

2.11 Paleontological Resources

This section discusses existing conditions and potential impacts to paleontological resources resulting from implementation of the proposed project. The analysis is based on a review of existing paleontological resources; technical data; and applicable laws, regulations, and guidelines, and identifies measures to mitigate impacts to paleontological resources.

Comments received in response to the Notice of Preparation (NOP) did not pertain to paleontological resources. A copy of the NOP and comment letters received in response to the NOP is included in Appendix A of this EIR.

2.11.1 Existing Conditions

Paleontological resources are the remains and/or traces of prehistoric life, exclusive of remains from human activities, and include the localities where fossils were collected and the sedimentary rock formations from which they were obtained/derived. The defining character of fossils is their geologic age. Fossils or fossil deposits are generally regarded as older than 10,000 years, the generally accepted temporal boundary marking the end of the last Late Pleistocene glacial event and the beginning of the current period of climatic amelioration of the Holocene (County of San Diego 2009).

A unique paleontological resource is any fossil or assemblage of fossils, or paleontological resource site or formation that meets any one of the following criteria (County of San Diego 2009):

- The best example of its kind locally or regionally;
- Illustrates a paleontological or evolutionary principle (e.g., faunal succession; plant or animal relationships);
- Provides a critical piece of paleobiological data (illustrates a portion of geologic history or provides evolutionary, paleoclimatic, paleoecological, paleoenvironmental, or biochronological data);
- Encompasses any part of a “type locality” of a fossil or formation;
- Contains a unique or particularly unusual assemblage of fossils;
- Occupies a unique position stratigraphically within a formation; or
- Occupies a unique position, proximally, distally or laterally within a formation’s extent or distribution.

Per the County of San Diego (County) Guidelines, paleontological sensitivity is defined as follows:

High: High resource potential and high sensitivity are assigned to geologic formations known to contain paleontological localities with rare, well preserved, critical fossil materials for stratigraphic or paleoenvironmental interpretation, and fossils providing important information about the paleoclimatic, paleobiological, and/or evolutionary history (phylogeny) of animal and plant groups. In general, formations with high resource potential are considered to have the highest potential to produce unique invertebrate fossil assemblages or unique vertebrate fossil remains and are, therefore, highly sensitive.

Moderate: Moderate resource potential and moderate sensitivity are assigned to geologic formations known to contain paleontological localities. These geologic formations are judged to have a strong, but often unproven, potential for producing unique fossil remains.

Low: Low resource potential and low sensitivity are assigned to geologic formations that, based on their relatively young age and/or high-energy depositional history, are judged unlikely to produce unique fossil remains. Low resource potential formations rarely produce fossil remains of scientific significance and are considered to have low sensitivity. However, when fossils are found in these formations, they are often very significant additions to our geologic understanding of the area.

Marginal: Marginal resource potential and marginal sensitivity are assigned to geologic formations that are composed either of volcanoclastic (derived from volcanic sources) or metasedimentary rocks, but that nevertheless have a limited probability for producing fossils from certain formations at localized outcrops. Volcanoclastic rock can contain organisms that were fossilized by being covered by ash, dust, mud, or other debris from volcanoes. Sedimentary rocks that have been metamorphosed by heat and/or pressure caused by volcanoes or plutons are called metasedimentary. If the sedimentary rocks had paleontological resources within them, those resources may have survived the metamorphism and still be identifiable within the metasedimentary rock, but since the probability of this occurring is so limited, these formations are considered marginally sensitive.

No Potential: No resource potential is assigned to geologic formations that are composed entirely of volcanic or plutonic igneous rock, such as basalt or granite, and therefore do not have any potential for producing fossil remains. These formations have no paleontological resource potential.

Geologic Setting

Alluvium (Qal)

Quaternary-aged alluvium is present in the bottom of the canyons and drainages on the project Site. These soils are generally thin (less than 3 feet) and unmapped, except where identified by the subsurface investigation and field mapping. Significant thicknesses of alluvial deposits have been identified within the following areas: the northwestern canyon near the crude abandoned runway (3 to 10 feet), the northeast-southwest-trending canyon within the southwestern portion of the Site (6 to 10 feet), and the main canyon accessed by Sarver Lane to the south of the Site (more than 10 feet).

