2.11 Paleontology

2.11.1 Regulatory Setting
Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding.

Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

2.11.2 Affected Environment
This section is based on the Paleontological Identification and Evaluation Report (October 2012).

In March 2012, a paleontological locality search was conducted to establish the status and extent of previously recorded paleontological resources within and adjacent to the Study Area and to determine which geologic sediments were likely to be exposed during ground-disturbing activities associated with the proposed project. This locality search was completed through the Natural History Museum of Los Angeles County (LACM) and records maintained by the consultant paleontologist. In addition, a vehicular windshield survey was conducted along Interstate 5 (I-5) right-of-way to confirm the accuracy of the geologic mapping and to identify whether there are any portions of the Study Area that might require a more thorough pedestrian survey. By doing this type of research, a determination can be made for the existence of paleontological material prior to the beginning of ground-disturbing activities, and specific areas can be located within the Study Area that might contain certain paleontological resources, prior to the beginning of construction.

The Study Area is located near the border of the northern Peninsular Ranges Geomorphic Province and the south-central portion of the Transverse Range Geomorphic Province of Southern California. Specifically, the proposed project is located on the eastern end of the San Joaquin Hills. The San Joaquin Hills are a coastal extension of the Santa Ana Mountains. Exposed formations have a combined thickness of 22,000 feet (ft) and range in age from the Paleocene to the Late Pleistocene. The hills consist of both marine and terrestrial sediments and intrusive igneous rocks.
Geologic mapping indicates that various geological units and formations have the potential to be encountered while excavating for the proposed project. The geological units and formations include: Young (Holocene) Axial Channel Deposits, Old (Middle to late Pleistocene) Alluvial sediments, Very Old (Early to Middle Pleistocene) Axial Channel Deposits, Very Old (Early to Middle Pleistocene) Alluvial Fan Deposits, the Late Pliocene to Early Pleistocene Niguel Formation, the Late Miocene to Pliocene Capistrano Formation, and the Middle to Late Miocene Monterey Formation. In addition, although not mapped, Artificial Fill also occurs within the Study Area and was observed during the vehicular survey. The specific sensitivities for units within the Study Area are listed in Table 2.11-1. As shown, the Old Alluvium, Very Old Axial Channel Deposits, Very Old Alluvial Fan Deposits, Niguel Formation, Capistrano Formation, and Monterey Formation are high based on the presence of scientifically significant fossil remains that have been recovered from these units in other areas, as well as some directly within the Study Area.

<table>
<thead>
<tr>
<th>Geologic Unit</th>
<th>Paleontological Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artificial Fill</td>
<td>Low</td>
</tr>
<tr>
<td>Young Axial Channel Deposits</td>
<td>Low</td>
</tr>
<tr>
<td>Old Alluvium</td>
<td>High</td>
</tr>
<tr>
<td>Very Old Axial Channel Deposits</td>
<td>High</td>
</tr>
<tr>
<td>Very Old Alluvial Fan Deposits</td>
<td>High</td>
</tr>
<tr>
<td>Niguel Formation</td>
<td>High</td>
</tr>
<tr>
<td>Capistrano Formation</td>
<td>High</td>
</tr>
<tr>
<td>Monterey Formation</td>
<td>High</td>
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</tbody>
</table>


The findings of the locality search conducted at the LACM indicated that the project crosses several types of Quaternary Alluvium, the Monterey Formation, the Capistrano Formation, and the Niguel Formation. The LACM has two records of vertebrate fossil localities within the project area and knows of other localities located nearby from the same sediments that are present within the Study Area. Within the Study Area, LACM-1215, located at the I-5 and Crown Valley Parkway interchange, within the Quaternary Marine Terrace Deposits, contained an undetermined shark and mammal. Also within the Study Area is LACM-7058, located at Aliso Creek northwest of the intersection of I-5 and Alicia Parkway, within the Niguel Formation, that contained a 6-gill shark and bony fish.
The LACM believes that all units that the project crosses, aside from the upper most layers of Younger Quaternary Alluvium, have the potential to contain scientifically significant paleontological remains.

The vehicular survey included visually examining exposed sediments while driving along the I-5 corridor. Visibility was obstructed by paving, vegetation, and sometimes Artificial Fill; however, what native sediment exposures were visible were consistent with geologic mapping.

The Young Axial Channel Deposits are generally not conducive for the preservation of paleontological resources, as they are too young. Like the Artificial Fill, the Young Axial Channel Deposits are assigned a low sensitivity rating in case these deposits are shallow and underlying sediments that might have a high sensitivity rating are encountered. For the proposed project, once a depth of 10 ft or more is reached, it would be assumed that areas mapped as Young Axial Channel Deposits would change to a sensitivity rating of high as it is likely that older sediments that have a sensitivity rating of high will begin to be encountered at these deeper depths. The Paleontological Sensitivities (Figure 2.11-1) graphically presents a summary of the Study Area and the underlying formations with paleontological sensitivity, which are presented as sensitivity polygons.

