

MEMORANDUM

DATE: September 7, 2018

To: Kenny Nguyen, P.E., Senior Civil Engineer, City of Santa Ana

FROM: Sarah Rieboldt, Ph.D., Senior Paleontological Resources Manager, LSA

SUBJECT: Paleontological Analysis of the Fairview Street Improvements from 9th Street to 16th Street and Bridge Replacement Project, Santa Ana, Orange County, California

INTRODUCTION

The City of Santa Ana (City), in conjunction with the California Department of Transportation (Caltrans) District 12, proposes to widen Fairview Street between 9th Street and 16th Street, including replacing the Fairview Street bridge crossing over the Santa Ana River (proposed Project) in Santa Ana, California. The purpose of the project is to reduce congestion and improve pedestrian and bicyclist safety on Fairview Street between 9th Street and 16th Street, consistent with the Orange County Master Plan of Arterial Highways and the City's General Plan Circulation Element.

South of 9th Street, Fairview Street provides three lanes in each direction which are reduced to two lanes in each direction north of 9th Street, across the existing four-lane bridge, to 16th Street. The Fairview Street segment between 9th Street and 16th Street is the only constraint for Fairview Street to be built out to its planned width of six lanes. This condition causes a traffic "bottleneck" during peak hours. In addition, there are no sidewalks, bikeways, or lighting on the existing bridge. Pedestrians and bicyclists currently use the roadway shoulder to cross the bridge.

Within the project limits, Fairview Street is bordered by single-family residences and a few commercial properties.

This memorandum was prepared to ensure that the proposed Project is in compliance with all applicable State and local regulations, requirements, and policies regarding paleontological resources, as well as guidelines of the Society of Vertebrate Paleontology (SVP, 2010). The applicable regulations, requirements, and policies include 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; and the Conservation Element of the City of Santa Ana (City) General Plan (City of Santa Ana, 2010). This memorandum addresses the potential for the proposed Project to impact paleontological resources and, if needed, includes mitigation measures and other recommendations to minimize these impacts. The City is the Lead Agency under CEQA.

PROJECT LOCATION

The Project site extends along Fairview Street from approximately 9th Street to 16th Street. The Project site is depicted on the United States Geological Survey (USGS) *Anaheim, California*

7.5-minute topographic quadrangle map in unsectioned lands of the Los Angeles Land Grant (USGS, 1981; see Figure 1, provided in Attachment B).

PROJECT DESCRIPTION

The proposed Project includes widening Fairview Street between 9th Street and 16th Street, including replacing the Fairview Street bridge crossing over the Santa Ana River. The proposed Project would widen Fairview Street from two lanes in each direction to three lanes in each direction. Fairview Street bridge would be replaced with a new six-lane bridge (three lanes in each direction), including a complete bridge deck with barrier rails, sidewalks, bicycle lanes, a raised median, and lighting.

The proposed bridge would be expanded from approximately 52 feet (ft) to 100 ft in width, and would have the same roadway profile as the existing bridge. The eight pier walls that support the existing bridge would be removed, and four new pier walls would be constructed to support the new bridge.

The proposed Project would acquire partial right-of-way take from three parcels (two commercial parcels [Assessor's Parcel Numbers (APNs) 405-213-02 and 405-213-01] and one single-family residence [APN 405-213-14]).

An existing 12-inch water line and a bank of 12 phone conduits cross the Santa Ana River, suspended under the deck of the existing bridge. These utilities would need to be temporarily relocated during construction and then permanently relocated to the new bridge.

Water quality best management practices (BMPs) would be included to treat stormwater runoff such as a vegetated swale adjacent to Fairview Street in the Fairview Triangle rest area.

Fairview Street would remain open during the construction period with two southbound lanes and one northbound lane, with lanes shifted to one side of the bridge while the other side is replaced. Therefore, no detours would be required for vehicles traveling along Fairview Street. Access to properties would be maintained.

During construction, pedestrians and bikes would be detoured away from the Fairview Street bridge to the 17th Street Bridge to cross the Santa Ana River by way of the Santa Ana River Trail (SART) between the hours of 9:00 a.m. and 7:00 p.m., when the gates to the SART are open and unlocked. After hours, pedestrians and bicyclists who wish to cross the Santa Ana River would be detoured to adjacent City streets such as King Street.