Alluvial soils likely underlie all of the on-site canyons, but in the upper elevations of the Site, the canyons were considered to be too narrow in lateral extent to be presented on the map at the scale provided. These soils typically consist of brown, damp to wet, loose to medium dense/stiff, silty sands, sandy clays and silty clays. The alluvium is also considered to be moderately porous and usually contains localized zones of moderate to abundant roots and other organic matter (EIR, Appendix J).

Older Quaternary Alluvium (Qalo)

Older alluvium was encountered in the deeper portion of the main canyon in the southwest corner of the project Site. It consists of red-brown to orange-brown silty sand with gravel older than the overlying Quaternary alluvium (Qal), the older alluvial deposits are generally medium dense to dense and moist. These materials are mapped in the lower portions (deeper than 10 to 15 feet below the ground surface) of the main canyon accessed by Sarver Lane. They are expected to represent the deeper, relatively dense and moist alluvial deposits (EIR, Appendix J).

Quaternary Slopewash (Qsw)

Quaternary slopewash includes residual materials shed from slopes and deposited on the lower portions of the slopes and within localized drainages. As encountered, the materials consist of light brown to gray-brown silty sand, dense and generally homogeneous. Resistant clasts of relatively unweathered granite are locally suspended within the deposits, which are anticipated to be on the order of 5 to 20 feet in thickness. These deposits are generally medium dense to dense, but are still locally porous and potentially compressible (EIR, Appendix J).

Possible Quaternary Landslide Deposits (Qls)

Review of available geologic literature indicates the presence of possible ancient landslide debris on the eastern edge of the project. This possible large landslide was mapped by others along the central portion of the eastern Site property line and beneath Interstate (I) 15 (SDAG 1988, as

cited in EIR, Appendix J). The landslide has only been mapped based on its surficial expression and has never been confirmed by a subsurface investigation.

Cretaceous Granitic Rock (Kgr)

Granitic rock outcrops were observed across the vast majority of the project Site, and granitic rock underlies the project Site at depths not exposed at the surface. The material generally consists of medium to coarse-grained quartz-rich granite rock. Large granitic boulders characterize the outcrops in the upper regions of the project Site, and in the mid- to lower-regions of the project Site, weathered granitic material was observed in road cuts below the topsoil/colluvium. The weathered granitics generally consists of light gray to light red brown, damp, dense, fine to coarse sand with localized residual boulders throughout. As observed in the trenches and existing road cuts, the depth of highly weathered rock varied from inches to less than 1 to 7 feet below the ground surface, or bedrock contact where these materials are buried. The seismic traverses performed at the project Site and observation of existing cut slopes also substantiates the very dense nature of the on-site bedrock (EIR, Appendix J).

Jurassic-Cretaceous Metavolcanic Rock (KJm)

Metavolcanic rocks are mapped within a narrow band along the western margin of the project Site, including the quarry area. This relatively variable unit consists of schist, quartzite, argillite, gneiss, and meta-basalt. These metamorphosed rocks represent the older rocks, intruded and altered by the young Cretaceous-aged Granitics (Kgr), and tend to be more basic, and therefore less resistant to weathering. These rocks generally form more subdued erodible topography than the adjacent Cretaceous granitic rocks mapped to the east and west of the Site (EIR, Appendix J).

Paleontological Resource Potential

According to geotechnical investigations for the project and published geological mapping (Kennedy and Tan 2007), igneous and metamorphic bedrock underlies the majority of the project Site (EIR, Appendix J). These rock types have no potential to yield paleontological resources. The only potential for paleontological resources would be within the areas underlain by sedimentary deposits. These occur in the southwestern area of the project Site (see EIR, Figure 2.6-1, Regional Geology Map), presumably at an unknown depth below the surface-mapped Holocene age Quaternary alluvium. Quaternary older alluvium, mapped in the extreme southeastern portion of the project Site along I-15 and Deer Springs Road, has the potential to yield Pleistocene age, or Ice Age, terrestrial mammals. In 2013, due north of the project Site, Caltrans excavation in surface mapped Pleistocene age deposits for the State Route 76: South Mission Road to I-15 Highway Improvement Project (approximately 7.5 miles north of the project Site) uncovered a partial skeleton and relatively complete skull of an extinct long-horned bison during shallow grading (less than 3 feet below the level of the existing freeway) (EIR, Appendix J).

