# H. PALEONTOLOGICAL ASSESSMENT

# PALEONTOLOGICAL RESOURCES REVIEW

# WILLOW ROAD INTERCHANGE

# NIPOMO, SAN LUIS OBISPO COUNTY, CALIFORNIA

Prepared For:

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# TABLE OF CONTENTS



## ILLUSTRATIONS



## APPENDICES

# MANAGEMENT SUMMARY

LSA Associates, Inc. (LSA) was retained by Rajappan and Meyer Consulting Engineers, Inc. to evaluate the potential for paleontological resources in the vicinity of the proposed Willow Road Interchange and Road Extension Project north of Nipomo, in San Luis Obispo County, California.

A literature review and paleontological resource locality record search was conducted for the sediments in the Santa Maria - Nipomo Valley area where the project is proposed. The literature review determined that Pleistocene sediments occur on and around the project at shallow depth. The records search determined that four localities contain late Pleistocene vertebrate fossils in the Nipomo area, that include the remains of mammoth, mastodon, and horse. These fossils were collected at shallow depth within a radius of two miles around the proposed project, in sediments that are mapped as being the same as those that occur at the project site.

A paleontological resource impact mitigation program (PRIMP) including excavation monitoring and fossil recovery is recommended to accompany construction excavation involved with the proposed Willow Road Interchange and Road Extension Project. Compliance with these recommendations will assure that impacts to paleontological resources will remain below a level of significance.

# INTRODUCTION

LSA Associates, Inc. (LSA) was retained by Rajappan and Meyer Consulting Engineers, Inc. to evaluate the potential for paleontological resources in the vicinity of the proposed Willow Road Interchange north of Nipomo, in San Luis Obispo County, California.

## PROJECT DESCRIPTION

The proposed Willow Road Interchange and road extension is located on U. S. Highway 101, north of the town of Nipomo, between the existing interchanges at Tefft Street and Los Berros Road. The portion of Willow Road under study runs from North Thompson Avenue on the east to Hetrick Avenue on the west. The project is shown on the *Nipomo* (USGS, 1965a) and *Oceano* (USGS, 1965b), California 7.5 USGS Quadrangle maps. The project as proposed will involve an interchange with Highway 101, and the realignment and extension of Willow Road to its intersection with North Thompson Avenue. Excavations for the proposed project will reach depths of 40 feet below the existing surface.

## PURPOSE OF INVESTIGATION

This paleontological resource literature review and records search was completed following the Conformable Paleontological Resource Impact Mitigation Guidelines of the Society of Vertebrate Paleontology. This program develops mitigation measures that reduce impacts to nonrenewable paleontological resources to a level that is less than significant, as required in the California Environmental Quality Act (CEQA) analysis of the project as well as National Environmental Policy Act (NEPA) compliance.

A project that may directly or indirectly destroy a unique paleontological resource or site may have a significant effect on the environment as discussed in the California Code of Regulations, Title 14, Chapter 3, Section 15382, and Appendix G, Section v(c) of the California Environmental Quality Act (CEQA). To mitigate the potential for such impacts to paleontological resources, the program documents the potential for paleontological resources older than 9,000 years and proposes methods to reduce impacts to a level less than significant.

# SETTING

## Geological Setting

The Willow Road Interchange project is within California's Coast Range geologic province that encompasses western San Luis Obispo County. It sits at the western margin of the Santa Lucia Range along Nipomo Creek (Jennings, 1958). The Santa Lucia Range consists of Miocene marine sediments that interfinger with Miocene volcanic rocks (Jennings, 1958) and, to the northwest, a core of Mesozoic Franciscan volcanic rocks. Canyons along Arroyo Grande Creek and Nipomo Creek contain perched Plio-Pleistocene terrace deposits of the Paso Robles Formation. At lower elevations, Pleistocene terrace deposits referred to as the Nipomo Mesa Quaternary Terrace Deposits (McLeod, 2004) have been deposited along Nipomo Creek. These sedimentary formations are covered by a wedge of Pleistocene to Holocene dune sand (Nipomo Dune Complex) that thickens westward toward its source. The dunes are Pleistocene at depth (Terratech, 1997; McLeod, 2004); and the thin layer of sand that covers the Nipomo Mesa terrace deposits is active today.