Construction of the proposed Project would require temporary closure of a portion of the SART for the demolition and placement of the bridge superstructure. The SART includes a Class I bike path on the eastern side and a regional riding and hiking trail on the western side. The portion of the SART affected by project construction would need to be temporarily closed four times for approximately 8 hours each time during two summer periods for the placement of precast concrete girders. During these periods, SART users would be detoured and signage would be provided to display the dates of the closures and to identify the detour routes. Work on the north and south sides of the bridge

would be completed during separate periods so that SART users can be detoured to the trail on the opposite side of the Santa Ana River at 5th Street. There are gates and ramps located on both sides of the SART at 5th Street that provide access to bicyclists and pedestrians for these detours. Details regarding the detours are being coordinated with Orange County Parks. Other short-term closures of up to 15 minutes would be allowed with flagmen.

A temporary detour within the river bed may be required as a contingency. This would involve construction of dirt and gravel ramps with asphalt topping to and from the SART and the river bed.

Construction vehicles would access the Santa Ana River from the gate and ramp at the County of Orange access road at the northwest corner of the bridge, and would use the existing concrete access ramp into the river approximately 250 ft west of the proposed Project Area. All access roads to the SART that are utilized by construction vehicles or for detour routes would be reconstructed and restored to pre-construction conditions or better prior to project completion.

Excavation associated with the various components of the proposed Project is expected to extend to a depth of 2 ft for the roadway widening, 4 ft for the utility relocations, 6 ft for the river pier footings, and 5 to 15 ft for the bridge abutments (personal communication, WKE, Inc., April, 2018).

METHODS

LSA examined geologic maps of the Project Area and reviewed relevant geological and paleontological literature to determine which geologic units are present in the Project Area and whether fossils have been recovered from those or similar geologic units elsewhere in the region. A search for known fossil localities was also conducted through the Natural History Museum of Los Angeles County (LACM) in order to determine the status and extent of previously recorded paleontological resources within and surrounding the Project Area.

RESULTS

Literature Review

The proposed Project 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 in the north to the tip of Baja California in the south (California Geological Survey, 2002; Norris and Webb, 1976). This province is characterized by mountains and valleys that trend in a northwest-southeast direction, roughly parallel to the San Andreas Fault. The total width of the province is approximately 225 miles, extending from the Colorado Desert in the east, across the continental shelf, to the southern Channel Islands (i.e., Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) (Sharp, 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rock covered by Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb, 1976).

Within this larger region, the proposed Project is located in the Los Angeles Basin, a broad alluvial lowland bounded to the north and east by the San Gabriel and Santa Ana Mountains, respectively, and by the Pacific Ocean to the southwest (Yerkes et al., 1965). The Basin is underlain by a structural depression that has discontinuously accumulated thousands of feet of marine and terrestrial

deposits since the Late Cretaceous (approximately 100.5 Ma) (Yerkes et al., 1965). Over millions of years, the Basin has experienced episodes of subsidence, deposition, uplift, erosion, and faulting, all of which have resulted in very complex geology and a very productive oil industry (Bilodeau et al., 2007; Yerkes et al., 1965). The surface of the basin slopes gently southwestward toward the ocean, interrupted in various places by low hills and traversed by several large rivers (Sharp, 1976; Yerkes et al., 1965), including the Los Angeles River, the Rio Hondo, the San Gabriel River, and the Santa Ana River.

Geologic mapping by Morton and Miller (2006) shows that the Project Area contains Very Young Wash Deposits and Young Alluvial Fan Deposits (see Figure 2, Geologic Map, provided in Attachment B). In addition, because the Project Area has been previously developed, some amount of Artificial Fill is likely present at the surface above the geologic unit mapped by Morton and Miller (2006). Ages for the geologic epochs and subdivisions are based on the International Chronostratigraphic Chart prepared by the International Commission on Stratigraphy (ICS, 2017) and Walker et al. (2012).

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. 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.