2.11.2 Regulatory Setting

State Regulations

CEQA

CEQA requires lead agencies to consider the potential effects of a project on unique paleontological resources. CEQA requires an assessment of impacts associated with the direct or indirect destruction of unique paleontological resources or sites that are of value to the region or state.

Local Regulations

County of San Diego General Plan — Conservation and Open Space Element

The following goals and policies identified in the County General Plan Conservation and Open Space Element are applicable to the proposed project (County of San Diego 2011):

- **Goal COS-9: Education and Scientific Uses.** Paleontological resources and unique geologic features conserved for educational and/or scientific purposes.
 - **Policy COS-9.1: Preservation.** Require the salvage and preservation of unique paleontological resources when exposed to the elements during excavation or grading activities or other development processes.
 - **Policy COS-9.2: Impacts of Development.** Require development to minimize impacts to unique geological features from human related destruction, damage, or loss.

County of San Diego Grading Ordinance

The County Grading Ordinance requires that projects involving grading, clearing, and/or removal of natural vegetation obtain a grading permit, unless the project meets one or more of the exemptions listed in Section 87.202 of the Grading Ordinance. The grading permit is discretionary and requires compliance with CEQA. Section 87.430 of the Grading Ordinance provides that the County official (e.g., permit compliance coordinator) may require a paleontological monitor during all or selected grading operations, to monitor for the presence of paleontological resources. If fossils greater than 12 inches in any dimension are encountered, then all grading operations in the area of discovery must be suspended immediately and not resumed until authorized by the County official. The Grading Ordinance also requires immediate notification of the County official regarding the discovery. The County official must determine the appropriate resource recovery operation, which the permittee must carry out prior to the County official's authorization to resume normal grading operations (County of San Diego 2012).

2.11.3 Analysis of Project Effects and Determination as to Significance

Guidelines for the Determination of Significance

For purposes of this EIR, the County's Guidelines for Determining Significance, Report Format and Content Requirements: Paleontological Resources (County of San Diego 2009) applies to both the direct and cumulative impact analyses. As stated in the County guidelines, the significance criteria is whether the proposed project would directly or indirectly destroy a unique paleontological resource or site. A significant impact to paleontological resources may occur as a result of the project, if project-related grading or excavation will disturb the substratum or parent material below the major soil horizons in any paleontologically sensitive area of the County, as shown on the County's Paleontological Resources Potential and Sensitivity Map, as included in the County Guidelines (County of San Diego 2009).

As discussed in Section 2.11.1, the majority of the project Site has no potential to yield paleontological resources due to the underlying geologic formations consisting of igneous and metamorphic bedrock. However, some portions of the project Site are underlain by sedimentary alluvial formations that have the potential to yield paleontological resources. The affected portions of the project Site are the Town Center, the Valley, Sierra Farms Park, and Sarver Lane. The Town Center is directly underlain by Quaternary older alluvium, which has the potential to yield paleontological resources. The Valley, Sierra Farms Park, and Sarver Lane are directly underlain by younger alluvial deposits, which is likely to be underlain by older alluvium that has potential to yield paleontological resources.

County guidelines state that for projects within areas of high or moderate paleontological resource potential that propose excavation equal to or greater than 2,500 cubic yards, the services of a Project Paleontologist and a Paleontological Resources Monitor are required. Although it is unknown how much of the total cubic yards of excavation would occur specifically in areas of moderate or high paleontological sensitivity, it may exceed the 2,500 cubic yards threshold. Therefore, excavation in areas underlain by Quaternary older alluvium and younger alluvial deposits (Town Center, the Valley, Sierra Farms Park, and Sarver Lane) would result in **potentially significant impacts** to paleontological resources (**Impact PR-1**).

