beds (map unit Qo-u). This upper part of the formation described as a gray boulder-conglomerate. The Ocotillo Formation has high (high a) paleontological sensitivity.

Paleontological Literature Review

Two nearby localities are recorded in Jefferson (2012) from the same or similar sediments as those that underlie the Project Area. The Miles Avenue Bridge locality (Anza Borrego Desert State Park [ABDSP] 3233) in Indio, located 5.3 miles west of the Project Area, yielded fish, snakes, rodents, and sheep fossils from Lake Cahuilla beds (Jefferson 2012). This same area is mapped as Qa on Dibblee and Minch (2008a). Another Lake Cahuilla bed fossil locality, located approximately 6.5 miles southwest of the Project Area in the city of La Quinta, produced fossil invertebrates and vertebrates. The late Pleistocene vertebrates include fish, frogs, salamanders, lizards, snakes, birds, and small- and medium-sized mammals (Jefferson 2012)

Paleontological Records Searches

A search of the American Museum of Natural History (AMNH) online collections database returned one locality approximately 4.8 miles north-northwest of the Project Area. This locality (AMNH FM 116148) yielded the partial skull and teeth of a fossil horse from an unnamed geologic unit (AMNH 2024). No other online fossil databases returned any fossil localities relevant to this Project.

The NHMLA paleontological records search results were received on September 15, 2024 (Confidential Appendix A). The NHMLA did not report any fossil localities from within the Project Area or from within a one-mile radius buffer of the Project Area. They did, however, report five vertebrate fossil localities and 25 invertebrate fossil localities from the same or similar sediments (Lake Cahuilla beds) as those found underlying the Project Area on the surface and/or at depth. These localities were recorded in the Coachella Valley from Indio to the Salton Sea

and include LACM VP (Los Angeles County Museum Vertebrate Paleontology) 6252-6256 and 25 invertebrate localities that produced several types of rodents, rabbit, snakes, lizards, birds, fish, freshwater invertebrate such as mussels and snails, from Lake Cahuilla beds at the surface to 20 feet below ground surface (bgs) (NHMLA 2024, Confidential Appendix A). LACM VP 1139, 1140, 1148-1152, 3233-3239, 5834, 6921 produced Edward's wolf, horse, rabbit, and other unspecified vertebrates from conglomeratic beds matching the Ocotillo Formation in the Mecca Hills (NHMLA 2024, Confidential Appendix A). Lastly, localities LACM VP 6916-6920; 7082-7085 produced horse, antelope, camel, deer and other uncatalogued mammals from the Ocotillo Formation in the Anza-Borrego Desert (NHMLA 2024, Confidential Appendix A).

The WSC records search results were received on October 12, 2024 (WSC 2024, Confidential Appendix A). The WSC did not report any fossil localities from within the Project Area or from within a one-mile radius buffer of the Project Area. They did, however, report one locality approximately 2.11 miles west of the Project Area boundary in the Indio Hills. WSC Locality 195 yielded rodents, rabbits, lizards, gastropods and plant material from an unspecified geological unit.

3 Constraints

No paleontological resources were identified within the Project Area as a result of the institutional records search or desktop geological and paleontological review. In addition, the Project Area is not anticipated to be underlain by unique geologic features. The Project Area is underlain by late to middle to late Holocene surficial sediments which would normally have low paleontological sensitivity, but this same area has localities from Lake Cahuilla beds mapped nearby, so the sensitivity is likely higher due to the undifferentiated sediments. The late Pliocene-age Ocotillo Formation upper beds have high paleontological sensitivity (**Figure 2**).

Areas within the Project Area boundary mapped as 1. late Pliocene-age Ocotillo Formation and/or 2. areas designated by the County of Riverside as “High (H)a” have the highest potential for producing fossils (**Figure 2, Table 2**). Areas mapped as 3. “Undetermined (U)” have the potential to produce fossils but that can only be determined by field surveys in support or either assigning a “high” or “low” potential to those areas (**Figure 2, Table 2**). These three types of areas would require more work and potential elevated cost when determining budgets for development within these areas as there would be higher potential for discovering paleontological resources. Areas designated by the County of Riverside as having “Low (L)” paleontological sensitivity/potential require a paleontological survey in support of that designation (**Figure 2, Table 2**). This would presumably establish the presence or absence of the Lake Cahuilla beds within the Project Area.

Within or outside of the potential fossil producing areas, as stated above, if intact paleontological resources are located onsite, ground-disturbing activities associated with construction of the proposed Project, such as grading during site preparation, large diameter (two-feet or greater) augering, and trenching for utilities, have the potential to destroy a unique paleontological resource or site. As such, the Project Area is considered to be potentially sensitive for paleontological resources, and without mitigation, the potential damage to paleontological resources during construction associated with the Project is considered a potentially significant impact.

Given the proximity of past fossil discoveries in the surrounding area from Lake Cahuilla deposits and the Ocotillo Formation, the Project Area, as a whole, is highly sensitive for supporting paleontological resources below the depth of fill and weathered Lake Cahuilla deposits and the Ocotillo Formation and has the ability to preserve fossil resources within and outside of areas already determined to have high paleontological sensitivity/ potential.

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Confidential Appendix A

Records Search Results (Confidential)