

MEMORANDUM

DATE: January 2, 2020

To: Cheryl Sinopoli, Archaeologist, California Department of Transportation District 12, Environmental Division

FROM: Kelly Vreeland, M.Sc., and Sarah Rieboldt, Ph.D., LSA

SUBJECT: Supplemental Paleontological Identification Report/Paleontological Evaluation Report for the State Route 133 Auxiliary Lane Project, Irvine, Orange County, California (12-ORA-133-PM 8.3/M9.3, EA 0N8900/EFIS 1214000130)

INTRODUCTION

The California Department of Transportation (Caltrans) proposes the State Route 133 Auxiliary Lane Project (project) in Irvine, Orange County, California. This operational improvement project is on State Route 133 (SR-133) from the southbound (SB) Interstate 5 (I-5)/SB SR-133 connector (SB I-5 connector) to the SB SR-133/northbound (NB) Interstate 405 (I-405) connector (NB I-405 connector). The potential impacts on paleontological resources of the No Build Alternative and the Build Alternative for this project have already been studied in the Paleontological Identification Report/Paleontological Evaluation Report (PIR/PER) prepared for the project (LSA, 2019). The purpose of this memorandum is to reanalyze potential project impacts on paleontological resources due to changes in the design of the Build Alternative. The location and regional vicinity of the project are illustrated on Figure 1 (figures are provided in Attachment B), as depicted on the United States Geological Survey (USGS) *Tustin, California* 7.5-minute topographic quadrangle map in Irvine Ranch Sections 138 and 139, San Bernardino Baseline and Meridian (USGS, 1981). The project area depicted on Figure 1 includes the horizontal and vertical extent of temporary and permanent impacts associated with this project.

This memorandum was prepared to ensure project compliance with all applicable State regulations and policies 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 guidelines of the Caltrans' *Standard Environmental Reference (SER), Environmental Handbook*, Volume 1, Chapter 8: Paleontology; and the standards of the Society of Vertebrate Paleontology (SVP, 2010). It addresses the potential for the changes in the design of the Build Alternative to impact paleontological resources and, if needed, includes mitigation measures and other recommendations to minimize these impacts. Caltrans is the Lead Agency for CEQA.

BUILD ALTERNATIVES

Two alternatives are proposed: the No Build Alternative and the Build Alternative. These alternatives are discussed in more detail below.

No Build Alternative

The No Build Alternative does not include improvements to existing SR-133. Therefore, SR-133 would be maintained in its existing condition and would continue to be used by commuters, recreational traffic, and commercial trucks. The No Build Alternative serves as the baseline against which to evaluate the effects of the Build Alternative.

Build Alternative

As described in the *Draft Project Report* prepared by Caltrans (2019), the revised Build Alternative includes the following components, which will be addressed in this Supplemental PIR/PER:

- Construct additional asphalt concrete pavement to provide a 12-foot (ft) wide auxiliary lane from the SB I-5/SB SR-133 connector to the SB SR-133/NB I-405 connector and a 12-ft wide lane from the gore area to a point 300 ft south of San Diego Creek.
- Construct additional asphalt concrete pavement to provide a second 12-ft wide lane on the SB SR-133/NB I-405 connector.
- Realign the Barranca Parkway loop on-ramp and reconstruct the ramp entrance. Convert the high occupancy vehicle (HOV) lane to a general-purpose (GP) lane, install a connector ramp meter system, reconstruct the loop detectors, and modify the Midwest Guardrail System (MGS) along the on-ramp left shoulder, if needed.
- Reconstruct maintenance vehicle pullouts.
- Construct tie back walls at the Barranca Parkway Overcrossing (OC) and the Alton Parkway OC.
- Construct an approximately 500-ft long retaining wall from the end of the San Diego Creek off-ramp bridge (55-0290F) towards the north.
- Construct an approximately 210-ft long retaining wall from the beginning of the San Diego Creek off-ramp bridge (55-0290F) towards the north.
- Construct an approximately 471-ft long retaining wall along the off-ramp from SB SR-133 to I-405.
- Replace approximately 520 ft of the existing Reinforced Concrete Channel (RCC) with a Reinforced Concrete Box (RCB) between Barranca Parkway and Alton Parkway.
- Relocate and modify two existing overhead signs to accommodate pavement widening.
- Remove and replace light poles along the shoulder of SB SR-133 and the Barranca Parkway on-ramp.
- Install ramp metering at the SB SR-133/NB I-405 connector.
- Remove and replace signage as needed.
- Construct an approximately 500-ft long MGS segment between Wall #29 and the tie-back wall at the Alton Parkway OC.

- Remove the existing metal beam guard railing and end treatment at the gore area of the SB SR-133 and the SB SR-133/NB I-405 connector.
- Construct approximately 1,200 square ft of additional bridge pavement, construct bridge rail with 20:1 taper, and install REACT 350 to shield the end of bridge railings beyond the gore area of the SB SR-133 and the SB SR-133/NB I-405 connector.
- Relocate three drainage inlets along the right shoulder of SB SR-133 and two drainage inlets along the right shoulder of the SB SR-133/NB I-405 connector.
- Refresh all striping and markers.
- The San Diego Creek Left Bridge (55-0290L) will be widened to cover the gore area. A bridge Super-Structure will be constructed to accommodate the new lane configuration.
- The San Diego Creek off-ramp bridge (55-0290F) will be widened by 14.5 ft. A new Sub-Structure and Super-Structure will be constructed to accommodate the new lane configuration.
- Approach and departure slabs, paving notch, and joint seals will be added at the left bridge (55-0290L) and the off-ramp bridge (55-0290F).
- The existing Barriers, type 25 at the left bridge (55-0290L) and the off-ramp bridge (55-0290F) will be replaced with Concrete Barrier Type 836.
- Rock Slope Protection (RSP) will be placed 6 ft below the top of pile cap between the piers/abutment footings and flush with the footings and adjacent ground. The RSP used should be ½ ton (24 inches in diameter), installed in a pre-excavated 6-ft hole, and extend 5 ft from each side of the pier wall and extend 40 ft upstream from the face of the right bridge and 10 ft from the downstream face of the new widening of the off-ramp bridge (55-0290F).
- Slurry will be placed underneath the existing piers/abutments pile caps to fill the voids due to erosion prior to the excavation for RSP placement. The approximate area of the existing piers where slurry will be placed is 0.15 acres (6,450 square ft).
- Temporary construction easements (TCEs) are needed for reconstructing RCB, bridge widening, and RSP.
- Clearing and grubbing.
- Highway planting.
- Replace damaged landscape irrigation in kind where needed between the Irvine Boulevard OC to the Barranca Parkway on-ramp.

EXCAVATION PARAMETERS

Based on personal communication with Caltrans,¹ the maximum depths of excavation for the various components of the Build Alternative are detailed below in Table A.

¹ Personal communication (e-mail) with Cheryl Sinopoli, District 12 Archaeologist, on July 23 and December 31, 2019.

Table A: Anticipated Maximum Excavation Depths for Components of the Build Alternative for the SR-133 Auxiliary Lane Project

Project Component	Depth
Construct additional asphalt concrete pavement	3 – 4 ft
Realign/reconstruct Barranca Parkway loop on-ramp and ramp entrance	3.10 ft
Reconstruct loop detectors at Barranca Parkway loop on-ramp	2 inches
Reconstruct maintenance vehicle pullouts	3.10 ft
Construct tieback walls at Barranca Parkway OC and Alton Parkway OC	3.5 ft
Construct retaining walls	5.5 ft
Construct 1,200 square ft of additional bridge pavement and bridge rail and install REACT 350	3 – 5 ft
Refresh all striping and markers	N/A
Widen San Diego Creek Left Bridge, construct new Super-Structure	N/A
Widen San Diego Creek on-ramp bridge, construct new Sub-Structure and Super-Structure (pile: 18 inches diameter; pile cap 8 ft diameter, 3 ft deep)	30 – 50 ft
Add approach and departure slabs, paving notch, and joint seals to bridges	N/A
Replace existing barriers	7 ft
Place slurry underneath existing piers/abutments	N/A
Replace/install sign structures	25 ft
Replace light poles	5 ft
Install ramp metering system	6 ft
Install Midwest Guardrail System	7 ft
Relocate draining inlets	10 ft
Install Rock Slope Protection/Partially Grouted Rock Slope Protection (RSP/PGRSP)	6 ft
Clear and grub	<1 ft
Plant/landscape	1.5 ft

Source: Personal communication, California Department of Transportation (July 2019; December 2019).

ft = foot/feet

OC = overcrossing

SR-133 = State Route 133

METHODS

LSA reviewed the previous PIR/PER (LSA, 2019), geologic maps of the project area, and 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. In addition, the results of the fossil locality searches conducted through the Natural History Museum of Los Angeles County (LACM) and the San Diego Natural History Museum (SDNHM) for the previous PIR/PER (LSA, 2019) were referenced to determine the status and extent of previously recorded paleontological resources within and surrounding the project area. The small areas added to the original project area were observed and inspected during the previous field survey, the results of which were reviewed for this Supplemental PIR/PER memorandum.

RESULTS

Literature Review

The revised project area does not include additional new geologic units. Geologic mapping by Morton and Miller (2006) shows the project area contains Holocene to late Pleistocene (less than 126,000 years ago; Cohen et al., 2019) Young Alluvial Fan Deposits and the Vaqueros Formation, which dates to the Arikareean North American Land Mammal Age (20.8– 30.6 million years ago; Prothero and Donohoo, 2001; Whistler and Lander, 2003) (Figure 2). Artificial Fill is also likely present from the surface to varying depths throughout much of the project area where it was placed during construction of SR-133. The Young Alluvial Fan Deposits are considered to have low paleontological sensitivity from the surface to a depth of 10 ft and high paleontological sensitivity below that mark. The Vaqueros Formation is considered to have high paleontological sensitivity, and Artificial Fill has no paleontological sensitivity. More detailed descriptions of these geologic units and their respective paleontological sensitivities may be found in the PIR/PER prepared for this project (LSA, 2019).

Fossil Locality Searches

As noted in the PIR/PER prepared for this project (LSA, 2019), the locality searches conducted by the LACM and the SDNHM indicate that there are no known fossil localities within the boundaries of the project and neither museum has records of fossil localities from the Holocene-age sediments of the Young Alluvial Fan Deposits. Only the LACM has a record of a fossil locality from deposits similar to the older sediments in the Young Alluvial Fan Deposits. From the Vaqueros Formation, the LACM has 12 vertebrate fossil localities near the project area, while the SDNHM has one vertebrate fossil locality approximately 3 miles from the project area. Copies of the results letters from the LACM and SDNHM can be found in Appendices A and B of the PIR/PER (LSA, 2019).

Field Survey

LSA Paleontologist Kelly Vreeland, M.Sc., conducted a vehicular and pedestrian survey of the project area on July 24, 2019, for the previous PIR/PER (LSA, 2019). Artificial Fill was noted throughout much of the project area, while sediments consistent with the Young Alluvial Fan Deposits and Vaqueros Formation as mapped by Morton and Miller (2006) were also noted. No paleontological resources were observed during the vehicular and pedestrian survey.

RECOMMENDATIONS

Similar to the conclusion reached for the PIR/PER prepared previously for this project (LSA, 2019), this supplemental study does not anticipate special paleontological situations that would require project redesign to avoid critical localities or strata. However, construction of the Build Alternative for this project would require excavation into paleontologically sensitive sediments and has the potential to impact scientifically significant, nonrenewable paleontological resources.

Because the project area and project plans, including excavation methods and depths, do not include any new geologic units and do not include significant changes to the project area, this study agrees with the recommendation of the previous PIR/PER prepared for this project (LSA, 2019).

Preparation of a Paleontological Mitigation Plan (PMP), and implementation of the procedures within the PMP, is recommended.

The PMP shall be developed concurrently with the final design plans and shall follow the Caltrans' guidelines in the *SER, Environmental Handbook, Volume 1, Chapter 8: Paleontology* (Caltrans, 2017), as well as standards from the SVP. Following these guidelines, the PMP shall include sections describing project activities, the geologic units within the project area and their paleontological sensitivities, the work plan for mitigating project impacts to paleontological resources, estimates of monitoring schedules and costs, decision thresholds for monitoring levels and fossil collections, a recommended repository for recovered fossils, any necessary permits, and the contents of the Paleontological Mitigation Report that is required at the end of the monitoring program regardless of whether any paleontological resources are recovered.

Once the PMP has been prepared, the paleontological resource protocols and procedures within it shall be incorporated into the project plans, specifications, and estimates. Implementation of these protocols and procedures will reduce project impacts to scientifically important paleontological resources to a less than significant level.

Attachments: A – References
B – Figures

ATTACHMENT A

REFERENCES

California Department of Transportation (Caltrans)

- 2017 Standard Environmental Reference, Volume 1, Chapter 8 – Paleontology. Website: <https://dot.ca.gov/programs/environmental-analysis/standard-environmental-reference-ser/volume-1-guidance-for-compliance/ch-8-paleontology>. Last updated November 15, 2017 (accessed September 2019).

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Morton, Douglas M., and Fred K. Miller

- 2006 Geologic Map of the San Bernardino and Santa Ana 30-minute by 60-minute quadrangles, California. Digital preparation by Pamela M. Cosette and Kelly R. Bovard. Prepared by the United States Geological Survey (USGS) in cooperation with the California Geological Survey. USGS Open File Report 2006-1217. Map Scale 1:100,000.

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- 2010 Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology. Impact Mitigation Guidelines Revision Committee. p. 11.

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Whistler, David P., and E. Bruce Lander

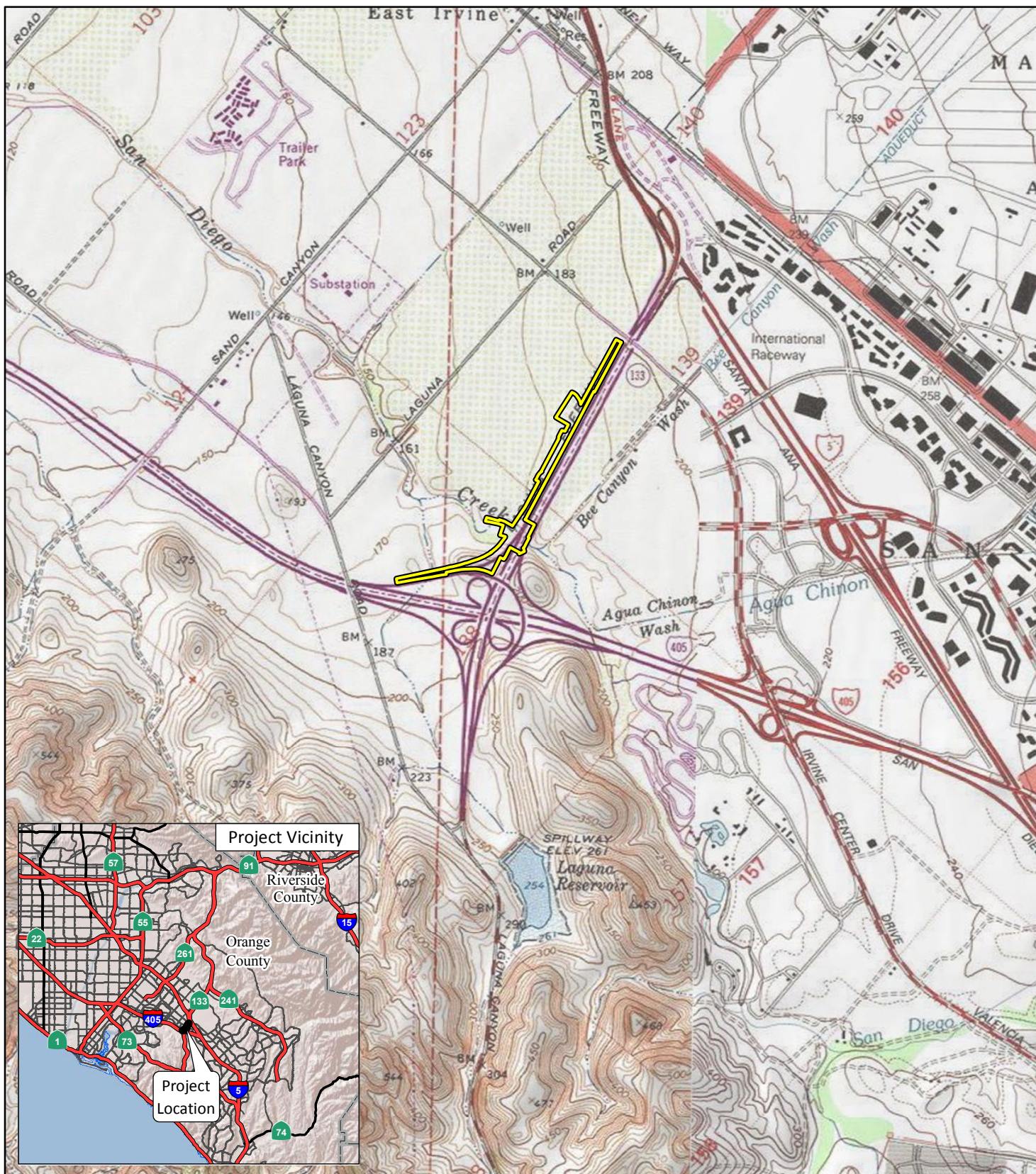
- 2003 New Late Uintan to Early Hemingfordian Land Mammal Assemblages from the Undifferentiated Sespe and Vaqueros Formations, Orange County, and from the Sespe and Equivalent Marine Formations in Los Angeles, Santa Barbara, and Ventura Counties, Southern California. Bulletin of the American Museum of Natural History 279:231-268.

ATTACHMENT B

FIGURES

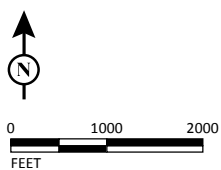
Figure 1: Project Location

Figure 2: Geology



LEGEND

 Project Area



SOURCE: Caltrans (9/26/2019); USGS 7.5' Quad - El Toro (1982) and Tustin (1981), CA

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FIGURE 1

SR-133 Auxiliary Lane Project

Project Location

12-ORA-133 PM 8.3/M9.3

EA 0N8900

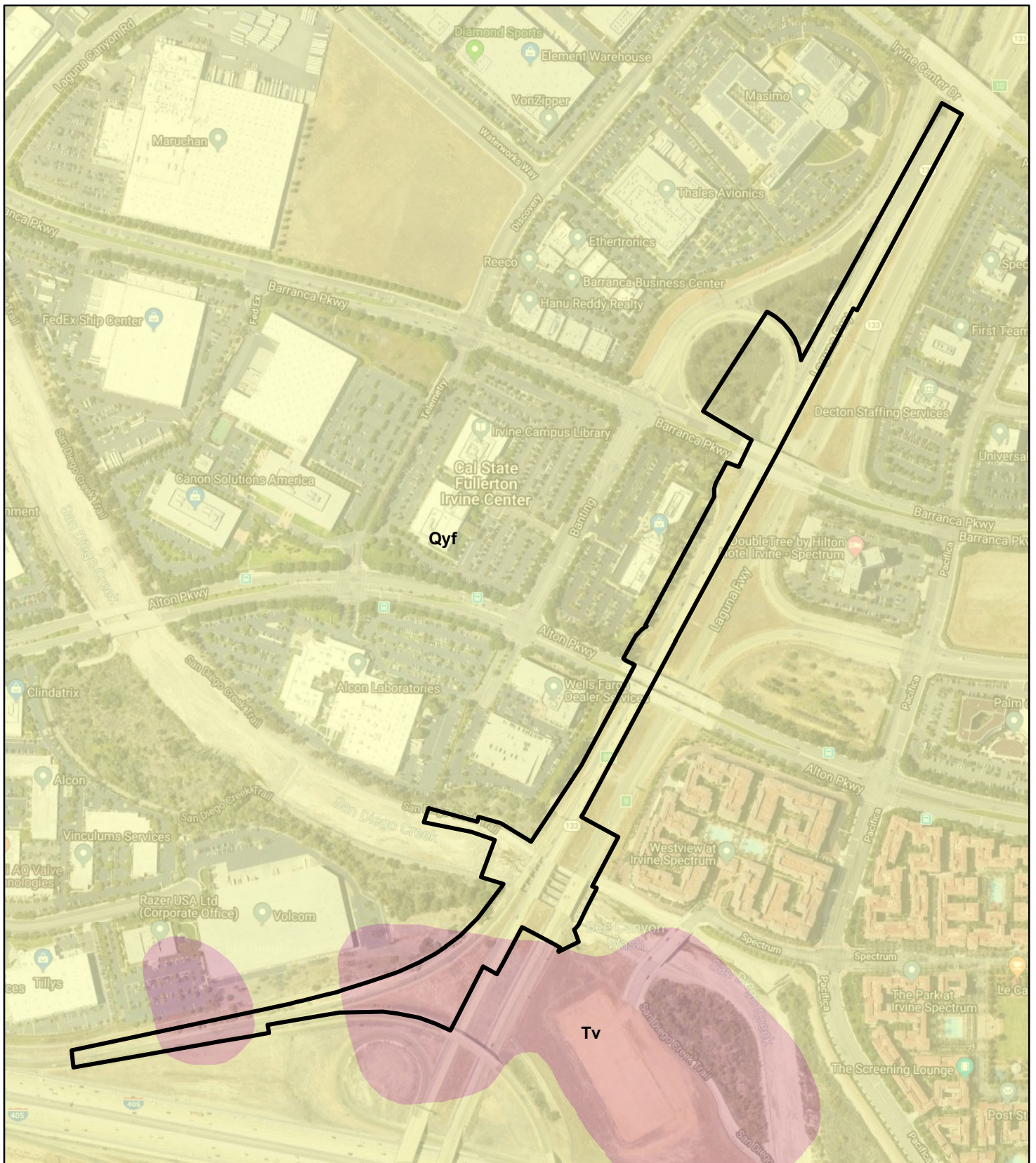



FIGURE 2

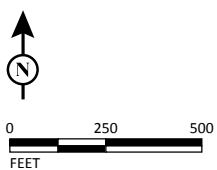
LEGEND

 Project Area

Geology

 Qyf - Young Alluvial Fan Deposits

 Tv - Vaqueros Formation



SR-133 Auxiliary Lane Project

Geology

12-ORA-133 PM 8.3/M9.3

EA 0N8900

SOURCE: Google Maps (2018); Caltrans (9/26/2019); Morton and Miller (2006)

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