The I-15 interchange improvements are anticipated to occur in an area that is identified as "None" on the San Diego County Paleontological Resources Potential and Sensitivity Map; however, the interchange improvements are adjacent to the southeast corner of the Project near the Town Center, and as such may be underlain by sedimentary alluvial formations that have the potential to yield paleontological resources. Thus, even in light of the sensitivity designation, Caltrans can and should require paleontological monitors be present during grading activities to monitor the improvements and confirm no significant resources are encountered.

2.11.3.1 Consistency with Applicable Plans, Policies, and Ordinances

Boulders and other geologic features would be used to build a distinctive landscape identity throughout the Community, reflecting the surrounding landscape character. The proposed project would be consistent with Goal COS-9. County guidelines state that for projects within areas of potential high or moderate paleontological resources that propose excavation equal to or greater than 2,500 cubic yards, the services of a Project Paleontologist and a Paleontological Resources Monitor are required. Excavation in areas underlain by Quaternary older alluvium and younger alluvial deposits (Town Center, the Valley, Sierra Farms Park, and Sarver Lane) would comply with County guidelines for monitoring paleontological resources during excavation to minimize impacts and require salvage and preservation of any discovered paleontological resources. The proposed project would be consistent with policies COS-9.1 and COS-9.2.

For additional discussion on the proposed project's consistency with applicable land use plans and policies see Section 3.3, Land Use and Planning.

2.11.4 Cumulative Impact Analysis

Cumulative projects (shown in Figure 1-46, Cumulative Projects Map, and listed in Table 1-10, in Chapter 1) would have the potential to result in a cumulative impact associated with paleontological resources from extensive grading, excavation, or other ground-disturbing activities that are located in an area of high or moderate sensitivity. Cumulative projects would be regulated by state and local regulations, including CEQA and the County Grading Ordinance.

As discussed in Section 2.11.2, the proposed project is subject to the County Grading Ordinance, which requires a paleontological monitor to be present during grading or excavation activities at the discretion of the County, mandates the suspension of grading operations upon the discovery of fossils greater than 12 inches in any dimension, and gives the appropriate County official the authority to determine the appropriate resource recovery operations, which would be carried out prior to the County official's authorization to resume normal grading operations (County of San Diego 2012). Additionally, any other cumulative project that proposes extensive excavation in areas of moderate or high paleontological sensitivity would be required to retain a Project Paleontologist and a Paleontological Resources Monitor during excavations, similar to the proposed project. Cumulative projects located within the City of San Marcos that may affect paleontologically sensitive areas would protect paleontological resources consistent with the City of San Marcos General Plan. Therefore, the proposed project would **not result in a cumulatively considerable impact** to unique paleontological resources.

2.11.5 Significance of Impacts Prior to Mitigation

Impact PR-1 Although it is unknown how much of the total cubic yards of excavation would occur specifically in areas of moderate or high paleontological sensitivity (total cubic yards at these locations would be known prior to the issuance of the grading permit), it may exceed the 2,500 cubic yards threshold. Therefore, excavation in areas underlain by Quaternary older alluvium and younger alluvial deposits (Town Center, the Valley, Sierra Farms Park, and Sarver Lane) would result in potentially significant impacts to paleontological resources.

2.11.6 Mitigation Measures

M-PR-1 Paleontological Resources Monitoring

For excavation into geologic units of high or moderate paleontological potential (i.e., Town Center, the Valley, Sierra Farms park, and Sarver Lane), a Project Paleontologist or Paleontological Resources Monitor (under the supervision of the Project Paleontologist) shall be on -site during initial cutting, grading, or excavation into the substratum. The Project Paleontologist is a person with a PhD or master's degree in paleontology or a related field, and who has knowledge of San Diego County paleontology and documented experience in professional paleontological procedures and techniques. A Paleontological Resources Monitor is defined as an individual with at least 1 year of experience in field identification and collection of fossil materials under the supervision of a Project Paleontologist. The Paleontological Resources Monitor shall work under the direct supervision of the Project Paleontologist. The applicant shall authorize the Project Paleontologist and/or Paleontological Resources Monitor to direct, divert, or halt any grading activity, and to perform all other tasks required by the provisions listed below.

