SUBCHAPTER 2.7

PALEONTOLOGICAL RESOURCES

2.7 Paleontological Resources

Paleontological impacts were assessed in the 1981 Sycamore Springs EIR and found to be less than significant based on analysis of on-site alluvial deposits. Paleontological resources were not addressed in the 1983 Hewlett Packard EIR.

This analysis is based on mapping provided in the Geotechnical Investigation conducted for the Proposed Project by Leighton and Associates, Inc. (Leighton) in 2012. Leighton's analysis is included in Appendix I. Additional geologic information was obtained from the Updated Geotechnical Assessment, Proposed Campus Park (Shepardson Engineering Associates 2007) and Paleontological Resource Assessment, Campus Park/Passerelle Development Project (Department of Paleoservices, San Diego Natural History Museum [Paleoservices] 2005). The Shepardson and Paleoservices analyses are included as part of the Geology/Paleontology Appendix for the Final Subsequent EIR for Campus Park (County 2011), which is incorporated by reference and available for public review and inspection at the County's PDS offices.

2.7.1 Existing Conditions

2.7.1.1 *Geologic Formations*

Paleontology is the science dealing with prehistoric plant and non-human animal life. Paleontological resources (or fossils) typically encompass the remains or traces of hard and resistant materials such as bones, teeth, or shells, although plant materials and occasionally less resistant remains (e.g., tissue or feathers) can also be preserved. The formation of fossils typically involves the rapid burial of plant or animal remains and the formation of casts, molds, or impressions in the associated sediment (which subsequently becomes sedimentary rock). Because of this, the potential for fossil remains in a given geologic formation can be predicted based on known fossil occurrences from similar (or correlated) geologic formations in other locations. Accordingly, while there are no recorded fossil occurrences or collection efforts known from the Project site, paleontological resource potential can be inferred from on-site geology and off-site fossil occurrences in similar materials, as outlined below.

Based on the geotechnical investigations undertaken for the Proposed Project, surficial materials and geologic formations observed or expected to occur within the Project site include fill deposits, native topsoils/colluvium, Quaternary (Holocene) alluvium, Quaternary river terrace deposits, and Cretaceous igneous intrusive rocks. This is supported by mapping developed for the Project, as well as the adjacent Campus Park area (County 2011a).

Historic fill deposits exhibit no potential for the occurrence of significant paleontological resources due to their recent age and the destructive nature of their origin (i.e., mechanically processed through methods such as crushing and screening). Similarly, native topsoil deposits do not exhibit any potential for significant paleontological resource values due to their relatively recent age and methods of formation and deposition (i.e., physical and chemical weathering, with soil transported and deposited by methods such as water, wind and gravity). On-site colluvial deposits exhibit no potential for significant paleontological resource values due to their relatively

recent age and method of deposition, as well as the fact that they are derived from igneous rocks (as described below) or related materials.

Quaternary alluvial materials are assigned a low paleontological resource sensitivity due to their relatively recent age, high-energy formation/deposition environment, and the fact that, with rare exceptions, significant fossil occurrences are unknown from alluvial deposits in San Diego County.

Igneous intrusive rocks generally exhibit no potential for the occurrence of paleontological resources based on their molten origin. Accordingly, residual soil deposits also exhibit no paleontological resource potential due to their formation from igneous rocks and relatively recent age. Santiago Peak Volcanics can contain a mix of metavolcanic and metasedimentary elements. The metasedimentary elements can contain micro-fossils and are identified as having moderate paleontological resource sensitivity. Small deposits of this mix are present north of SR-76, often adjacent to areas of older quaternary alluvium.

Quaternary river terrace deposits and alluvial fan deposits have been identified in the Project vicinity. These deposits are located both on site and within the adjacent Campus Park project site (where off-site Project pipelines could be constructed in Horse Ranch Creek Road if construction by Campus Park is not completed prior to Campus Park West implementation). Figure 2.7-1, Paleontological Resources, illustrates the general location of Quaternary older alluvium (Qoa, Quaternary river terrace deposits) in this quadrant and underlying most of the Campus Park West site north of SR-76. River terrace deposits were formed at times of higher and older stream base levels than exist today, and are of probable late Pleistocene age. Such deposits are known to locally contain the fossilized remains of animals and plants. Fossils recovered from Pleistocene-age river terrace deposits within and adjacent to the San Luis Rey River in Oceanside included mammoth, mastodon, camel, horse and tapir. The river terrace deposits are considered to exhibit a moderate paleontological resource sensitivity.