Very Young Wash Deposits

The Very Young Wash Deposits are late Holocene in age (less than 4,200 years ago; Walker et al., 2012) and consist of unconsolidated sand and gravel in active washes, channels on active alluvial fans, and ephemeral streams (Morton and Miller, 2006). These deposits accumulated along river and stream channels as floods and debris flows carried sediment down from higher elevations. The size, color, and types of clasts in these deposits are dependent on the local bedrock from which they were derived, with boulder-size clasts more common closer to the mountains and in areas prone to flash floods (Morton and Miller, 2006). These deposits are mapped along the Santa Ana River channel in the Project Area.

Although Holocene deposits can contain remains of plants and animals, only those from the middle to early Holocene (4,200 to 11,700 years ago; Walker et al., 2012) are considered scientifically important (SVP, 2010). Older deposits that may contain scientifically important fossils may be encountered at undetermined depths below these late Holocene deposits. Therefore, the Very Young Wash Deposits are considered to have low paleontological sensitivity.

Young Alluvial Fan Deposits

Young Alluvial Fan Deposits, which are Holocene to late Pleistocene in age (less than 126,000 years ago; ICS, 2017), consist of unconsolidated gravel, sand, and silt with occasional cobbles and boulders near mountain fronts (Morton and Miller, 2006). These sediments were deposited by flooding

streams and debris flows coming down from higher elevations and generally form a fan or lobe shape at the base of hills and mountains (Morton and Miller, 2006).

As noted above, only fossils from the middle to early Holocene (4,200 to 11,700 years ago; Walker et al., 2012) are considered scientifically important (SVP, 2010). These Holocene deposits overlie older Pleistocene deposits, which have produced scientifically important fossils elsewhere in the region (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). These older deposits span the end of the Rancholabrean North American Land Mammal Age (NALMA), which dates from 11,000 to 240,000 years ago (Sanders et al., 2009) and was named for the Rancho La Brea fossil site in central Los Angeles. The presence of *Bison* defines the beginning of the Rancholabrean NALMA (Bell et al., 2004), but fossils from this time also include other large and small mammals, reptiles, fish, invertebrates, and plants (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). There is a potential to find these types of fossils in the older sediments of this geologic unit, which may be encountered below a depth of approximately 10 ft. Therefore, these deposits are assigned low paleontological sensitivity from the surface to a depth of 10 ft and high sensitivity below that mark.

Fossil Locality Search

According to the locality search conducted by the LACM, there are no known fossil localities within the boundaries of the proposed Project. The LACM reports that the Project Area is underlain by deposits of younger Quaternary alluvium overlying older Quaternary alluvium (i.e., Young Alluvial Fan Deposits). The museum notes that these deposits typically do not contain scientifically significant fossils in the uppermost layers but, they may produce important fossils at depth.

The closest vertebrate locality in these older Quaternary deposits is LACM 1339, south-southwest of the Project Area near the top of the bluffs along Adams Avenue in Costa Mesa. This locality produced a specimen of horse (*Equus*) at a depth of 43 ft below the street. The next closest locality is LACM 2032, northeast of the Project Area near the intersection of Mission Road and Daly Street. That locality yielded specimens of mammoth (*Mammuthus*) and camel (Camelidae) at a depth of 15 ft below the top of the bluff. Locality LACM 4943, which is located northeast of the Project Area near the intersection of Glassell Street and Fletcher Avenue in Orange, produced a specimen of horse (*Equus*) at a depth of 8 to 10 ft below the surface.

The LACM believes that shallow excavations in the Young Alluvial Fan Deposits in the Project Area are unlikely to encounter any scientifically important vertebrate fossils. However, the museum notes that deeper excavations into these deposits may encounter scientifically significant vertebrate remains and should be monitored to recover those remains. A copy of the letter describing the locality search results from the LACM is provided in Attachment C.