1. Monitor initial cutting, grading or excavation into the substratum;
2. If paleontological resources are unearthed the Project Paleontologist or Paleontological Resources Monitor, under supervision by the Project Paleontologist, shall:
 - a. Direct, divert, or halt any grading or excavation activity until such time that the sensitivity of the resource can be determined and the appropriate recovery implemented;

- b. Salvage unearthed fossil remains, including simple excavation of exposed specimens or, if necessary, plaster-jacketing of large and/or fragile specimens or more elaborate quarry excavations of richly fossiliferous deposits;
 - c. Record stratigraphic and geologic data to provide a context for the recovered fossil remains, typically including a detailed description of all paleontological localities within the stratigraphic section, if feasible, and photographic documentation of the geologic setting;
 - d. Prepare collected fossil remains for curation, to include cleaning the fossils by removing the enclosing rock material, stabilizing fragile specimens using glues and other hardeners, if necessary, and repairing broken specimens;
 - e. Curate, catalog and identify all fossil remains to the lowest taxon possible, inventory specimens, assign catalog numbers, and enter the appropriate specimen and locality data into a collection database; and
 - f. Transfer the cataloged fossil remains to an accredited institution (museum or university) in California that maintains paleontological collections for archival storage and/or display. The transfer shall include copies of relevant field notes, maps, stratigraphic sections, and photographs.
3. The Project Paleontologist shall prepare a final Paleontological Resources Mitigation Report summarizing the field and laboratory methods used, the stratigraphic units inspected, the types of fossils recovered (if applicable), and the significance of the curated collection (if applicable).
 4. Submit two hard copies of the final Paleontological Resources Mitigation Report to the Director of Planning & Development Services for final approval of the mitigation, and submit an electronic copy of the report according to the County Planning & Development Services' Electronic Submittal Format Guidelines.
 5. If no paleontological resources are unearthed the Project Paleontologist or Paleontological Resources Monitor, under supervision by the Project Paleontologist, shall prepare and submit a signed letter, stating that monitoring was conducted and no fossils were encountered during grading and excavation to Planning & Development Services.

Mitigation will be deemed complete when the County receives and approves the final report.

If no fossils of greater than 12 inches in any dimension are found during grading and excavation, the project applicant or designee shall submit a letter to the County Department of Planning & Development Services identifying who conducted the monitoring, stating that no fossils were found, and signed by the Project Paleontologist or Paleontological Resources Monitor. The letter shall be submitted to the County within 90 days following cessation of grading and excavation. Mitigation will be deemed complete when the letter report from the Project Paleontologist or Paleontological Resources Monitor stating that monitoring was conducted and no fossils were encountered during grading and excavation is submitted to and approved by Planning & Development Services.

While the final configuration and design of the Caltrans interchange improvements are not known at this time, to ensure potential impacts to paleontological resources remain less than significant, this EIR recommends the following measure:

M-PR-2 Pursuant to California Public Resources Code Section 21081(a)(2), in coordination with the I-15 interchange improvement project, which is to be fully funded and constructed by the project applicant, though is within the responsibility and jurisdiction of Caltrans to approve, Caltrans can and should require paleontological monitors to be present during grading activities to monitor the improvements and confirm no significant resources are encountered. The monitor should provide preconstruction coordination with contractors, oversee original cutting in previously undisturbed areas, halt or redirect construction activities as appropriate to allow recovery of newly discovered fossil remain, and oversee fossil salvage operations and reporting.

2.11.7 Conclusion

Excavation in areas underlain by Quaternary older alluvium and younger alluvial deposits (Town Center, the Valley, Sierra Farms Park, and Sarver Lane) would result in potentially significant impacts to paleontological resources (**Impact PR-1**). Retention of a Project Paleontologist and Paleontological Resources Monitor during excavation in paleontologically sensitive areas (**M-PR-1**) would reduce potentially significant impacts to **less than significant**.