2.7.1.2 *Regulations*

The County Guidelines for Determining Significance – Paleontological Resources (January 15, 2009) provide direction for evaluating environmental effects related to paleontological resources, pursuant to related CEQA standards. The Guidelines give an overview of paleontological resources and their occurrence in San Diego County, and provide guidance for assessing resource values, identifying the nature and extent of impacts, and establishing mitigation/reporting requirements.

Section 87.430, Paleontological Resources, of the San Diego County Code of Regulatory Ordinances states that:

> The County Official may require that a qualified paleontologist be present during all or selected grading operations, to monitor for the presence of paleontological resources. If fossils greater than twelve inches in any dimension are encountered, then all grading operations in the area where they were found shall be suspended immediately and not resumed until authorized by the County Official. The

permittee shall immediately notify the County Official of the discovery. The County Official shall investigate and determine the appropriate resource recovery operations, which the permittee shall carry out prior to the County Official's authorization to resume normal grading operations.

2.7.2 Analysis of Project Effects and Determination as to Significance

The following analysis takes into consideration both on- and off-site improvements; however, no distinction is made between **Scenarios 1** or **2** as impacts to paleontological resources would not be affected by variations in proposed land uses.

2.7.2.1 *Paleontological Analysis*

Guideline for the Determination of Significance

The Proposed Project would have a potentially significant environmental impact to paleontological resources if it would:

1. Directly or indirectly damage a unique paleontological resource or site, or include grading or excavation that would 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.

Guideline Source

Guideline No. 1 is taken from the County Guidelines for Determining Significance – Paleontological Resources (January 15, 2009).

Analysis

On-site Resources

As discussed above, developable parcels located south of SR-76, and some of the Project area north of SR-76 are underlain by topsoils/fill and recent alluvial/colluvial deposits and/or Cretaceous igneous intrusive rocks at depth, all of which are rated as having a no to low paleontological sensitivity. Much of the Project site north of SR-76 is underlain by river terrace deposits, however, which has a moderate paleontological sensitivity rating. The County Paleontological Resources Monitoring Requirements map indicates monitoring by an excavation/grading contractor would be required on the Project site parallel to I-15 and south of SR-76. Table 1 in the Paleontological Guidelines, "Formations with a High or Moderate Potential to Contain Paleontological Resources in San Diego County," includes older Quaternary alluvial fan deposits among the formations with paleontological potential. The County Guidelines further note that for projects within areas of high or moderate paleontological resources potential that propose excavation equal to or greater than 2,500 cy, the services of a project paleontologist and a paleontological resources monitor are required.

Grading for the Proposed Project would consist of approximately 850,000 cy of cut and fill in the site proper. Earthwork for the Project would impact areas containing deposits with a moderate paleontological sensitivity rating; therefore, potential impacts to paleontological resources could be **potentially significant**. **(Impact P-1)**

Off-site Resources

River terrace deposits considered to have a moderate paleontological sensitivity rating underlie off-site locations of facilities that would serve the Project. If required, off-site trenching associated with installation of wastewater pipelines in Horse Ranch Creek Road, as well as focused road improvements on Old Highway 395, could disturb river terrace deposits. Because both of these areas have been previously disturbed, it is possible that new lines would be placed within engineered fill and no impacts would occur. Pending final design, however, potential impacts from these facilities to paleontological resources are conservatively identified as **potentially significant**. **(Impact P-2)**

2.7.3 Cumulative Impact Analysis

The cumulative projects in the vicinity of the Project site are listed in Table 1-4 and depicted on Figure 2.7-2, Cumulative Projects for Paleontological Resources, of this EIR.

Based on review of the 2007 Kennedy and Tan Geologic Map of the Oceanside 30' x 60' Quadrangle, California, and as indicated above, the area is dominated by volcanic/granitic formations. Also as noted above, these formations are generally not fossil bearing. The projects most likely to potentially contain paleontological resources would be located within Quaternary tertiary deposits (such as the Proposed Project) or in the Santiago Peak Volcanics. These include projects immediately adjacent to Campus Park West (Campus Park and Meadowood projects), as well as 13 projects also appearing to be located within the older quaternary alluvium associated with the terraces adjacent to the river valley/primary drainages (1, 2, 7, 26, 27, 39, 40, 41, 42, 46, 74, 93 and 95). Six projects are also potentially located within the medasedimentary pockets identified on the Kennedy and Tan map (6, 17, 13, 33, 48 and 60). All of the listed projects would be subject to similar analysis and (if applicable) mitigation requirements for paleontological resources as described in this subchapter (and pursuant to CEQA).