CONCLUSIONS AND RECOMMENDATIONS

Any Artificial Fill present within the Project Area has no paleontological sensitivity, the Very Young Wash Deposits have low paleontological sensitivity, and the Young Alluvial Fan Deposits have low paleontological sensitivity from the surface to a depth of 10 ft and high paleontological sensitivity below a depth of 10 ft. The majority of project excavation is anticipated to be shallower than a depth of 10 ft, with only the bridge abutments possibly extending to a depth of 15 ft. However,

because much of the Project Area has been previously developed, excavation into any existing native deposits for the abutments will have a limited impact area. Therefore, LSA recommends the following mitigation measure:

PALEO-1 If paleontological resources are encountered during the course of ground disturbance, work in the immediate area of the find shall be redirected and a paleontologist shall be contacted to assess the find for scientific significance. If determined to be significant, the fossil shall be collected from the field. The paleontologist may also make recommendations regarding additional mitigation measures, such as paleontological monitoring. Scientifically significant 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 museum repository. If scientifically significant paleontological resources are collected, a report of findings shall be prepared to document the collection.

Implementation of this mitigation measure will ensure that project impacts to scientifically significant paleontological resources will be mitigated to a level that is less than significant.

Attachments: A – References

B – Figure 1: Project Location

Figure 2: Geologic Map

C – Paleontological Locality Search Results from the Natural History Museum of Los Angeles County

ATTACHMENT A

REFERENCES

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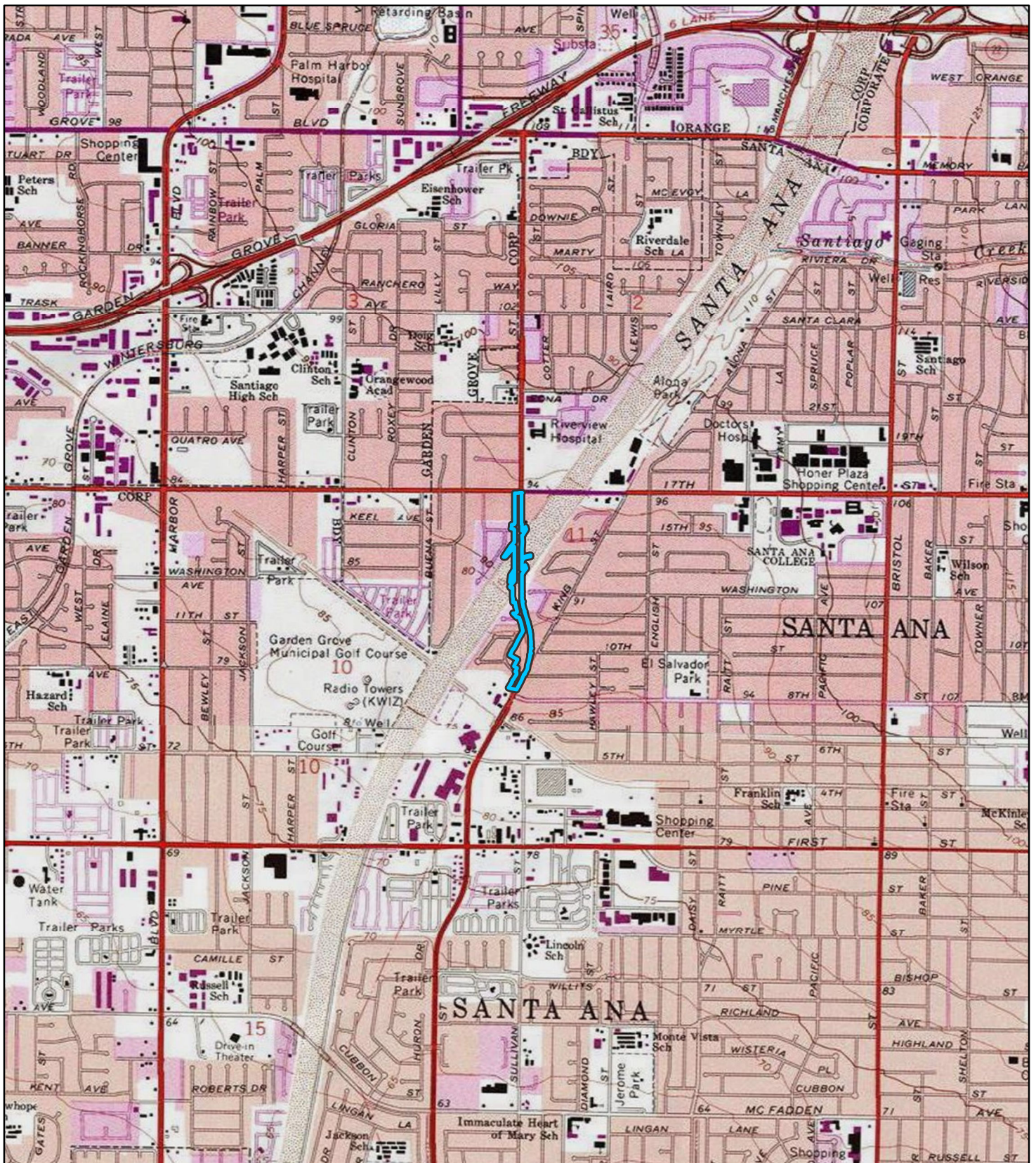
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ATTACHMENT B