## Paleontological Setting

All sedimentary formations in the Nipomo Valley and the surrounding Santa Lucia Range have the potential to contain nonrenewable paleontological resources, except Holocene resources due to recently active dune sand in the upper reaches of the Nipomo Dune Complex. The potentially fossiliferous formations include the early to late Miocene marine formations, the Plio-Pleistocene Paso Robles Formation, the Nipomo Mesa terrace deposits, and the lower or Pleistocene portion of the Nipomo Dune Complex.

# PERSONNEL

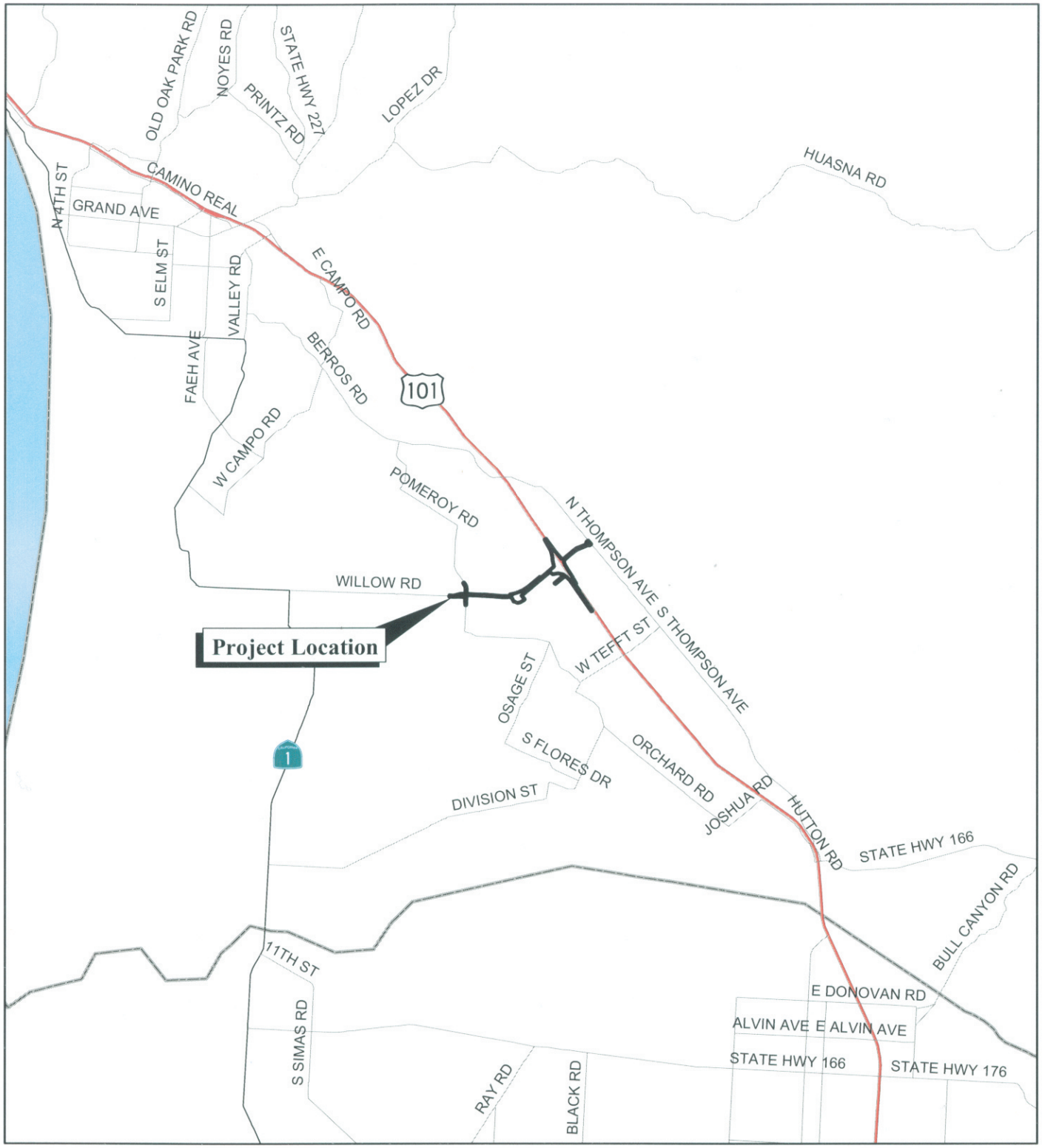
The literature review, search for paleontological locality records, and report writing were conducted by Robert Reynolds. Mr. Reynolds is the paleontological program manager at LSA's Riverside office, a research associate of the Los Angeles County Museum, and former Curator of Earth Sciences at the San Bernardino County Museum. He has 23 years of experience with paleontologic salvage programs and 37 years of research experience in collecting biostratigraphic specimens from sediments in Southern California and Nevada.

# METHODS

The literature review and records search were initiated in July and completed in August, 2004. Records search requests were sent to institutions and individuals that are located near the area or have a history of research in the area. These included:

University of California Museum of Paleontology, Berkeley (Dr. Pat Holroyd)
California Polytechnic State University, San Luis Obispo (Dr. Harry L. Fierstine)
Natural History Museum of Los Angeles County (Dr. Samuel McLeod)

The literature review utilized the geotechnical report for the Willow Road Interchange project (Terratech, 1996) as well as available references and geological mapping (Taliaferro, 1943; Jennings, 1958).




LSA

MAP 1

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Miles

*Willow Road Extension Project*
Project Vicinity Map

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# RESULTS

## Literature Review

Review of geologic mapping in the Willow Road interchange project area indicates that the proposed project is located on Pleistocene terrace deposits of Nipomo Mesa, located east of the Nipomo Dune Complex which in part is late Pleistocene in age. The Pleistocene sediments of the Nipomo Dune Complex and Mesa terrace deposits are both overlain by Holocene dune sands, of which the surface component is active today. The sands of the Dune Complex can be distinguished from the Mesa terrace deposits since deposits of the latter are coarser, contain silts, and often exhibit development of soil profiles.

## Depositional Summary

The Pleistocene terrace deposits of Nipomo Mesa are older than, and cut by, a sequence of transgressive wave-cut platforms (Jennings, 1958; Terratech, 1996). The flat surface of the Mesa represents three transgressive Pleistocene marine events (Terratech, 1996), the oldest being highest in elevation and eroding underlying sediments farthest to the east. East of Thompson Avenue, the older surface dates from 560,000 to 480,000 ybp. Adjacent to Thompson Avenue, a somewhat younger surface dates from 480,000 to 430,000 ybp. Terrace deposits (sediments deposited on the terraces by marine, aeolian and stream sources) include marine shoreline sands, dune sands, and gravels from ancestral drainages of Nipomo Creek, hence the name Nipomo Dune Complex. Sediments from the Dune Complex date to late Pleistocene time (Flandrian marine transgression = Wisconsin glacial maximum at 18,000 ybp.; Terratech, 1996) into Holocene and recent time.

## Paleontological Resource Records

The search for paleontological locality records through institutions and professionals working in the Santa Maria area located four localities in the Nipomo area and two west of Nipomo. These are described as follows:

LSA 1 **Los Berros Creek at U. S. 101.** This locality produced Pleistocene mammoth, mastodon, and horse from the banks of Los Berros Creek, approximately 1.3 miles north northwest along U. S. 101 from the proposed Willow Road Interchange (Fierstine, 2004).

LSA 2 **Nipomo Creek at Tefft Street.** This locality produced Pleistocene mammoth, mastodon, and horse from the banks of Nipomo Creek, approximately one mile southeast of the proposed Willow Road Interchange along U. S. 101 (Fierstine, 2004).

LSA 3 **Unnamed Creek north of Nipomo.** This locality produced Pleistocene mammoth, mastodon, and horse from an unnamed creek, approximately 0.5 miles east of the proposed Willow Road Interchange, on the east side of Thompson Avenue (Fierstine, 2004).

LSA 4 **LACM 4089, Nipomo.** This poorly defined locality "in" Nipomo produced a specimen of Columbian mammoth (McLeod, 2004).

LSA 5 **UCMP V 6599, Guadalupe (Santa Maria).** A Pleistocene fossil tapir (*Tapirus californicus*)

is reported from 0.8 miles south of Corralitos Canyon Road, southwest of the town of Guadalupe (UCMP).

LSA 6 **Oso Flaco Lake.** The author recalls a report of fossil marine gastropods and pelecypods from Ice Age dune deposits east of Oso Flaco Lake. These dune deposits would be part of the Nipomo Dune Complex.

### Summary

Vertebrate fossils, including the remains of mammoth, mastodon and horse, are located in sediments of Pleistocene age within a one-mile radius of the proposed Willow Road Interchange and Road Extension Project. The fossiliferous sediments are mapped (Jennings, 1958) as being the same as those that underlie the proposed project. Many of the fossils were collected in banks of shallow creeks (Fierstine, 2004), in sediments that are considered to be near the current topographic surface. The project as proposed includes excavation to depths of forty feet below the surface. Therefore, there will be potential for excavation to cause adverse impacts to significant, nonrenewable paleontological resources.

## PALEONTOLOGICAL RESOURCE RECOMMENDATIONS

The records search and review of available geologic literature indicates that the Willow Road Interchange and Road Extension Project is located in an area where Pleistocene sediments occur below a depth of six feet and which have a high potential for containing remains of vertebrate fossils.

The presence of sediments below a depth of six feet that are suitable to contain paleontological resources and the positive results of the literature review reinforced the high potential for construction excavation to encounter significant nonrenewable vertebrate fossils. This study recommends that a paleontological resource impact mitigation program (PRIMP) be included with construction excavation for the project where excavation is at or greater than six feet. This PRIMP includes excavation monitoring and fossil salvage, fossil preparation and identification, repository curation, and a compliance report. Compliance with these recommendations will assure that impacts to paleontological resources will remain below a level of significance.

### Paleontologic Resource Impact Mitigation Program

The results of the literature review and records search indicated that a project specific PRIMP should be developed for the excavation phase of the Willow Road Interchange and Road Extension Project. This program was designed to conform to the agency guidelines for administration of CEQA, and those of the Society of Vertebrate Paleontology. It includes the following steps:

- A trained paleontological monitor will be present during ground-disturbing activities within the project area in sediments below a depth of six feet that have been determined likely to contain paleontological resources. The monitor will be empowered to temporarily halt or redirect construction activities to ensure avoidance of adverse impacts to paleontological resources. The monitor will be equipped to rapidly remove any large fossil specimens encountered during excavation. During monitoring, samples will be collected and processed to recover microvertebrate fossils. Processing will include wet screen washing and

microscopic examination of the residual materials to identify small vertebrate remains.

- Upon encountering a large deposit of bone, salvage of all bone in the area will be conducted in accordance with modern paleontological techniques.
- All fossils collected during the project will be prepared to a reasonable point of identification. Excess sediment or matrix will be removed from the specimens to reduce the bulk and cost of storage. Itemized catalogs of all material collected and identified will be provided to the museum repository along with the specimens.
- A report documenting the results of the monitoring and salvage activities and the significance of the fossils will be prepared.
- All fossils collected during this work, along with the itemized inventory of these specimens, will be deposited in a museum repository for permanent curation and storage.

Compliance with these recommendations assures that excavation impacts to the paleontological resources are maintained below a level of significance.

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1965a *Nipomo* 7.5 minute topographic quadrangle map.

1965b *Oceano* 7.5 minute topographic quadrangle map. Photorevised 1994.

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# APPENDIX A

# RECORDS SEARCH RESULTS A

## CONFIDENTIAL – NOT FOR PUBLIC REVIEW

# APPENDIX B

# RECORDS SEARCH RESULTS B

## CONFIDENTIAL – NOT FOR PUBLIC REVIEW

# APPENDIX C

# RECORDS SEARCH RESULTS C

## CONFIDENTIAL – NOT FOR PUBLIC REVIEW