

2.6 Paleontological Resources

This section discusses 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.

2.6.1 Existing Conditions

Paleontological resources are the remains and/or traces of prehistoric life, exclusive of human remains, 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 2007).

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:

- Is 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.
- Occupies a unique position, proximally, distally or laterally within a formation’s extent or distribution (County of San Diego 2007).

Geologic Setting

Geologic mapping of the site indicates the Project site is underlain by five distinct geologic units. These deposits have been mapped at various scales, with a preliminary map at the 1:100,000 scale prepared by Todd (2004) and a map of the Jacumba 7.5' quadrangle (1:24,000 scale) prepared by Dibblee and Minch (2008). Furthermore, these geologic units were described locally in the paleontological report prepared for the neighboring East County Substation project (SDG&E 2009). Although terminologies and exact boundaries differ when mapped and

described by various authors, the five units underlying the project site shall be referred to in this section as follows:

- **Holocene¹ valley-fill alluvium and fanglomerate² (Qya/Qa):** These are unconsolidated and undissected surficial sediments of valley fill and floodplains. These deposits consist of clay and silt, grading to sandy gravel near mountains. These deposits are often thin on valley margins, thickening towards valley centers and desert basins. These deposits underlie the eastern margin of the proposed solar field, and reflect modern-day sediment deposition from washes.
- **Older alluvium and fanglomerate (Qfg/Qt):** These deposits are flat-lying gravels and sands that are poorly sorted and largely unconsolidated. They differ from the Holocene-age alluvium described above in that they have a greater degree of dissection, are relatively elevated relative to valley floors (i.e., on subtle terraces), and are older (likely Pleistocene³ in age). These deposits occur on the southern base of the hill around which the solar field would wrap.
- **The Table Mountain Formation (Ttm/Ta):** The Table Mountain Formation consists of up to 300 feet of yellowish to reddish brown, crudely stratified, friable, medium to coarse-grained sandstones and conglomeratic sandstones and is thought to be early Miocene⁴ in age (SDG&E 2009). The Table Mountain Formation is the hill-forming unit on the Project site and underlies the northern part of the western limb of the solar field.
- **Tonalite of LaPosta (qd/Klp):** These are ancient plutonic rocks in San Diego County (the County) that comprise part of the northern end of the Peninsular Ranges Batholith that extends for several hundred miles south into Baja California, Mexico. This unit underlies most of the project site on the southern, east-central and northern parts of the solar field. The granitic rock tends to decompose into a sandy/gravelly soil at the surface, and only becomes hard/massive well below the surface.
- **Julian Schist (ms/Jsp):** The Julian Schist is the oldest geologic unit in the region, and is composed of quartz-mica schist and quartzite, with minor amounts of marble and amphibolite. The age of the unit is uncertain but thought to be Triassic or older. This unit underlies a very small part of the site in its extreme southwestern corner.

The geologic unit abbreviation in the parentheses above indicate first the designation by Dibblee and Minch (2008), second the designation by Todd (2004).

¹ The Holocene is a geological epoch that began at the end of the Pleistocene (at 11,700 calendar years before present) and continues to this day.

² A type of conglomerate consisting of heterogeneous rock fragments of all sizes deposited in an alluvial fan.

³ The Pleistocene is the geological epoch that lasted from about 2.6 million to 11,700 years ago.

⁴ The Miocene is the first geological epoch of the Neogene period and extends from about 23 to 5.3 million years ago.

Paleontological Resource Potential

Based on rock type and location of previously recorded fossils, areas within the County have been assigned to the following categories for potential paleontological resources: high sensitivity, moderate sensitivity, low sensitivity, marginal sensitivity, and zero sensitivity. The County's California Environmental Quality Act (CEQA) guidelines for paleontological resources use these categories to guide the significance determinations for projects under discretionary review. Most of the County is underlain by geologic formations with no potential, low sensitivity, or marginal sensitivity for paleontological resources. However, the guidelines refer specifically to the Project region as an exception, stating: "Known fossil occurrences in the Peninsular Ranges Region are extremely rare, but provide a glimpse of the potential for future discoveries of significant fossils in this portion of the County. For example, in Jacumba Valley middle Miocene (~16 million year old) sedimentary rocks (Table Mountain Gravels) interbedded with volcanic flow and ash deposits (Jacumba Volcanics) have produced sparse skeletal remains of unidentified artiodactyls (i.e., even-toed ungulates such as pigs, camels, deer, and cattle)" (County of San Diego 2007).