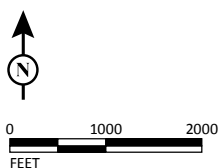
FIGURE 1: PROJECT LOCATION FIGURE 2: GEOLOGIC MAP



LEGEND

 Project Location

MAP 2



SOURCE: USGS 7.5' Quad - Anaheim (1981) & Newport Beach (1981)

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*Fairview Street Improvements
from 9th Street to 16th
Street and Bridge Replacement Project
Project Location*

Federal Project No.: BRLS 5063(184)

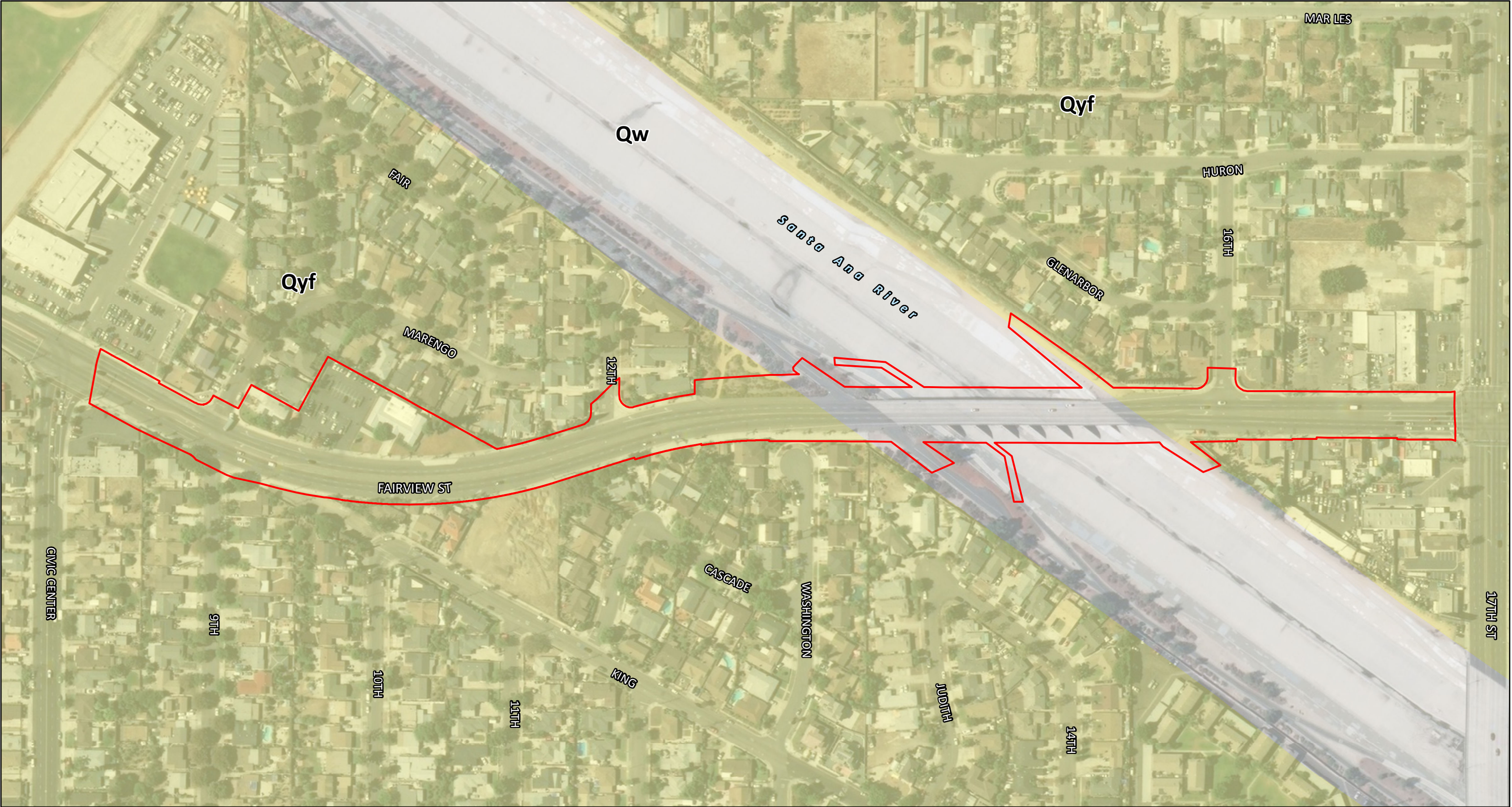


FIGURE 2

LEGEND

Project Boundary

Geologic Units

Qw - Very Young Wash Deposits

Qyf - Young Alluvial Fan Deposits



0 100 200
FEET

SOURCE: Bing (2015); WKE (2017); Morton and Miller (2006)

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*Fairview Street Improvements
from 9th Street to 16th
Street and Bridge Replacement Project*
Geologic Map

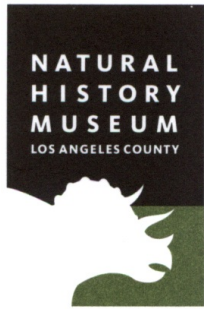
Federal Project No.: BRLS 5063(184)

ATTACHMENT C

PALEONTOLOGICAL LOCALITY SEARCH RESULTS FROM THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org



Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

23 February 2018

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614

Attn: Sarah Rieboldt, Ph.D., Senior Paleontological Resources Manager

re: Paleontological Resources Records Check for the proposed Fairview Street Widening and Bridge Replacement Project, LSA Project # WKE1702, in the City of Santa Ana, Orange County, project area

Dear Sarah:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed Fairview Street Widening and Bridge Replacement Project, LSA Project # WKE1702, in the City of Santa Ana, Orange County, project area as outlined on the portion of the Anaheim USGS topographic quadrangle map that you sent to me via e-mail on 9 February 2018. We do not have any vertebrate fossil localities that lie within the proposed project area boundaries, but we do have localities nearby from the same sedimentary units that may occur subsurface in the proposed project area.

