



SR-710 Study

Alternatives Analysis Report

Appendix S

Paleontological Resources Technical Memorandum





TECHNICAL MEMORANDUM

Paleontological Resources

PREPARED FOR: Michelle Smith/Metro
COPY TO: Caltrans
Study Team
PREPARED BY: CH2M HILL Team
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This memorandum addresses the potential of the SR-710 Study to encounter and potentially affect paleontological resources. The memo provides a brief summary of paleontological resource issues by alternative. This analysis discusses the types of rocks present within each alternative and attempts to characterize how much potential impact to each sensitive unit could occur under each build alternative based on the amount of acreage affected by each alternative. Actual impacts are dependent on the location and extent of ground disturbing activities for each alternative.

The Level II screening analysis evaluated 12 alternatives (with 3 variations) including a TSM/TDM improvement, 3 bus rapid transit, 4 light rail transit, 4 freeway, and 2 highway alternatives along with the No Build conditions.

Methodology

This memo describes the findings of archival research, a locality search for paleontological localities conducted through the Los Angeles County Museum of Natural History. All project alternatives were mapped and geological mapping of the area overlaid on the project alternatives. GIS analysis was then used to calculate the acreage and percentage of each mapped rock unit within each alternative. This data is presented in Table A – Paleontological Resources by Alternative for the SR-710 Project (below).

Regional Setting

The SR-710 Project is located at the northern end of the Peninsular Range geomorphic province, a 900-mile-long northwest-southeast-trending structural block that extends from the tip of Baja California to the Transverse Ranges and includes the Los Angeles Basin (Norris and Webb, 1976). The total width of the province is approximately 225 miles, with a maximum landbound width of 65 miles (Sharp, 1976). It contains extensive pre-Cretaceous (more than 65 million years ago) igneous and metamorphic rocks covered by limited exposures of post-Cretaceous sedimentary deposits.

The Los Angeles Basin is a broad, almost level alluvial plain (gradient of 0.5 to 1 percent). It is bounded on the north and northeast by hills and mountains of the Northern Peninsular and Transverse Ranges and on the south and west by the Pacific Ocean. The Los Angeles Basin is divided into several areas. The Northeastern Block, in which the project lies, is located immediately south of the San Gabriel Mountains.

Specifically, the SR-710 Project extends from south and east of the Elysian Hills along the alluvial fan that abuts the southern margin of the San Gabriel Mountains. The project essentially contemplates a north-south highway linking I-10 and I-210. The Project Area is typified by a low-lying topography with slight hills or mesas rising above the basin floor.

Geologic mapping (Morton and Miller, 2006 and Morton, 2004) indicates that sediments from the middle Miocene through latest Quaternary are mapped as occurring within the Project Area.

Local Setting

The Project Area essentially crosses four fossiliferous formations (from youngest to oldest): Quaternary Alluvium, Fernando Formation, Puente Formation and the Topanga Formation. These rocks can contain fossils from the Pleistocene (Quaternary Alluvium, including old alluvium and old alluvial fan deposits), Pliocene (Fernando Formation, various facies) and Miocene (Puente and Topanga Formations, various facies). Rocks that are not likely to contain fossils are also present within the project area including Mesozoic igneous rocks, recent alluvium and recent fill.

Resources in Study Area

TSM/TDM

TSM/TDM crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation and the Topanga Formation. Mesozoic igneous rocks, encountered by the TSM/TDM, have a low paleontological sensitivity.

BRT-1

BRT-1 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by BRT-1.

BRT-6

BRT-6 crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by BRT-6.

BRT-6a

BRT-6a crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, and the Topanga Formation. No low sensitivity units are encountered by BRT-6a.

LRT-4a

LRT-4a crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by LRT-4a.

LRT-4b

LRT-4b crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by LRT-4b.

LRT-4d

LRT-4d crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by LRT-4d.

LRT-6

LRT-6 crosses sensitive sediments of Pleistocene Alluvium, the Fernando Formation, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by LRT-6.

F-2

F-2 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by F-2.

F-5

F-5 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. Only local Mesozoic igneous rocks within the F-5 have a low paleontological sensitivity.

F-6

F-6 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by F-6.

F-7

F-7 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by F-7.

H-2

H-2 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. Only local Mesozoic igneous rocks within the H-2 have a low paleontological sensitivity.

H-6

H-6 crosses sensitive sediments of Pleistocene Alluvium, the Puente Formation, and the Topanga Formation. No low sensitivity units are encountered by H-6.

Potential Effects to Paleontological Resources**Level I Screening**

Paleontological resources were not considered during Level I Screening.

Level II Screening**No Build**

The No Build Alternative would not impact any paleontological resources.

TSM/TDM

For the TSM/TDM Alternative, approximately 111.0 acres (99.8%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

BRT-1

For the BRT-1 Alternative, approximately 16.2 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

BRT-6

For the BRT-6 Alternative, approximately 15.0 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

BRT-6a

For the BRT-6a Alternative, approximately 15.5 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

LRT-4a

For the LRT-4a Alternative, approximately 79.0 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

LRT-4b

For the LRT-4b Alternative, approximately 150.6 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

LRT-4d

For the LRT-4d Alternative, approximately 89.0 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

LRT-6

For the LRT-6 Alternative, approximately 172.0 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

F-2

For the F-2 Alternative, approximately 340.3 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

F-5

For the F-5 Alternative, approximately 380.0 acres (93.8%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

F-6

For the F-6 Alternative, approximately 403.8 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

F-7

For the F-7 Alternative, approximately 397.1 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

H-2

For the H-2 Alternative, approximately 263.9 acres (96.4%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

H-6

For the H-6 Alternative, approximately 180.5 acres (100%) of the area within the estimated disturbance limits of the alternative are located within high sensitivity sediments.

Summary of Potential Effects to Paleontological Resources

The following table presents the acreage of high sensitivity resources within each alternative, and the percentage of total surface area of high sensitivity sediments compared to the total surface area of the alternative.

TABLE 1
Paleontological Acreage and Sensitivity by Alternative

| Resource | No Build | TSM/TDM | BRT-1 | BRT-6 | BRT-6a | LRT-4a | LRT-4b | LRT-4d | LRT-6 | F-2 | F-5 | F-6 | F-7 | H-2 | H-6 |
|--------------------------------------|----------|---------|-------|-------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|
| High Sensitivity Sediments (Acreage) | 0 | 111.0 | 16.2 | 15.0 | 15.5 | 79.0 | 150.6 | 89.0 | 172.0 | 340.3 | 380.0 | 403.8 | 397.1 | 263.9 | 180.5 |
| Percentage of total alternative | 0 | 99.8 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 93.8 | 100 | 100 | 96.4 | 100 |