Based on the County of San Diego geographic information system (GIS), the Proposed Project's development footprint is located within areas rated as high, low, and no sensitivity. The area of high sensitivity corresponds to the Table Mountain Formation (Tta/Ta) (approximately 34% of the development footprint) and the area of low sensitivity is within the Quaternary Alluvium (Qya/Qa) geologic formation (approximately 9% of the development footprint). The areas with no sensitivity (approximately 57% of the development footprint) are located within the Cretaceous Plutonic (qd/Klp) and Julian schist (ms/Jsp) (see Figure 2.6-1).

2.6.2 Regulatory Setting

State Regulations

CEQA

CEQA requires lead agencies to carefully 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 of San Diego General Plan (August 2011) Conservation and Open Space Element are applicable to the Proposed Project:

- **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.

County of San Diego Grading Ordinance

The 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 shall be suspended immediately and not resumed until authorized by the County official. The ordinance also requires immediate notification of the County official regarding the discovery. The County official shall determine the appropriate resource recovery operation, which the permittee shall carry out prior to the County official's authorization to resume normal grading operations.

2.6.3 Analysis of Project Effects and Determination of Significance

Methodology

Paleontological resource impacts occur through the destruction or alteration of a paleontological resource or site by grading, excavation, trenching, boring, tunneling or other activity that disturbs the subsurface geologic formation. Excavation operations are the most common ways for paleontological resources to be adversely impacted and can result in the permanent loss of resources and valuable information. The most extensive excavation impacts are usually associated with mass grading, where earthmovers are used in combination with bulldozers to rip and transport soil and bedrock. Front-end loaders, track hoes, and trucks can also be used in mass excavation operations. Smaller amounts of earth are moved during, boring, trenching, and tunneling, and typically the impacts are less extensive.

The analysis of potential impacts to paleontological resources resulting from implementation of the Proposed Project is based on a review of the County's Paleontological Resources Maps (County of San Diego 2007) and proposed grading and excavation activities. These maps indicate that a portion of the Proposed Project—coincident with the southern side of the hill around which the proposed solar field wraps—is located within an area designated as high sensitivity for paleontological resources.

Guidelines for the Determination of Significance

For the purposes of this environmental impact report, any of the following will be considered a significant impact to paleontological resources:

Activities are proposed that would directly or indirectly damage 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 San Diego County Paleontological Resources Potential and Sensitivity Map.

This guideline is derived from CEQA, and is from the County's Guidelines for Determining Significance for Paleontological Resources, revised January 15, 2009.

Analysis

Development of the solar facility and supporting infrastructure would disturb approximately 108 acres with grading activities. Construction of the aboveground gen-tie line would also require ground disturbances and excavation along a corridor approximately 4 acres in size. Impacts to paleontological resources could occur for activities that disturb the subsurface including grading activities, collection system trenching, pile driving of PV system support racks, excavation of drainage channels, and any excavation required for road construction. Clearing and grubbing activities are unlikely to disturb paleontological resources, if present, because they would affect surface soil horizons only, which are unlikely to contain significant paleontological resources. A review of the County's Paleontological Resources Maps indicates that a portion of the 304-acre project property area contains a high resource sensitivity area, which has the potential for producing fossil remains. This area is concentrated on the southern side of the hill on the western limb of the proposed solar field. Because this area has the greatest slope, it is also likely to be where deepest cuts could be required for road installation. According to the project's most recent preliminary grading plan, it is expected to require a total of 180,000 cubic yards of excavation.

County guidelines state that for projects within areas of high or moderate paleontological resources 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 180,000 cubic yards of excavation would occur specifically in areas of high paleontological sensitivity, it is likely to exceed the 2,500 cubic yards threshold. As shown in Table 2.6-1, approximately 34% of the development footprint is underlain by a geologic unit of high sensitivity. According to county guidelines, because the proposed excavation is equal to or greater than 2,500 cubic yards in an area of high paleontological sensitivity, the impact is **potentially significant (PR-1)** and services of a Project Paleontologist and a Paleontological Resources Monitor are required.

2.6.4 Cumulative Impact Analysis

Cumulative projects (Table 1-7, Cumulative Scenario – Reasonably Foreseeable Approved and Pending Projects) located within the cumulative project area 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 on state or public lands would be required to comply with Public Resources Code Sections 5097–5097.6 pertaining to impacts to paleontological resources. Other cumulative projects would be regulated by state and local regulations, including CEQA and the County Grading Ordinance.

As discussed in Section 2.6.2, 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 shall be carried out prior to the County official’s authorization to resume normal grading operations. Therefore, due to the Grading Ordinance and discretionary review process required for the Proposed Project, the project **would not contribute to a cumulatively considerable impact** to paleontological resources.

2.6.5 Significance of Impacts Prior to Mitigation

County guidelines state that for projects within areas of high or moderate paleontological resources 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 180,000 cubic yards of excavation would occur specifically in areas of high paleontological sensitivity, it is very likely to exceed the threshold. As shown in Table 2.6-1, approximately 34% of the Project’s development footprint is underlain by a geologic unit of high sensitivity for paleontological resources. Because the Proposed Project excavation is anticipated to be equal to or greater than 2,500 cubic yards in an area of high paleontological sensitivity, the impact is **potentially significant**, according to County guidelines.

2.6.6 Mitigation Measures and Design Considerations

M-PR-1 PALEONTOLOGICAL RESOURCES MONITORING

For excavation into geologic units of high or moderate paleontological potential (i.e., 30% of the site), 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 one 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 acts 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 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 PDS for final approval of the mitigation, and submit an electronic copy of the report according to the County PDS's Electronic Submittal Format Guidelines.

For any excavation into the substratum in areas of low or marginal potential (i.e., 70% of the site), monitoring by the on-site contractor (Monitor) is required. A Monitor is any one person who is on the site during all the original cutting of undisturbed substratum. A Monitor must be designated by the Applicant and given the responsibility of watching for fossils so that the project is in conformance with Section 87.430 of the Grading Ordinance. If a fossil of greater than twelve inches in any dimension, including circumference, is encountered during excavation or grading, all excavation operations in the area where the fossil was found shall be suspended immediately, the PDS's Permit Compliance Coordinator shall be notified, and a Project Paleontologist shall be retained by the applicant to assess the significance of the find and, if the fossil is significant, to oversee the salvage program, including salvaging, cleaning, and curating the fossil(s), and documenting the find, as described under Item 2 above.

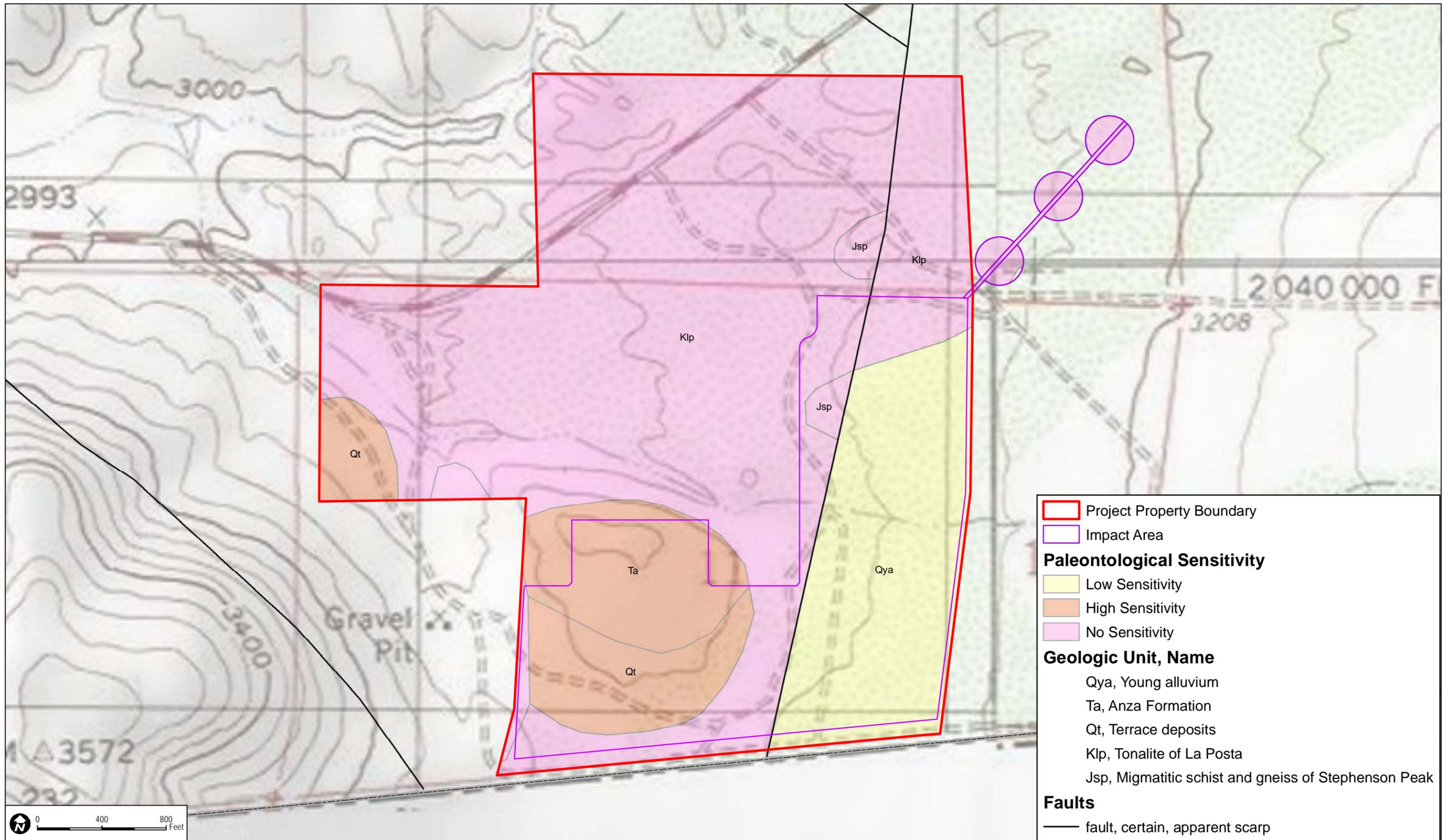
Mitigation will be deemed complete when the County's Permit Compliance Coordinator, on behalf of the Director of Planning and Development Services, receives the final report.

2.6.7 Conclusion

With implementation of **M-PR-1**, Paleontological Resources Monitoring, as set out in the Grading Ordinance, the potential impact to paleontological resources would be less than significant. Implementation of the mitigation measure would ensure that fossils, if present, would be identified and recovered as appropriate.

**Table 2.6-1
Paleontological Resource Sensitivity**

Paleontological Sensitivity	Impact Area (acres)	Percent	Mitigation
High	33.4	30%	M-PR-1 (professional monitoring)
Low	46.9	42%	M-PR-1 (On-site monitoring)
None	31.8	28%	None required



Project Property Boundary
 Project Property Boundary

Impact Area
 Impact Area

Paleontological Sensitivity

- Low Sensitivity
- High Sensitivity
- No Sensitivity

Geologic Unit, Name

- Qya, Young alluvium
- Ta, Anza Formation
- Qt, Terrace deposits
- Klp, Tonalite of La Posta
- Jsp, Migmatitic schist and gneiss of Stephenson Peak

Faults

- fault, certain, apparent scarp

FIGURE 2.6-1
Paleontological Resources

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