2.11.3 Environmental Consequences

2.11.3.1 Temporary Impacts

**No Build Alternative – Alternative 1**

The No Build Alternative does not include any changes to the physical environment; therefore, no temporary impacts to paleontological resources would occur.

**Build Alternatives – Alternative 2 (Preferred Alternative) and Alternative 3**

All of the Build Alternatives would require ground disturbance and modification to existing freeway and local street structures. These construction activities could result in direct or indirect impacts to paleontological resources. The potential impacts to paleontological resources would be permanent direct or indirect impacts and are addressed below. Therefore, any analysis of direct or indirect temporary impacts is not applicable.
2.11.3.2 Permanent Impacts

**No Build Alternative – Alternative 1**

The No Build Alternative would not include any excavation in the Study Area. Therefore, the No Build Alternative would not result in adverse impacts related to paleontological resources.

**Build Alternatives – Alternative 2 (Preferred Alternative) and Alternative 3**

As discussed above, there are areas of high paleontological sensitivity within the Study Area. With the exception of the Artificial Fill and Young Axial Channel Deposits, all other sediments in the Study Area have the potential to contain significant, unrenewable paleontological resources, and it is likely that paleontological localities would be encountered during project excavation.
FIGURE 2.11-1

I-5 Widening Project: SR-73 to El Toro Road

Paleontological Sensitivities

Project Location
High Paleontological Sensitivity
Low Paleontological Sensitivity on Surface
High Beginning at Approximately 10 feet
2.11.4 Avoidance, Minimization, and/or Mitigation Measures

To reduce direct or indirect impacts to nonrenewable paleontological resources that may be present, where excavation may take place in areas of undisturbed sediments, a Paleontological Mitigation Program (PMP), as specified below in Measure PAL-1, would be implemented during construction. The PMP is to be implemented in areas identified as having a high paleontological sensitivity and would follow guidelines in the California Department of Transportation (Caltrans) Standard Environmental Reference (SER), Environmental Handbook, Volume 1, Chapter 8 – Paleontology (February 2012 or more current) and recommendations from the Society of Vertebrate Paleontology (SVP) prior to completion of final project design.

PAL-1

Prior to construction activities, the California Department of Transportation (Caltrans) would ensure that a Paleontological Mitigation Plan (PMP) is prepared and adhered to during construction of the project portions that are identified as having high paleontological sensitivity. The PMP would include, but not be limited to, the following:

- A preconstruction field survey in areas identified as having a high paleontological sensitivity after vegetation and any paving is removed, followed by salvage of any observed surface paleontological resources prior to the beginning of additional grading.
- Attendance at the pregrade meeting by a qualified paleontologist or representative. At this meeting, the paleontologist would explain the likelihood for encountering paleontological resources, what resources may be discovered, and the methods of recovery that would be employed.
- During construction excavation, a qualified vertebrate paleontological monitor would initially be present on a full-time basis whenever excavation would occur within the sediments that have a high paleontological sensitivity rating and on a spot-check basis for sediments that have a low sensitivity rating. Monitoring may be reduced to a part-time basis if no resources are being discovered in sediments with a high sensitivity rating (monitoring reductions, when they occur, would be determined by the qualified Principal Paleontologist). The monitor would inspect fresh cuts and/or spoils piles to recover paleontological resources. The
monitor would be empowered to temporarily divert construction equipment away from the immediate area of the discovery. The monitor would be equipped to rapidly stabilize and remove fossils to avoid prolonged delays to construction schedules. If large mammal fossils or large concentrations of fossils are encountered, the grading contractor would consider using heavy equipment on site to assist in the removal and collection of large materials.

- Localized concentrations of small (or micro-) vertebrates may be found in all native sediments. Therefore, it is recommended that these native sediments occasionally be spot-screened on site through one-eighth to one-twentieth-inch mesh screens to determine whether microfossils are present. If microfossils are encountered, sediment samples (up to 3 cubic yards, or 6,000 pounds) would be collected and processed through one-twentieth-inch mesh screens to recover additional fossils.

- Recovered specimens would be prepared to the point of identification and permanent preservation. This includes the sorting of any washed mass samples to recover small invertebrate and vertebrate fossils, the removal of surplus sediment from around larger specimens to reduce the volume and cost of storage for the repository, and the addition of approved chemical hardeners/stabilizers to fragile specimens.

- Specimens would be identified to the lowest taxonomic level possible and curated into an institutional repository with retrievable storage. The repository institutions usually charge a one-time fee based on volume, so removing surplus sediment is important. The repository institution may be a local museum or university that has a curator who can retrieve the specimens upon request. A draft curation agreement would be established with an approved curation facility prior to the initiation of any paleontological monitoring.

- Preparation and submittal of the Paleontological Mitigation Report (PMR) documenting completion of the PMP.