The importance of individual resources comes from the research value and the information they can provide to the paleontologist. The information gained from test excavations and data recovery programs for projects with paleontological resource impacts within the County would be presented in reports and filed with the County, as well as a scientific institution with permanent paleontological collections, such as the San Diego Natural History Museum. The fossil collections from any potentially significant site also would be curated at such a scientific institution and would be available to other paleontologists for further study. Based on the required regulatory compliance of both the Proposed Project and applicable cumulative projects with analysis and mitigation requirements for paleontological resources under CEQA, implementation of the Proposed Project would not significantly contribute to cumulative paleontological resource impacts. Cumulative Project effects on paleontological resources would be **less than significant**.

2.7.4 Significance of Impacts Prior to Mitigation

The following potentially significant impacts related to paleontological resources could occur under Project implementation:

Impact P-1 Project grading for on-site facilities, including excavation and grading activities, could have a potentially significant impact paleontological resources within terrace deposits.

Impact P-2 Project grading for off-site facilities could have a potentially significant impact on paleontological resources within terrace deposits.

2.7.5 Mitigation

The following mitigation measures shall be implemented to ensure that potential adverse impacts to paleontological resources from Proposed Project implementation would be reduced to less than significant. Evidence shall be provided to the Director of PDS that the following notes have been placed on the grading plan:

M-P-1 and 2

A qualified paleontologist shall be at the pre-construction meeting to consult with the grading and excavation contractors concerning excavation schedules, paleontological field techniques, and safety issues. A qualified paleontologist is defined as an individual having an M.S. or Ph.D. in paleontology or a related field (e.g., sedimentary or stratigraphic geology, evolutionary biology, etc.), and who has knowledge of San Diego County paleontology and documented experience in professional paleontological procedures and techniques.

A qualified paleontologist or paleontological monitor (under the supervision of the qualified paleontologist) shall be on site on a full-time basis during the original cutting of previously undisturbed deposits of moderate paleontological resource sensitivity (i.e., Quaternary river terrace deposits) to inspect exposures for ~~contained~~ fossils. A paleontological monitor is defined as an individual with at least one year of experience in field identification and collection of fossil materials. The paleontological monitor shall work under the direct supervision of the qualified paleontologist.

The Project Applicant shall: (1) submit a copy of a letter signed by the qualified paleontologist or paleontological monitor which states that the applicant has retained their services and acknowledges agreement to perform and/or be responsible for concurrence with the Project mitigation measures; and (2) authorize the qualified paleontologist to direct, divert, or halt any grading activity, and to perform all other acts required by the provisions listed below. If the qualified paleontologist or paleontological monitor ascertains that the river terrace deposits are not fossil bearing, the qualified paleontologist shall have the authority to terminate the monitoring program.

If paleontological resources are unearthed, the qualified paleontologist or paleontological monitor shall:

1. Direct, divert, or halt any grading or excavation activity until the sensitivity of the resource can be determined and the appropriate recovery implemented.
2. Salvage unearthed fossil remains.
3. Record stratigraphic and geologic data to provide a context for the recovered fossil remains.
4. Prepare collected fossil remains for curation.
5. 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.
6. Transfer the cataloged fossil remains to an accredited institution (museum or university) in California that maintains paleontological collections for archival storage and/or display.