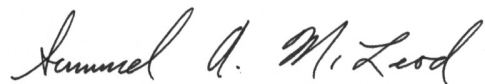
The entire proposed project has surface deposits of younger Quaternary Alluvium, derived as fluvial deposits from the Santa Ana River that flows through the northern portion of the proposed project area. These deposits are unlikely to contain significant vertebrate fossils in the uppermost layers, but older Quaternary deposits occurring at varying depths may well contain significant fossil vertebrate remains. Our closest vertebrate fossil locality from older Quaternary deposits is probably LACM 1339, south-southwest of the proposed project area in Costa Mesa east of the Santa Ana River near the top of the mesa bluffs along Adams Avenue, that produced fossil specimens of mammoth, *Mammuthus*, and camel, Camelidae, bones from sands approximately 15 feet below the top of the mesa that is overlain by shell bearing silts and sands.

Our next closest vertebrate fossil locality in older Quaternary sediments is probably LACM 4943, northeast of the proposed project area in the City of Orange between the Newport Freeway (Highway 55) and the Santa Ana River near the intersection of Glassell Street and Fletcher Avenue. Locality LACM 4943 produced a specimen of fossil horse, *Equus*, at a depth of 8-10 feet below the surface.

Surface grading or shallow excavations in the proposed project area probably will not uncover significant vertebrate fossil remains. Excavations that extend down into the older Quaternary deposits, however, may well encounter significant fossil vertebrate specimens. Any substantial excavations below the uppermost layers in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples from these deposits should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

A handwritten signature in cursive script that reads "Samuel A. McLeod". The signature is written in dark ink and is positioned above the printed name.

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice