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## MEMORANDUM

DATE: May 20, 2016

TO: Ray Hussey

FROM: Sarah Rieboldt, Ph.D.

SUBJECT: Paleontological Analysis of the Madison Plaza Commercial Project, City of Riverside, County of Riverside, California

## INTRODUCTION

LSA Associates, Inc. (LSA) is under contract to Peninsula Retail Partners/Hanover, PRP Madison, LLC to conduct a paleontological analysis for the Madison Plaza Commercial Project (project) located at 3490 Madison Street in the City of Riverside (City), County of Riverside, California. It includes Assessor's Parcel Nos. 230-090-002, -003, -004, and -005 and occupies approximately 8.57 acres). The project is located on the northwest side of the intersection of Madison Street and State Route 91 (SR-91). It is depicted on the United States Geological Survey (USGS) *Riverside West, California* 7.5-minute topographic quadrangle in Township 3 South, Range 5 West, Section 4, San Bernardino Baseline and Meridian (USGS, 1980).

The proposed project seeks to construct a new shopping center space within the project site. The existing Denny's restaurant building will be retained on site and is not included in the new shopping center space. The project would construct two attached structures consisting of a 41,117 sf supermarket and a 37,811 sf health club and fitness center, plus a freestanding pad for a 2,000 sf fast-food restaurant with a drive-through. In addition to the building area included as part of the proposed project, an existing California Department of Transportation (Caltrans) retention basin along the westbound SR-91 on-ramp lane would be maintained.

Development of this project will involve demolition of the existing fitness center in the southern portion of the site, the fast-food restaurant and drive-through on the eastern portion of the site, and the pavement and planters throughout the site, as well as removal of the existing undocumented fill soils within the project site. Project development would also include excavation to reach competent material as determined by the project geologist; construction of the new buildings, driveways, and parking areas; installation of wet and dry utilities; and landscaping.

This memorandum was prepared to ensure project compliance with all applicable State and City regulations, policies, and guidelines regarding paleontological resources, including the California Environmental Quality Act (CEQA): Public Resources Code (PRC) Division 13, Chapter 2.6; the *State CEQA Guidelines*: California Code of Regulations (CCR), Title 14, Chapter 3, Appendix G; PRC 5097.5; the Historic Preservation Element of the General Plan of the City (City of Riverside, 2012); and the Society of Vertebrate Paleontology (SVP, 2010). This memorandum addresses the project's potential to adversely impact paleontological resources and, if needed, includes mitigation measures and other recommendations to minimize these impacts.

## METHODS

LSA examined geologic maps of the project area and reviewed relevant geological and paleontological literature to determine which geologic units are present within the project area and whether fossils have been recovered within the project area or from those or similar geologic units elsewhere in the region.

## RESULTS

The project area is located at the northern end of the Peninsular Ranges Geomorphic Province, a 900-mile long northwest-southeast trending structural block that extends from the Transverse Ranges to the tip of Baja California and includes the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). The total width of this province is approximately 225 miles, extending from the Colorado Desert in the east, across the continental shelf to the Southern Channel Islands (Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) in the west (Sharp, 1976). This province is characterized by a series of mountain ranges separated by northwest-trending valleys subparallel to faults branching from the San Andreas Fault (California Geological Survey, 2002). It contains extensive pre-Cretaceous (older than 145 million years ago [Ma]) igneous and metamorphic rocks covered by limited exposures of post-Cretaceous (younger than 66 Ma) sedimentary deposits (Norris and Webb, 1976). Within this province, the project is located on the Perris Block, a fault-bounded structural block that extends from the southern foot of the San Gabriel and San Bernardino Mountains southeast to the vicinity of Bachelor Mountain and Polly Butte (Morton and Miller, 2006; Kenney, 1999). It is bounded on the northeast by the San Jacinto Fault and on the southwest by the Elsinore Fault Zone (Morton and Miller, 2006).

Geologic mapping by Morton and Miller (2006) shows that the entire project site contains late to middle Pleistocene Older Alluvial Fan Deposits. According to the geotechnical report prepared for this project, the project site also contains 2.5–5.5 feet of Artificial Fill overlying the Older Alluvial Fan Deposits (Southern California Geotechnical, Inc., 2016). Dates for the geologic ages referenced in this report are derived from the International Chronostratigraphic Chart published by the International Commission on Stratigraphy (ICS, 2015).

**Artificial Fill.** Artificial Fill consists of sediments that have been removed from one location and transported to another location by human activity, rather than by natural means. The transportation distance can vary from a few feet to many miles, and composition is dependent on the source and purpose. Artificial Fill will sometimes contain modern debris such as asphalt, wood, bricks, concrete, metal, glass, plastic, and even plant material.

While Artificial Fill may contain fossils, these fossils have been removed from their original location and are thus out of stratigraphic context. Therefore, they are not considered important for scientific study. As such, Artificial Fill has no paleontological sensitivity.

**Older Alluvial Fan Deposits.** The Older Alluvial Fan Deposits formed during the late to middle Pleistocene (11,700–781,000 years ago) (Morton and Miller, 2006) from sediments that were eroded from the mountains and carried to lower elevations by rivers and streams. These deposits are composed of moderately consolidated mixtures of gravel and cobbles that are predominantly reddish-

brown in color (Morton and Miller, 2006). They have been dissected by erosional gullies and show some soil development (Morton and Miller, 2006).

These deposits span the latest two North American Land Mammal Ages (NALMAs): the Rancholabrean NALMA (11,700–240,000 years ago) and the Irvingtonian NALMA (240,000–1.8 Ma; Alroy, 2000). Fossils are known in similar Rancholabrean and Irvingtonian deposits from excavations for roads, housing developments, and quarries, as well as scientific investigations in the Southern California area (Jefferson, 1991a, 1991b; Miller, 1971; Pajak et al., 1996; Reynolds and Reynolds, 1991; Springer et al., 2009). These fossils include mammoths, mastodons, horses, bison, camels, saber-toothed cats, coyotes, deer, and sloths, as well as smaller animals like rodents, rabbits, birds, reptiles, and fish. As such, these deposits are considered to have high paleontological sensitivity.

## RECOMMENDATIONS

The project area contains Artificial Fill, which has no paleontological sensitivity, overlying Older Alluvial Fan Deposits, which have high paleontological sensitivity. Ground-disturbing activities for the project are expected to extend into deposits with high paleontological sensitivity. Therefore, LSA recommends the following mitigation measure:

- PALEO-1**
- A paleontologist shall be hired to develop a Paleontological Resource Impact Mitigation Program (PRIMP) for this project. The PRIMP shall include the methods that will be used to protect paleontological resources that may exist within the project area, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.
  - Excavation and grading activities in deposits with high paleontological sensitivity (Older Alluvial Fan Deposits) shall be monitored by a paleontological monitor following a PRIMP. No monitoring is required for excavations in rocks with no paleontological sensitivity (Artificial Fill).
  - If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find in order to assess its significance.
  - Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a scientific institution.
  - At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.
  - In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected and a paleontologist should be contacted to assess the find for significance. If determined to be significant, the fossil shall be collected from the field.

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