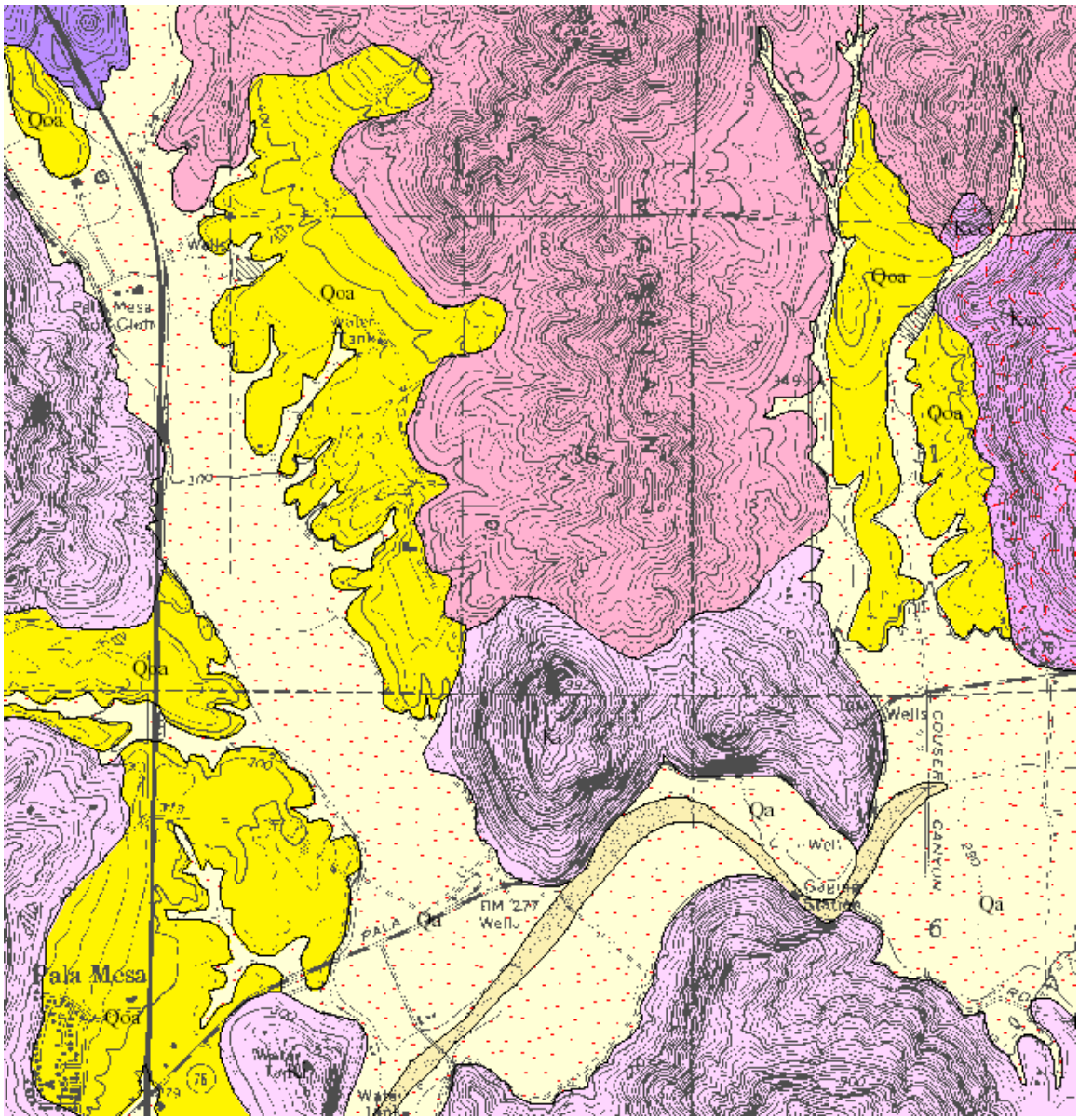
The qualified paleontologist shall prepare a final Paleontological Resources Mitigation Report summarizing the field and laboratory methods used, the stratigraphic units inspected, the types of fossils recovered, and the significance of the curated collection.

2.7.6 Conclusion

Grading and excavation activities associated with development of on- and off-site facilities for the Proposed Project could result in potentially significant impacts related to disturbance/destruction of sensitive fossil resources preserved within the Quaternary (Pleistocene) river terrace deposits (Impacts P-1 and P-2). Mitigation for these impacts would include monitoring during original cutting of previously undisturbed Quaternary river terrace deposits and collection of fossils, if discovered (M-P-1 and 2). The mitigation also ensures that the paleontological monitor has the authority to halt or divert grading activities in the area of any discovery. Implementation of the specified mitigation measures would reduce associated impacts to paleontological resources to less than significant because they would ensure that relevant information contained in the paleontological record, which is important in understanding prehistory, is preserved.

Qa	Quaternary Alluvium
Qoa	Quaternary older alluvium

Other mapped rocks units have no paleontological sensitivity



Source: Tan et al., 2000

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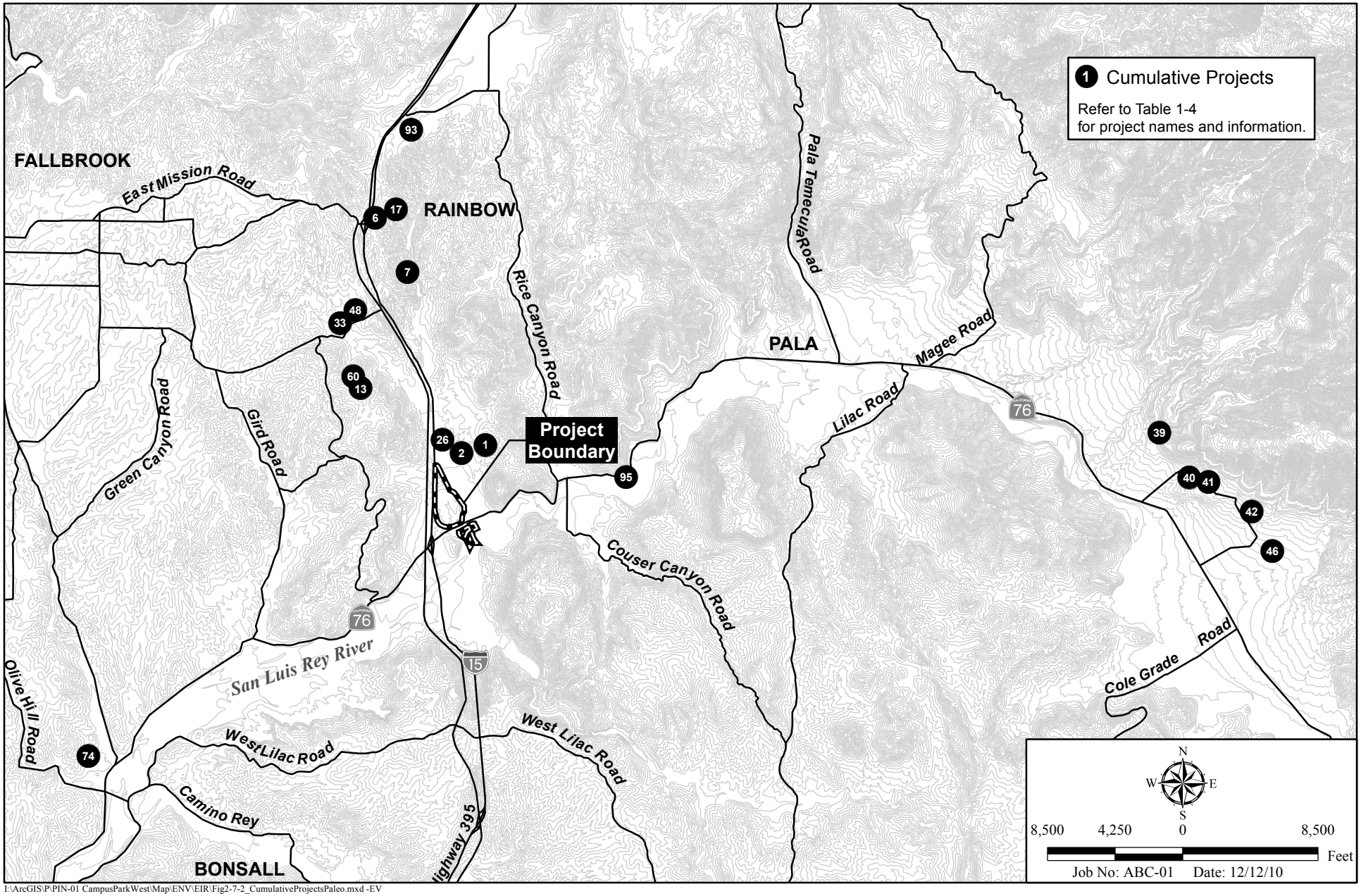
Paleontological Resources

CAMPUS PARK WEST

Figure 2.7-1

HELIX Environmental Planning



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Cumulative Projects for Paleontological Resources

CAMPUS PARK WEST

HELIX Environmental Planning

Figure 2.7-2