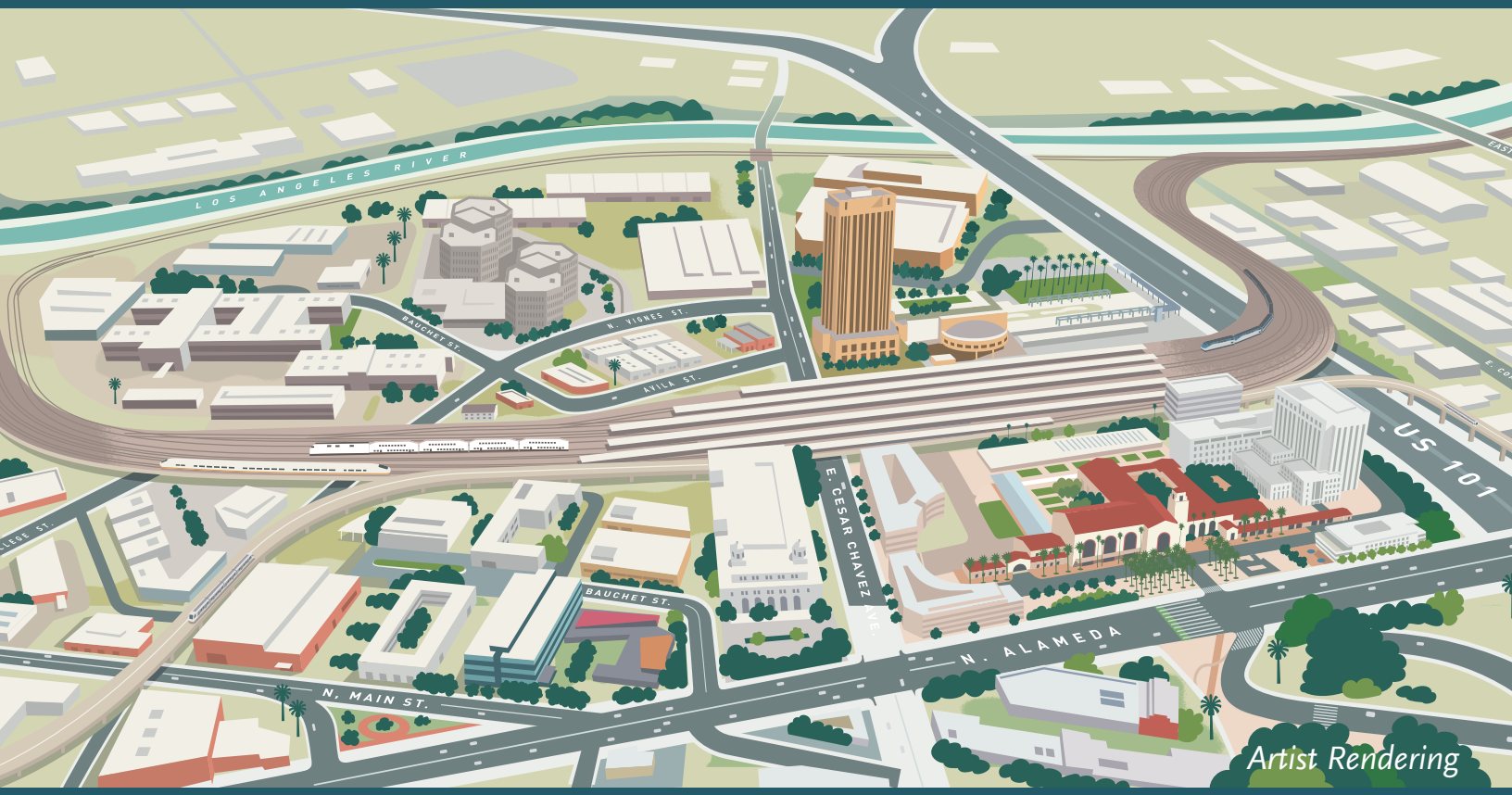
Link Union Station

Draft Paleontological Identification Report and Paleontological Evaluation Report

June 2024



The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by the State of California pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated July 23, 2019, and executed by the Federal Railroad Administration and the State of California.

Metro

CALIFORNIA High-Speed Rail Authority

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ACRONYMS

Authority	California High-Speed Rail Authority
Caltrans	California Department of Transportation
EIS	environmental impact statement
FRA	Federal Railroad Administration
HSR	high-speed rail
LACM	Natural History Museum of Los Angeles County
LAUS	Los Angeles Union Station
Link US	Link Union Station
Metro	Los Angeles County Metropolitan Transportation Authority
NEPA	National Environmental Policy Act
PMP	paleontological mitigation plan
Project	Link Union Station Project
Qa, Qg	Quaternary alluvium
Qoa	Quaternary older alluvium
RSA	resource study area
US-101	United States Highway 101
USC	United States Code

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ES.0 Executive Summary

This combined Paleontological Identification Report and Paleontological Evaluation Report presents the results of the paleontological study for the Link Union Station (Link US) Project (Project or proposed action). The purpose of this study was to determine if paleontological resources are known or reasonably anticipated within the resource study area (RSA) and to assess the potential for the Build Alternative to result in adverse effects on paleontological resources. For the purposes of this study, the RSA corresponds to the Project study area, where the majority of Project-related infrastructure is proposed in the vicinity of LAUS. A full evaluation of the proposed action is provided in the environmental impact statement (EIS).

Paleontological research for the Build Alternative included a geologic map review, literature search, institutional records search, and review of geotechnical reports. The results of the study were used to complete paleontological sensitivity and effect analyses and develop paleontological mitigation recommendations designed to minimize or avoid adverse effects pursuant to the National Environmental Policy Act (NEPA).

The majority of the RSA is covered by Quaternary alluvial gravel and sand with very minor amounts of Quaternary older alluvium (Qoa) at the surface. The Link US *Preliminary Geotechnical Report* (Los Angeles County Metropolitan Transportation Authority [Metro] 2023) indicates that Qoa and Miocene Puente Formation underlie the surficial deposits at depth. There are no documented fossil collection localities within the boundaries of the RSA, but both the Qoa and Puente Formation have produced fossils in the vicinity. The Quaternary alluvium (Qa, Qg) mapped at the surface has low sensitivity for paleontological resources. However, the underlying Qoa (present at depths of 40 to 70 feet) and Puente Formation (present at depths of 20 to 100 feet) have a high potential for paleontological resources. Therefore, Link US activities within the RSA may affect paleontological resources if these sensitive geologic units are encountered during deep excavations.

Because of the presence of paleontologically sensitive Qoa and Puente Formation at depth within the RSA, it is recommended that a qualified paleontologist be retained to review final excavation plans prior to the start of construction to determine if these geologic units would be affected. If excavations are not anticipated to extend beyond the artificial fill and younger Qa, Qg, as a precautionary measure, a qualified paleontologist should be retained to prepare and present a paleontological resource awareness training to all ground disturbing personnel, and to respond to any unanticipated fossil discoveries made by the construction crew.

If the excavation plans indicate that Qoa and/or Puente Formation would be affected during construction, then a Paleontological Resources Monitoring and Mitigation Plan should be prepared and implemented. Monitoring is not recommended for excavations that affect only artificial fill and Qa, Qg. Full-time monitoring should be implemented during deep excavations that extend into Qoa and/or Puente Formation, with the exception of pile driving. Any significant fossils recovered during Link US construction should be curated in perpetuity at an accredited repository, such as the Natural History Museum of Los Angeles County (LACM).

1.0 Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro), as the owner of Los Angeles Union Station (LAUS), is proposing the infrastructure improvements associated with the Link Union Station (Link US) Project (Project or proposed action) to address existing capacity constraints at LAUS. For the purposes of the National Environmental Policy Act (NEPA), Metro is serving as the local Project sponsor and joint lead agency.

Pursuant to 23 United States Code (USC) Section 327 and a memorandum of understanding (MOU) between the Federal Railroad Administration (FRA) and the State of California, effective July 23, 2019, under a program known as NEPA Assignment, the California High-Speed Rail Authority (CHSRA) is responsible for the federal review and approval of environmental documents for projects on the high-speed rail (HSR) system and other passenger rail projects that directly connect to the HSR system, including the Link US Project. For the purposes of the environmental impact statement (EIS) being prepared, CHSRA is serving as the federal lead agency with NEPA responsibilities pursuant to the requirements of the NEPA Assignment MOU. CHSRA and Metro are preparing the EIS in compliance with NEPA (42 USC Section 4321 et seq.), the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508), FRA's Procedures for Considering Environmental Impacts (FRA's Environmental Procedures) (*Federal Register* [FR] 64(101), 28545-28556, May 26, 1999), 23 USC Section 139, and the NEPA Assignment MOU.[1, 2]

Pursuant to the MOU requirements between FRA and the State of California, FRA's Environmental Procedures are being used to determine environmental effects of the No Action Alternative and the Build Alternative.

Below is an overview of the purpose and need, the Project study area, the No Action Alternative, and the major components associated with the on-site infrastructure improvements proposed at and within the vicinity of LAUS that are associated with the Build Alternative considered in the EIS.

1.1 Purpose

The purpose of the proposed action is to increase the regional and intercity rail service capacity of LAUS and to improve schedule reliability at LAUS through the implementation of a run-through

[1] While this environmental document was being prepared, FRA adopted new NEPA compliance regulations (23 CFR 771). Those regulations only apply to actions initiated after November 28, 2018. See 23 CFR 771.109(a)(4). Because this environmental document was initiated prior to that date, it remains subject to FRA's Environmental Procedures rather than the Part 771 regulations.

[2] The CEQ issued new regulations, effective April 20, 2022, updating the NEPA implementing procedures at 40 CFR Parts 1500–1508. However, because this environmental document was initiated prior to the effective date, it is not subject to the new regulations and CHSRA is relying on the regulations as they existed on the date of the initial Notice of Intent, May 31, 2016. Therefore, all citations to CEQ regulations in this environmental document refer to the 1978 regulations and the 1986 amendment, 51 Federal Register 15618 (April 25, 1986).

tracks configuration and elimination of the current stub end tracks configuration while preserving current levels of freight rail operations, accommodating the planned HSR system in Southern California, increasing the passenger/pedestrian capacity and enhancing the safety of LAUS through the implementation of a new passenger concourse, meeting the multi-modal transportation demands at LAUS.

1.2 Need

The need for the proposed action is generated by the forecasted increase in regional population and employment; implementation of federal, state, and regional transportation plans (RTP) that provide for increased operational frequency for regional and intercity trains; and introduction of the planned HSR system in Southern California. Localized operational, safety, and accessibility upgrades in and around LAUS will be required to meet existing demand and future growth.

1.3 Project Location and Study Area

The Build Alternative consists of infrastructure improvements in Downtown Los Angeles in the vicinity of LAUS (Figure 1-1). LAUS is located at 800 Alameda Street in the City of Los Angeles, California. LAUS is bounded by United States Highway 101 (US-101) to the south, Alameda Street to the west, Cesar Chavez Avenue to the north, and Vignes Street to the east. The northern Project limit is at North Main Street (Mile Post 1.18) and the southern Project limit is in the vicinity of Control Point (CP) Olympic, south of Interstate 10 and Olympic Boulevard (Mile Post 142.70).

Figure 1-2 depicts the Project study area, which is generally used to characterize the affected environment, unless otherwise specified, and provide a geographic context for the existing and proposed infrastructure improvements at and within the vicinity of LAUS. The Project study area includes three main segments (Segment 1: Throat Segment, Segment 2: Concourse Segment, and Segment 3: Run-Through Segment). The existing conditions within each segment are summarized north to south below:

- **Segment 1: Throat Segment** – This segment, known as the LAUS throat, includes CP Chavez and the area north of the platforms at the LAUS rail yard, from North Main Street at the north to Cesar Chavez Avenue at the south. In the throat segment, all arriving and departing trains are required to traverse through a complex network of lead tracks, switches, and crossovers. Five lead tracks provide access into and out of the rail yard, except for one location near the Vignes Street Bridge, where it reduces to four lead tracks. Currently, special track work consisting of multiple turnouts and double-slip switches are used in the throat to direct trains into and out of the appropriate assigned terminal platform tracks. The Garden Tracks (stub-end tracks where private train cars are currently stored) are also located just north of the platforms. Land uses in the vicinity of the throat segment are residential, industrial, and institutional.
- **Segment 2: Concourse Segment** – This segment is between Cesar Chavez Avenue and US-101 and includes LAUS, the rail yard, the East Portal Building, the baggage handling building with associated parking areas and access roads, the ticketing/waiting halls, and

the 28-foot-wide pedestrian passageway with connecting ramps and stairways below the rail yard. Land uses in the vicinity of the concourse segment are residential, commercial, and public.

- **Segment 3: Run-Through Segment** – This segment is south of LAUS and extends east to west from Alameda Street to the west bank of the Los Angeles River and north to south from Keller Yard to CP Olympic. This segment includes US-101, the Commercial Street/Ducommun Street corridor, Metro Red and Purple Lines Maintenance Yard (Division 20 Rail Yard), BNSF Railway (BNSF) West Bank Yard, Keller Yard, the main line tracks on the west bank of the Los Angeles River from Keller Yard to CP Olympic, and the Amtrak lead track connecting the main line tracks with Amtrak's Los Angeles Maintenance Facility in the vicinity of 8th Street. Land uses in the vicinity of the run-through segment are primarily industrial and manufacturing.

The Project study area has a dense street network ranging from major highways to local city streets. The roadways within the Project study area include the El Monte Busway, US-101, Bolero Lane, Leroy Street, Bloom Street, Cesar Chavez Avenue, Commercial Street, Ducommun Street, Jackson Street, East Temple Street, Banning Street, First Street, Alameda Street, Garey Street, Vignes Street, Main Street, Aliso Street, Avila Street, Bauchet Street, and Center Street.

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Figure 1-1. Project Location and Regional Vicinity

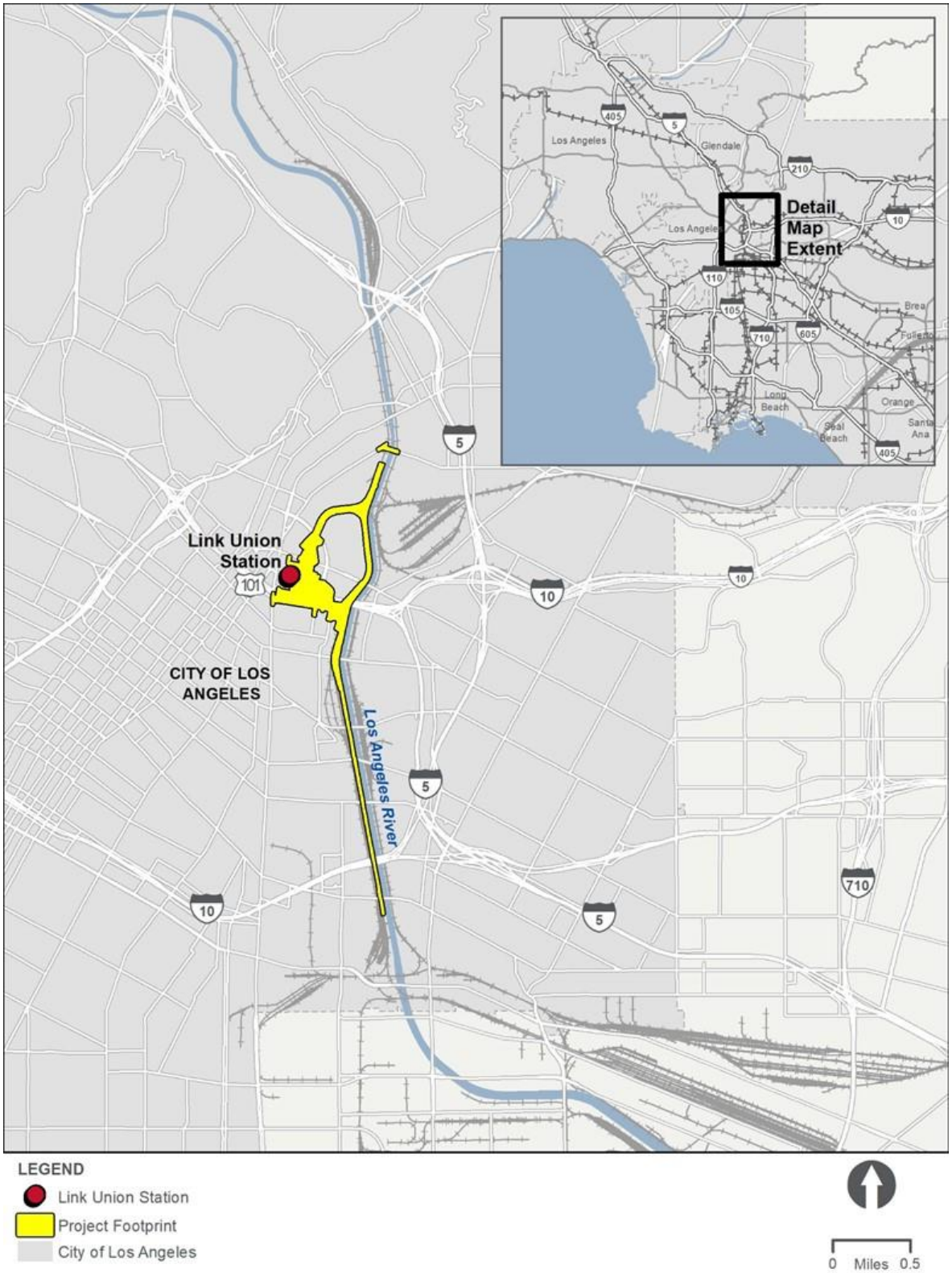

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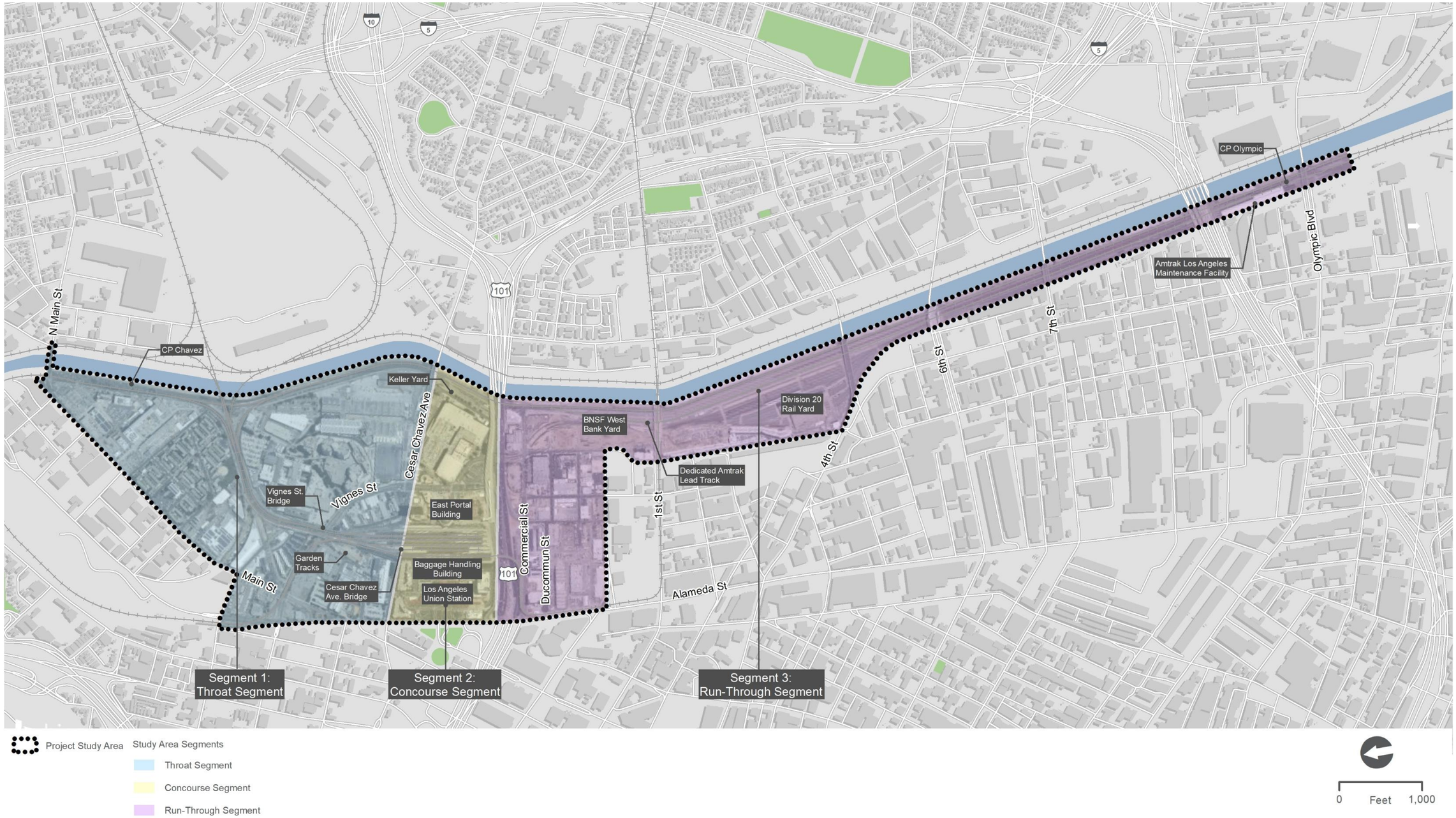
Figure 1-2. Project Study Area



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1.4 Project Alternatives

The EIS includes an evaluation of the No Action Alternative and one build alternative (Build Alternative). The Build Alternative would include, but not be limited to, new lead tracks north of LAUS (Segment 1: Throat Segment), an elevated throat and rail yard with concourse-related improvements at LAUS (Segment 2: Concourse Segment), and 10 run-through tracks south of LAUS (Segment 3: Run-Through Segment).

1.4.1 No Action Alternative

NEPA (40 CFR 1502.14(d)) requires federal agencies to include an analysis of "the alternative of no action." For NEPA purposes, the No Action Alternative is the baseline against which the effects of implementing the Build Alternative is evaluated against to determine the extent of environmental and community effects. For the No Action Alternative, the baseline year is 2016, and the horizon year is 2040.

The No Action Alternative represents the future conditions that would occur if the proposed infrastructure improvements and the operational capacity enhancements at LAUS were not implemented. The No Action Alternative reflects the foreseeable effects of growth planned for the area in conjunction with other existing, planned, and reasonably foreseeable projects and infrastructure improvements in the Los Angeles area, as identified in planning documents prepared by Southern California Association of Governments (SCAG), Metro, and/or Metrolink, including the 2023 Federal Transportation Improvement Program (FTIP) (SCAG 2023), *Final 2008 Regional Comprehensive Plan* (SCAG 2008), and the 2020 RTP/Sustainable Communities Strategy (SCS): Connect SoCal (SCAG 2020).

Conditions in the Project study area would remain similar to the existing condition, as described below:

- **Segment 1: Throat Segment** – Trains would continue to operate on five lead tracks that do not currently accommodate the planned HSR system. The tracks north of LAUS would remain at the current elevation, and the Vignes Street Bridge and Cesar Chavez Avenue Bridge would remain in place.
- **Segment 2: Concourse Segment** – LAUS would not be transformed from a stub-end tracks station into a run-through tracks station, and the 28-foot-wide pedestrian passageway would be retained in its current configuration. No modifications to the existing passenger circulation routes or addition of vertical circulation elements (VCE; escalators and elevators) at LAUS would occur.
- **Segment 3: Run-Through Segment** – Commercial Street would remain in its existing configuration, and implementation of active transportation improvements would likely be implemented along Center Street in concert with the *Connect US Action Plan* (Metro 2015). No modifications to the BNSF West Bank Yard would occur.

1.4.2 Build Alternative

The key components associated with the Build Alternative are summarized north to south below:

- **Segment 1: Throat Segment (lead tracks and throat track reconstruction)** – The Build Alternative includes subgrade and structural improvements in Segment 1 of the Project study area (throat segment) to increase the elevation of the tracks leading to the rail yard. The Build Alternative includes the addition of one new lead track in the throat segment for a total of six lead tracks to facilitate enhanced operations for regional/intercity rail trains (Metrolink/Amtrak) and future operations for HSR trains within a shared track alignment. Regional/intercity and HSR trains would share the two western lead tracks in the throat segment. The existing railroad bridges in the throat segment at Vignes Street and Cesar Chavez Avenue would also be reconstructed. North of CP Chavez on the west bank of the Los Angeles River, the Build Alternative also includes safety improvements at the Main Street public at-grade railroad crossing (medians, restriping, signals, and pedestrian and vehicular gate systems) to facilitate future implementation of a quiet zone by the City of Los Angeles.
- **Segment 2: Concourse Segment (elevated rail yard and expanded passageway)** – The Build Alternative includes an elevated rail yard and expansion of the existing 28-foot-wide pedestrian passageway in Segment 2 of the Project study area (concourse segment). The rail yard would be elevated approximately 15 feet. New passenger platforms would be constructed on the elevated rail yard with associated VCEs (stairs, escalators, and elevators) to enhance safety elements and improve Americans with Disabilities Act (ADA) accessibility. Platform 1, serving the Gold Line, would be lengthened, and elevated to optimize east to west passenger circulation. The pedestrian passageway would be expanded at the current grade to a 140-foot width to accommodate a substantial increase in passenger capacity with new functionally modern passenger amenities while providing points of safety to meet applicable California Building Code (CBC) and National Fire Protection Association (NFPA) 130 Standards for Fixed Guideway Transit Systems. The expanded passageway and associated concourse improvements would facilitate enhanced passenger circulation and provide space for ancillary support functions (back-of-house uses, baggage handling, etc.), transit-serving retail, and office/commercial uses while creating an opportunity for an outdoor, community-oriented space with new plazas east and west of the elevated rail yard (East and West Plazas). Amtrak ticketing and baggage check-in services would be enhanced, and new baggage carousels would be constructed in a centralized location under the rail yard. A canopy would be constructed over the West Plaza up to 70 feet in height, and two design options are considered for canopies that would extend over the rail yard (Section 1.4.3).
- **Segment 3: Run-Through Segment (10 run-through tracks)** – The Build Alternative includes 10 new run-through tracks south of LAUS in Segment 3 of the Project study area (run-through segment). The Build Alternative includes common rail infrastructure from LAUS to the west bank of the Los Angeles River (vicinity of First Street Bridge) to support

run-through tracks for both regional/intercity rail trains and future HSR trains. At the BNSF West Bank Yard, dedicated lead tracks for Amtrak trains and BNSF trains, in combination with implementation of common rail infrastructure would result in permanent loss of freight rail storage track capacity at the north end of BNSF West Bank Yard (5,500 track feet).

The Build Alternative would also require modifications to US-101 and local streets (including potential street closures and geometric modifications); improvements to railroad signal, positive train control (PTC), and communication systems; modifications to the Gold Line light rail platform and tracks; modifications to the main line tracks on the west bank of the Los Angeles River; modifications to the Amtrak lead track; addition of access roadways to the railroad right-of-way (ROW); land acquisitions; addition of utilities; utility relocations, replacements, and abandonments; and addition of drainage facilities/water quality improvements.

1.4.3 Rail Yard Canopy Design Options

Two design options for canopies over the elevated platforms in the rail yard are considered in conjunction with the concourse-related improvements as part of the Build Alternative.

- **Rail Yard Canopy Design Option 1 (individual canopies)** – This design option would include replacing the existing historic butterfly canopies with individual canopies above each platform. New individual canopies would extend up to 25 feet above each platform and would be similar in form to the existing butterfly canopies but sized to fit the widened and lengthened platforms. Platform lengths would vary between 450 and 1,445 feet. Platforms would be up to 30 feet wide.
- **Rail Yard Canopy Design Option 2 (grand canopy)** – This design option would include replacing the existing historic butterfly canopies with a large grand canopy that would extend up to 75 feet above the elevated rail yard platforms. The grand canopy would be up to 1,500 feet long and wide enough to provide cover over all elevated platforms in the rail yard.

1.5 Project Implementation Approach

The implementation of infrastructure improvements would generally occur in three main phases that are evaluated as scenario years in the EIS: the interim condition, the full build-out condition and the full build-out with HSR condition. The infrastructure improvements for each of these scenarios are described below.

1.5.1 Interim Condition

The interim condition is when the run-through track infrastructure south of LAUS and the associated signal modifications, property acquisitions, and civil/structural improvements to facilitate new run-through service would be implemented. The interim condition does not include new lead tracks north of LAUS, or the elevated rail yard and new concourse-related improvements at LAUS. The interim condition aligns with a construction completion date as early as 2026.

A summary of the proposed activities associated with the interim condition is provided below.

- Acquire properties south of LAUS within the Project footprint;
- Relocate utilities north and south of LAUS;
- Acquire a portion of the BNSF West Bank Yard (majority north of First Street) and remove 5,500 feet of existing storage tracks at BNSF West Bank Yard;
- Construct special track work and modify signal/communication infrastructure north of LAUS;
- Construct a run-through track ramp on the southern extent of Platform 4 at LAUS;
- Construct a common viaduct/deck over US-101;
- Construct a common embankment from Vignes Street to Center Street south of LAUS;
- Construct common Center Street Bridge south of LAUS;
- Construct common embankment or new common bridge from Center Street to Amtrak Bridge south of LAUS;
- Construct common Amtrak Bridge south of LAUS;
- Construct Division 20 access road;
- Construct common rail embankment on the west bank of the Los Angeles River (from Amtrak Bridge to First Street Bridge);
- Construct new dedicated lead tracks for BNSF freight trains and Amtrak trains; and
- Construct two run-through tracks from Platform 4 at LAUS to the main line tracks along the west bank of the Los Angeles River.

Some embankments and/or bridges south of LAUS could be constructed in a phased manner.

1.5.2 Full Build-Out Condition

The full build-out condition is when new lead tracks and the elevated throat north of LAUS, along with the elevated rail yard and concourse-related improvements at LAUS would be implemented. The full build-out condition aligns with a construction completion date as early as 2031.

A summary of the proposed activities associated with the full build-out condition is provided below.

- Construct new compatible lead tracks and reconstruct throat north of LAUS.
- Construct new bridges over Vignes Street and Cesar Chavez Avenue north of LAUS.
- Construct elevated rail yard, concourse-related improvements, and East/West Plazas at LAUS.

- Construct remaining run-through tracks for regional/intercity rail operations on previously constructed structures south of LAUS.

1.5.3 Full Build-Out with High-Speed Rail Condition

The full build-out with HSR condition is when HSR tracks and catenaries would be implemented through the Project limits to facilitate operation of the planned HSR system. CHSRA is responsible for construction and operation of the planned HSR system, and the EIS identifies where future HSR tracks, catenaries, and related operational infrastructure would be located throughout the Link US Project limits. Operation of HSR trains would occur on two of the lead tracks north of LAUS, Platforms 2 and 3 and associated Tracks 3 through 6 at LAUS, and common rail bridges and embankments south of LAUS. The full build-out with HSR condition corresponds to an HSR opening year consistent with CHSRA's 2022 Business Plan (as early as 2033).

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2.0 Purpose

The purpose of this study is as follows:

- Determine if paleontological resources are known or reasonably anticipated within the RSA;
- Assess the potential for the Build Alternative to result in adverse effects on paleontological resources; and
- Make recommendations regarding paleontological resources for the Build Alternative moving forward.

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3.0 Regulatory Setting

This section of the report presents the regulatory requirements pertaining to paleontological resources that apply to Link US.

3.1 Regulatory Setting

3.1.1 National Environmental Policy Act

NEPA, as amended (Public Law 91-190, 42 USC Section 4321-4347, January 1, 1970, as amended by Public Law 94-52, July 3, 1975, Public Law 94 83, August 9, 1975, and Public Law 97-258 Section 4(b), September 13, 1982) recognizes the continuing responsibility of the Federal Government to "preserve important historic, cultural, and natural aspects of our national heritage..." (Section 101 [42 USC Section 4321]) (#382). With the passage of the Paleontological Resources Preservation Act (2009), paleontological resources are considered to be a significant resource, and it is therefore now standard practice to include paleontological resources in NEPA studies in all instances where there are potential environmental effects.

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4.0 Methods

Paleontological research for the Build Alternative included a geologic map review, literature search, institutional records search, and review of geotechnical reports. Geotechnical logs and reports from previous projects in the RSA and vicinity were reviewed, compiled, and summarized (Metro 2024). The geotechnical studies in the RSA and vicinity include the following:

- *Final Environmental Impact Report/Environmental Impact Statement, Run-Through Tracks Project* (Caltrans and FRA 2005)
- *Final Geotechnical Summary Report, SR-710 Tunnel Technical Study, Los Angeles County, California* (Caltrans 2010)
- *Geotechnical Investigation Report Volume I, Southern California Rapid Transit District, Metro Rail Project* (Metro 1981)
- *Geotechnical Report: Metro Rail Project-Design Unit A135, LOTBs* (Metro 1983)
- *Union Station Area Aquifer Pump Tests Metro Rail Project* (Metro 1986)
- *Temporary Tunnel Excavation Support by Chemical Grouting*. Grouting Soil Improvement and Geosynthetics Proceedings, GT Div. ASCE (Gularte et al. 1992)
- *Geotechnical Engineering and Groundwater Study, Proposed Two Level Subterranean Parking Garage and Four Story Office* (Catellus Urban Corporation 1998)
- *Report of Phase I Environmental Site Assessment, Alameda District Plan* (Cordoba Corporation 1994)
- *Metro Rail Project, Main Yard and Shops Yard Leads* (Southern California Rapid Transit District 1988)
- *The Phase I Subsurface Investigation at the Metro Rail A-130 Corridor* (Metro 1987a)
- *The Phase III Subsurface Investigation at the Metro Rail A-130 Corridor* (Metro 1987b)
- *The Phase IV Subsurface Investigation at the Metro Rail A-130 Corridor* (Metro 1987c)
- *Geotechnical Investigation, Proposed West Campus Infrastructure Project, Los Angeles, California, LOTBs* (Catellus Urban Corporation 2003)
- *Phase I Environmental Site Assessment and Limited Phase II Testing Selected Portions of the Los Angeles Union Station Property* (TPG Capital, L.P. 2011)

The geology underlying the RSA was reviewed, as well as any geologic units occurring within a 0.5-mile radius. The literature reviewed included published and unpublished scientific papers and available online databases. A paleontological records search of the RSA and a 1-mile radius buffer was conducted by Dr. Sam McLeod at the LACM on June 20, 2016 (Appendix A). The results of the geologic map review, literature, and museum records searches were used to complete a paleontological sensitivity analysis using the Caltrans sensitivity criteria; to complete

an analysis; and to develop paleontological mitigation recommendations. Specifically, the paleontological sensitivity of the RSA is evaluated in the context of the fossil collection locality records searches conducted for this study.

5.0 Definition and Significance of Paleontological Resources

As defined by Murphey and Daitch (2007), "Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains. Paleontological resources include not only fossils themselves, but also the associated rocks or organic matter and the physical characteristics of the fossils' associated sedimentary matrix.

The fossil record is the only evidence that life on earth has existed for more than 3.5 billion years. Fossils are considered nonrenewable resources because the organisms they represent no longer exist. Thus, once destroyed, a fossil can never be replaced. Fossils are important scientific and educational resources because they are used to achieve the following goals:

- Study the phylogenetic relationships amongst extinct organisms, as well as their relationships to modern groups
- Elucidate the taphonomic, behavioral, temporal, and diagenetic pathways responsible for fossil preservation, including the biases inherent in the fossil record
- Reconstruct ancient environments, climate change, and paleoecological relationships
- Provide a measure of relative geologic dating that forms the basis for biochronology and biostratigraphy, and which is an independent and corroborating line of evidence for radiometric dating
- Study the geographic distribution of organisms and tectonic movements of land masses and ocean basins through time
- Study patterns and processes of evolution, extinction, and speciation
- Identify past and potential future human-caused effects on global ecosystems, environments, and climates

Paleontological resources vary widely in their relative abundance and distribution, and not all are generally regarded as significant. Vertebrate fossils, whether preserved remains or trackways, are classed as significant by most federal agencies, professional groups, and State of California agencies. In some cases, "noteworthy occurrences of invertebrate or plant fossils" are also considered significant and can provide important information about ancient local environments (Bureau of Land Management 1998). According to the Bureau of Land Management (2007), a significant paleontological resource is generally considered to be of scientific interest if it is a rare or previously unknown species, is of high quality and well-preserved, preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has an identified educational or recreational value. Paleontological resources that may

not be considered to have scientific significance include those that lack provenance or context, lack physical integrity because of decay or natural erosion, or are overly redundant or are otherwise not useful for research or education. Paleontological resources are significant if they are scientifically judged to provide important data concerning key research interests in the study of taxonomy, evolution, biostratigraphy, paleoecology, or taphonomy.

The full scientific significance of individual fossil specimens or fossil assemblages often cannot be accurately predicted before they are discovered and collected and, in many cases, before they are prepared in the laboratory and compared with previously collected material. Pre-construction assessment of significance associated with an area or geologic unit must be made based on previous finds, characteristics of the sediments, and other methods that can be used to determine paleoenvironmental conditions.

A separate issue is the potential of a given geographic area or geologic unit to preserve fossils. Information that contributes to assessment of preserved fossils includes:

- The existence of known fossil collection localities or documented absence of fossils nearby and in the same geologic unit (e.g., formation or one of its subunits)
- The observation of fossils within the vicinity of the area of interest (e.g., the Build Alternative)
- The nature of sedimentary deposits in the area of interest, compared with those of similar deposits known elsewhere (size of particles, clasts, and sedimentary structures conducive or non-conducive to fossil inclusion) that may favor or disfavor preservation of fossils
- Sedimentological details and known geologic history of the geologic unit of interest in terms of the environments in which the sediments were deposited, and assessment of the favorability of those environments for the probable preservation of fossils

6.0 Background

The RSA is located within the Los Angeles Basin in the northern section of the Peninsular Ranges Geomorphic Province. The Peninsular Ranges Geomorphic Province is characterized by linear mountain ranges separated by northwest-trending valleys, and it extends from southwestern California into Baja California in Mexico (Wagner 2002). The Los Angeles Basin is bordered by the Santa Monica and San Gabriel Mountains to the north, the Santa Ana Mountains to the east, and the Pacific Ocean to the west (Yerkes et al. 1965). While the Los Angeles Basin is traditionally considered part of the Peninsular Ranges Geomorphic Province, it is more tectonically related to the Transverse Ranges Geomorphic Province (Harden 2004). The Los Angeles Basin is one of the largest and deepest sedimentary basins in Southern California and is filled with over 18,000 feet of sediments that have accumulated since the late Miocene as a result of uplift of the mountains of the western Transverse Ranges and contemporaneous sinking of the basin associated with the rotation of the Transverse Ranges (Harden 2004; Prothero 2017; Norris and Webb 1990).

6.1 Geologic Context

Geologic mapping by Dibblee and Ehrenspeck (1989) indicates that the entirety of the RSA surface footprint is underlain by Quaternary alluvial gravel and sand (Qa, Qg). Quaternary older alluvial deposits (Qoa) are mapped at the surface in proximity to the RSA, just east of the Los Angeles River; and Pliocene Fernando Formation (Tfr), unnamed Miocene shale (attributed to the Puente Formation in the geotechnical study [Metro 2024]), and Miocene Monterey Formation are mapped in the hills surrounding the RSA. The distribution of these geologic units within the RSA vicinity is illustrated on Figure 6-1. The Link US geotechnical study reports that the RSA is also locally underlain by artificial fill, as well as by Qa, Qg, Qoa, and Miocene Puente Formation (Metro 2024). Below is a description of each geologic unit.

6.1.1 Artificial Fill

Artificial fill is modern and consists of previously disturbed sediment that has been transported by humans. It is commonly used in construction projects (e.g., structures, roadways, concrete channels, and railway embankments). Artificial fill material is not mapped within the RSA by Dibblee and Ehrenspeck (1989); however, preliminary geotechnical testing in the area documented artificial fill within the RSA. The artificial fill layer was typically 5 to 15 feet thick but was reported to be up to 30 feet thick in some areas (Metro 2024).

6.1.2 Quaternary Alluvium

Quaternary alluvial gravel and sand (Qa, Qg) consists of surficial deposits that are Holocene in age (11,000 years old or less [United States Geological Survey 2007]). They occur as fluvial and alluvial deposits in valleys and floodplains in the Los Angeles Basin, and typically are composed of poorly consolidated alluvial gravel, sand, silts, and clay of variable color, but are often tan to brown (Jahns 1954; Dibblee and Ehrenspeck 1989). Within the RSA, these deposits are primarily

coarse grained and consist of loose to very dense silty sand, clayey sand, and sand with varying amounts of gravel and cobbles (Metro 2024). The results of the preliminary geotechnical study indicate these deposits are 40 to 70 feet thick in the vicinity of the RSA and they overlie older geologic units (Metro 2024).

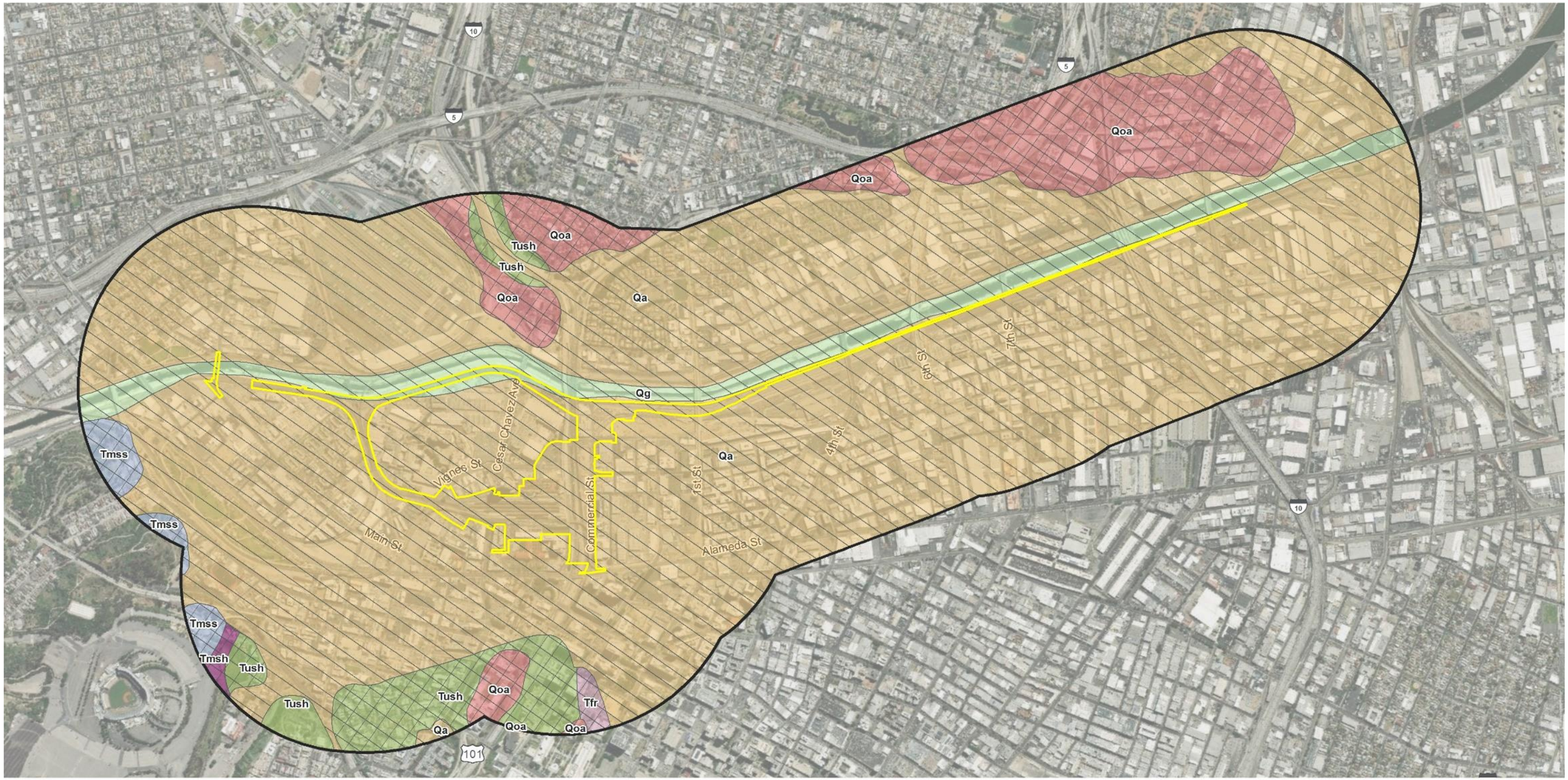
6.1.3 Quaternary Older Alluvium

Quaternary older alluvium (Qoa) is Pleistocene in age (approximately 11,000 to 2.5 million years old). It is similar in composition to the younger, Holocene-aged alluvium, and consists of alluvial deposits of gravel, sand, and silt. However, the older alluvium is more consolidated than the younger deposits and when exposed at the surface is generally more deeply dissected by erosion (Dibblee and Ehrenspeck 1989). The results of the preliminary geotechnical study indicate that the older alluvium in the RSA ranges in thickness from 10 to 70 feet where encountered in the subsurface underlying Qa and Qg. It is also noted that the older alluvial deposits may be referred to as the San Pedro Formation by some geologists (Metro 2024).

6.1.4 Pliocene Fernando Formation

The Pliocene Fernando Formation (Tfr) is exposed in the hills surrounding the RSA. The formation has been divided into two members, which are separated by an erosional unconformity (Durham and Yerkes 1964). The lower member generally consists of a light grayish-brown to olive-brown siltstone, is massive to poorly bedded, and is micaceous. Several thin, lenticular pebble conglomerate beds are interbedded with the fine-grained strata and form prominent outcrops (Durham and Yerkes 1964). The upper member primarily consists of well-cemented sandy conglomerate interbedded with pebbly sandstone. Locally, the top of the upper member consists of massive mudstone and sandy siltstone (Durham and Yerkes 1964). This formation was not encountered during preliminary geotechnical investigations within the RSA (Metro 2024).

Figure 6-1. Link Union Station Geology



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6.1.5 Miocene Marine Shale Attributed to the Puente Formation

This unit is mapped by Dibblee and Ehrenspeck (1989) as unnamed shale (Tush); however, it is attributed to the Puente Formation by authors of other geologic maps (Lamar 1970; Schoellhamer et al. 1965; Webber 1980 [cited in Dibblee and Ehrenspeck 1989]) and is referred to as the Puente Formation in the *Link US Preliminary Geotechnical Report* (Metro 2024). Therefore, it is referred to as the Puente Formation throughout this report.

While not present at the surface within the RSA, Puente Formation exposures are located in surrounding hills within 0.5 mile of the RSA (Dibblee and Ehrenspeck 1989). The Puente Formation was encountered at depths of 20 to 50 feet in the northwestern portion of LAUS, 92 feet in the center portion of the LAUS, and 90 to 100 feet on the southwest side of LAUS within the RSA during the Link US preliminary geotechnical investigations (Metro 2024). The Puente Formation typically consists of grey to light brown, thinly bedded silty clay shale that locally contains calcareous nodules, fine-grained sandstone interbeds, and lenses of semi-siliceous or diatomaceous shale (Dibblee and Ehrenspeck 1989).

6.1.6 Miocene Monterey Formation

The Monterey Formation (Tmsh, Tmss) is thought to be locally time equivalent to the Puente Formation (Cooper 1981; Critelli et al. 1995), and it should be noted that areas mapped by Dibblee as Monterey Formation within the Los Angeles Basin have been mapped by others as Puente Formation (Lamar 1970; Schoellhamer et al. 1965; Webber 1980 [cited in Dibblee and Ehrenspeck 1989]).

The Monterey Formation is a well-studied rock unit that was deposited in a deep-marine environment, and consists chiefly of mudstone, shale, diatomite, biogenic siltstone, and chert (Garrison and Douglas 1981). The Monterey Formation is said to represent a condition rather than a laterally contiguous deposit—the condition being the opening of rift basins along the continental margin of coastal California during the Miocene Epoch (approximately 10 to 15 million years ago) as the San Andreas Fault was forming and lengthening (Fritsche and Behl 2008; United States Geological Survey 2007). The Monterey Formation was not encountered during preliminary geotechnical investigations within the RSA (Metro 2024).

6.2 Paleontological Resources

A request was made for a paleontological search of records maintained by the Department of Vertebrate Paleontology at the LACM. The LACM responded on June 20, 2016, that they do not have any vertebrate fossil collection localities within Link US boundaries, but that there were recorded fossil collection localities nearby from the same older Quaternary units that occur as subsurface deposits within the RSA (McLeod 2016; Appendix A). Literature searches and online database reviews were also negative for fossils within the RSA (Jefferson 1991; University of California Museum of Paleontology 2016; PaleoBiology Database 2023), although fossils were recorded from Qoa in the vicinity and throughout Los Angeles County.

The closest recorded fossil collection locality to the RSA in Qoa deposits is LACM 1023. This locality is east of Interstate 5 near the intersection of Workman Street and Alhambra Avenue; it yielded fossil specimens of turkey, saber-toothed cat, horse, and deer. Near the intersection of Mission Road and Daly Street, LACM 2032 produced fossil specimens of pond turtle, ground sloth, mastodon, mammoth, horse, and camel from depths of 20 to 35 feet. Near the southern portion of the Build Alternative, near the intersection of Hill Street and 12th Street, a horse fossil (LACM 1755) was discovered at a depth of 43 feet. Microvertebrate fossils were recovered from depths of 11 to 34 feet from fossil collection localities LACM 7701-7702 near the intersection of Atlantic Avenue and Interstate 710, and included specimens of three-spined stickleback, salamander, lizard, snake, rabbit, pocket mouse, harvest mouse, and pocket gopher. A second microvertebrate fossil collection locality, LACM 7758, produced specimens of three-spined stickleback, meadow vole, deer mouse, pocket gopher, and pocket mouse from 16 feet below the surface to the southwest of the Build Alternative near the intersection of 46th Street and Western Avenue (McLeod 2016; Table 6-1).

The Puente Formation is known to produce fossils of marine invertebrates, marine and terrestrial vertebrates, and terrestrial plants (Cooper 1981; Cooper and Eisentraut 2002; Uhen 2014). The closest recorded fossil collection locality to the RSA in deposits of the Puente Formation is located just south of US-101 (LACM 6202). A total of five species of anglerfish were recovered from an unreported depth (PaleoBiology Database 2023; Table 6-1).

Fossils are generally unknown from Quaternary (Holocene) alluvium, because of its young age. However, these young deposits are often underlain by older, paleontologically sensitive sediments at depth (McLeod 2016), and as indicated in the geotechnical report (Metro 2024).

Table 6-1. Fossil Collection Localities in the Link Union Station Vicinity

Locality Number	Common Name	Scientific Name	Depth	Reference
LACM 1023	Turkey	*Meleagris californicus*	Not reported	McLeod 2016; Jefferson 1991
	Saber-toothed cat	*Smilodon fatalis*		
	Horse	*Equus*		
	Deer	*Odocoileus*		
LACM 2032	Pond turtle	*Clemmys marmorata*	20-35 feet	McLeod 2016
	Ground sloth	*Paramylodon harlani*		
	Mastodon	*Mammut americanum*		
	Mammoth	*Mammuthus imperator*		
	Horse	*Equus*		
	Camel	*Camelops*		
LACM 1755	Horse	*Equus*	43 feet	McLeod 2016

Table 6-1. Fossil Collection Localities in the Link Union Station Vicinity

Locality Number	Common Name	Scientific Name	Depth	Reference
LACM 7701-7702	Three-spined stickleback	*Gasterosteus aculeatus*	11-34 feet	McLeod 2016
	Salamander	*Batrachoseps*		
	Lizard	*Lacertilia*		
	Snake	*Colubridae*		
	Rabbit	*Sylvilagus*		
	Pocket mouse	*Microtus*		
	Harvest mouse	*Reithrodontomys*		
	Pocket gopher	*Thomomys*		
LACM 7758	Threespine stickleback	*Gasterosteus aculeatus*	16 feet	McLeod 2016
	Meadow vole	*Microtus*		
	Deer mouse	*Peromyscus*		
	Pocket gopher	*Thomomys*		
	Pocket mouse	*Perognathus*		
LACM 6202	Anglerfish	*Chaenophyryne melanorhabdus* *Leptacanthichthys gracilispinis* *Oneirodes sp.* *Borophryne apogon* *Linophryne indica*	Not reported	PaleoBiology Database 2023

Notes:
LACM=Natural History Museum of Los Angeles County

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7.0 Sensitivity and Effects Analysis

Based on the results of the geologic map review, and literature and museum records searches for the Build Alternative, the paleontological sensitivity of the geologic units within the RSA was ranked using Caltrans' tripartite scale (Caltrans 2014), and an analysis was performed using available Link US Project excavation descriptions and preliminary geotechnical investigations (Metro 2024).

7.1 Sensitivity Criteria

Caltrans' paleontological sensitivity scale comprises three rankings: high potential, low potential, and no potential. The criteria for each ranking, as stated in the Caltrans Standard Environmental Reference, Chapter 8 (Caltrans 2014), are described below.

7.1.1 High Potential

This category includes rock units that, based on previous studies, contain or are likely to contain significant vertebrate, significant invertebrate, or significant plant fossils. These units include, but are not limited to, sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing (1) abundant vertebrate fossils; (2) a few significant fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and significant taxonomic, phylogenetic, ecologic, and/or stratigraphic data; (3) areas that may contain datable organic remains older than recent, including *Neotoma* (sp.) middens; or (4) areas that may contain unique new vertebrate deposits, traces, and/or trackways. Areas with a high potential for containing significant paleontological resources require monitoring and mitigation.

7.1.2 Low Potential

This category includes sedimentary rock units that (1) are potentially fossiliferous but have not yielded significant fossils in the past; (2) have not yet yielded fossils but possess a potential for containing fossil remains; or (3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny, and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized strata. Rock units designated as low potential generally do not require monitoring and mitigation. However, as excavation for construction gets underway, it is possible that new and unanticipated paleontological resources might be encountered. If the resource is determined to be significant, monitoring and a mitigation plan are required.

7.1.3 No Potential

Rock units of intrusive igneous origin, most extrusive igneous rocks, and moderately to highly metamorphosed rocks are classified as having no potential for containing significant paleontological resources.

7.2 Sensitivity Analysis

By their very nature, fossils found in artificial fill have lost their native provenance and, therefore, have marginal (if any) scientific value. Artificial fill is considered to have low potential to produce significant paleontological resources. Fossils are generally unknown from Qa and Qg deposits, such as those mapped at the surface within the proposed RSA, because of their young age. Reworked paleontological material from older deposits may also be present, but would not meet significance criteria, as the material would lack critical primary contextual information. Therefore, the Qa and Qg deposits are considered to have low paleontological potential. Based on the preliminary geotechnical report (Metro 2024) and records search results (McLeod 2016), the Qa and Qg deposits in the RSA are underlain by Quaternary older (Pleistocene) deposits at depths of between 40 and 70 feet. In addition, deposits of the Puente Formation occur at depths of between 20 and 50 feet in the northwest corner of LAUS, 92 feet in the central portion of the LAUS, and 90 and 100 feet in the southwest corner of LAUS. Significant vertebrate fossils have been recorded from both the Quaternary older (Pleistocene) deposits (Qoa) and the Puente Formation in proximity to the RSA (McLeod 2016; PaleoBiology Database 2023), resulting in a high paleontological potential assignment for these geologic units.

7.3 Effects Analysis

Direct adverse effects on paleontological resources primarily concern the physical destruction of nonrenewable paleontological resources and the loss of information associated with these resources. Direct adverse effects can typically be mitigated through the implementation of Project-specific paleontological mitigation measures. Indirect effects on paleontological resources typically concern the loss of resources to theft and vandalism resulting from increased public access to paleontologically sensitive areas. Cumulative effects on paleontological resources concern the incremental loss of these nonrenewable resources to society as a whole as various impact-producing projects come online over time.

In summary, where surface disturbance occurs within the RSA, effects on paleontological resources can be either beneficial or adverse. As described above, adverse effects would be due to ground-disturbing actions in paleontologically sensitive areas/geologic units that are unmitigated and the destruction and permanent loss of these fossils and associated information to science. Conversely, disturbance of fossil-bearing geologic units has the potential to result in the exposure of fossils that may never have been unearthed via natural processes. If mitigation measures are implemented, these newly exposed fossils become available for salvage, data recovery, scientific analysis, and preservation in perpetuity at a museum or university (beneficial effect). Potential beneficial effects of the results of mitigation include advances in scientific

knowledge by both permitted field researchers and paleontologists who study fossils in museum collections, contributions to public education and interpretation, and community involvement and partnerships. Overall, beneficial effects would be due to advances in scientific understanding and increased knowledge of the spatial distribution (both geographic and stratigraphic) of significant fossil resources.

As discussed in Section 5.2, there are no documented fossil collection localities within the boundaries of the RSA. The Qa and Qg deposits mapped at the surface and unmapped artificial fill deposits that were reported in the geotechnical study (Metro 2024) have low paleontological potential. However, there is a possibility that deposits with high paleontological potential could be directly affected if excavations extend into the underlying Qoa or Puente Formation. Therefore, construction activities within the RSA may affect paleontological resources if these paleontologically sensitive sediments are encountered during excavation. Potential effects of the Build Alternative are discussed below by Project segment and are based on currently available construction information and results of preliminary geotechnical investigations (Metro 2024).

7.3.1 Segment 1: Throat Segment

The Build Alternative includes reconstruction of the throat where the trains enter and exit the LAUS rail yard. It would include one new lead track, and throat modifications would include switch and turnout configuration modifications; removal of existing crossovers, turnouts, and escape tracks; construction of new switches, crossovers, turnouts, and track leads; new signal, positive train control, and communications-related equipment; and new embankments and retaining walls to support the elevated tracks. The deepest excavations are anticipated during construction of the retaining walls, which would be between 9 and 13 feet below the current ground surface.

Segment 1 is mapped as Qa and Qg deposits (low paleontological potential) at the surface (Dibblee and Ehrenspeck 1989) where the throat and elevated rail yard would be reconstructed, and geological cross sections near Vignes Street indicate that there is also an approximately 14-foot-thick layer of artificial fill overlying the Qa, Qg in this area. As noted above, these areas have low paleontological potential. Construction of the Build Alternative is not expected to affect paleontologically sensitive sediments in Segment 1.

7.3.2 Segment 2: Concourse Segment

The Build Alternative includes an expanded concourse and associated concourse improvements below the elevated rail yard. Additionally, the Build Alternative includes the construction of new plazas east and west of the elevated rail yard.

Segment 2 is mapped as Qa and Qg (low paleontological potential) at the surface (Dibblee and Ehrenspeck 1989), and geological cross sections indicate that this segment is also underlain by a 16- to 18-foot-thick layer of artificial fill. Therefore, shallow excavations related to the at-grade concourse design (anticipated to be up to 20 feet deep), raised rail yard, and elevated platforms associated with the construction of the Build Alternative are unlikely to affect paleontologically sensitive sediments in Segment 2.

7.3.3 Segment 3: Run-Through Segment

The Build Alternative includes construction of up to 10 new run-through tracks on a common viaduct/deck over US-101 and the embankment south of US-101.

Segment 3 is mapped as Qa and Qg (low paleontological potential) at the surface (Dibblee and Ehrenspeck 1989). A geological cross section was not prepared for the Segment 3 alignment. Shallow excavations in this segment associated with construction of the Build Alternative are unlikely to affect paleontologically sensitive sediments. However, construction of the Build Alternative in areas of Segment 3 where deeper excavations are required for components such as bridge replacements, support bents, and modifications to existing roads and highways, may result in adverse effects on paleontologically sensitive sediments of Qoa and the Puente Formation. Given the high paleontological potential of these geologic units, adverse effects on these resources would be considered substantial, if encountered. Implementation of the mitigation measures in Section 8.0 would avoid or minimize the potential for adverse effects on paleontological resources.

8.0 Conclusions and Recommendations

The majority of the RSA is underlain by Quaternary alluvial gravel and sand (Qa and Qg) with very minor amounts of Qoa at the surface. The Link US geotechnical study indicates that these surficial deposits are capped by artificial fill in certain areas of the RSA. This study also indicates Qoa and the Miocene Puente Formation underlie the surficial deposits at depth. There are no documented fossil collection localities within the boundaries of the RSA, but both Qoa and the Puente Formation have produced fossils in the vicinity. The Qa and Qg mapped at the surface have low paleontological potential. However, the underlying Qoa deposits (present at depths of 40 to 70 feet) and Puente Formation (present at depths of 20 to 100 feet) have high paleontological potential. Therefore, construction of the Build Alternative would result in no adverse effects on paleontological resources if construction-related activities are confined to these surficial deposits, as anticipated during construction of Segments 1 and 2. In contrast, if construction-related activities extend deep enough to encounter underlying geologic deposits with high paleontologic potential (e.g., Qoa or Puente Formation), as anticipated during construction of Segment 3, adverse effects are most likely to occur. Given the high paleontological potential of these geologic units, adverse effects on these resources would be considered substantial, if encountered.

Implementation of the following mitigation measures would avoid or minimize the potential for adverse effects on paleontological resources:

- **Prepare a Paleontological Mitigation Plan (PMP):** It is anticipated that Quaternary older alluvium or Puente Formation, which are geologic units that have a high sensitivity level, would be impacted during construction if excavation activities extend to depths as shallow as 6 feet below the natural ground surface. Metro shall retain a qualified paleontologist to prepare a PMP using final excavation plans to determine where these geologic units would be impacted. Metro shall implement the PMP prior to the start of any ground-disturbing construction activities if it is determined that such activities would encounter Quaternary older alluvium or Puente Formation. The PMP shall include site-specific impact mitigation recommendations and specific procedures for construction monitoring and fossil discovery.

  The PMP shall include a requirement for full-time paleontological monitoring if excavations would occur within native Quaternary older alluvium and/or Puente Formation. Monitoring is not recommended for excavations that only impact artificial fill and Quaternary alluvium.

  The PMP shall detail a discovery protocol in the event potentially significant paleontological resources are encountered during construction. For example, the contractor shall halt surface disturbing activities in the immediate area (within a 25-foot radius of the discovery), and Metro's qualified paleontologist shall make an immediate evaluation of the significance and appropriate treatment of the encountered paleontological resources in accordance with the PMP. If necessary, appropriate salvage measures and mitigation measures shall be developed in consultation with the responsible agencies and in conformance with federal and state guidelines and best practices.

Construction activities may continue in other areas of the Project site while evaluation and treatment of the discovered paleontological resources take place. Work may not resume in the discovery area until it has been authorized by Metro's qualified paleontologist.

- **Worker Environmental Awareness Program (WEAP) Training**: Metro's qualified paleontologist shall prepare a paleontological resource-focused WEAP training that shall be delivered to all ground-disturbing construction personnel including a review of protocols to follow in the event of a fossil discovery, as identified in the PMP.
- **Curation:** Metro shall make arrangements for the curation in perpetuity of significant fossils recovered during construction at an accredited repository, such as the Natural History Museum of Los Angeles County. These fossils shall be prepared, identified, and catalogued for curation (but not prepared for a level of exhibition of any salvaged specimen) by Metro's qualified paleontologist. This includes removal of all or most of the enclosing sediment to reduce the specimen volume, increase surface area for the application of consolidants or preservatives, provide repairs and stabilization of fragile or damaged areas on a specimen, and allow identification of the fossils. All field notes, photographs, stratigraphic sections, and other data associated with the recovery of the specimens must be deposited with the institution receiving the specimens.

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Appendix A:
Records Search Results

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

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
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20 June 2016

Paleo Solutions, Inc.
911 South Primrose Avenue, Unit N
Monrovia, CA 91016

Attn: Barbara Webster, GIS Specialist & Archaeologist

re: Paleontological resources for the proposed HDR Metro Link Union Station Project, in the City of Los Angeles, Los Angeles County, project area

Dear Barbara:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed HDR Metro Link Union Station Project, in the City of Los Angeles, Los Angeles County, project area as outlined on the portion of the Los Angeles USGS topographic quadrangle map that you sent to me via e-mail on 6 June 2016. We do not have any vertebrate fossil localities that lie directly within the proposed project boundaries, but we do have localities nearby from the same sedimentary units that probably occur as subsurface deposits in the proposed project area.

Surface sediments throughout the entire proposed project area consist of younger Quaternary Alluvium, derived as fluvial deposits from the floodplain of the Los Angeles River that currently flows in a concrete channel through or adjacent to the proposed project area. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but at relatively shallow depth they may be underlain with older sedimentary deposits that do contain significant vertebrate fossils. Our closest vertebrate fossil locality from these older Quaternary deposits beneath the younger Quaternary Alluvium to the northern portion of the proposed project area is LACM 1023, east of Taylor Junction and east of the Golden State Freeway (I-5) near the intersection of Workman Street and Alhambra Avenue, where excavations for a storm drain recovered fossil specimens of turkey, *Meleagris californicus,* sabre-toothed cat, *Smilodon fatalis*, horse, *Equus*, and deer, *Odocoileus*, at unstated depth. A specimen of the turkey, *Meleagris*, from this locality was published in the scientific literature by D. W. Steadman

(1980. A Review of the Osteology and Paleontology of Turkeys (Aves: Meleagridinae). Contributions in Science, Natural History Museum of Los Angeles County, 330:131-207). Just south of locality LACM 1023, still east of the Golden State Freeway but near the intersection of Mission Road and Daly Street, we have another older Quaternary locality, LACM 2032, that produced fossil specimens of pond turtle, *Clemmys mamorata*, ground sloth, *Paramylodon harlani*, mastodon, *Mammut americanum*, mammoth, *Mammuthus imperator*, horse, *Equus*, and camel, *Camelops*, at a depth of 20-35 feet below the surface. The pond turtle specimens from locality LACM 2032 were figured in the scientific literature by B.H. Brattstrom and A. Sturn (1959. A new species of fossil turtle from the Pliocene of Oregon, with notes on other fossil *Clemmys* from western North America. Bulletin of the Southern California Academy of Sciences, 58(2):65-71).

Our closest vertebrate fossil locality to the southern portion of the proposed project area from the older Quaternary deposits is LACM 1755, to the west near the intersection of Hill Street and 12th Street, that produced a fossil specimen of horse, *Equus*, at a depth of 43 feet below the street. Our next closest vertebrate fossil localities from these deposits are LACM 7701-7702, southeast of the proposed project area in the City of Commerce near the intersection of Atlantic Avenue and the Long Beach Freeway (I-710) just north of the Los Angeles River that produced fossil specimens of threespine stickleback, *Gasterosteus aculeatus*, salamander, *Batrachoseps*, lizard, Lacertilia, snake, Colubridae, rabbit, *Sylvilagus*, pocket mouse, *Microtus*, harvest mouse, *Reithrodontomys*, and pocket gopher, *Thomomys*, 11 to 34 feet below grade. At about the same distance, but southwest of the proposed project area near the intersection of 46th Street and Western Avenue, our vertebrate fossil locality LACM 7758 produced fossil specimens of three-spine stickleback, *Gasterosteus aculeatus*, meadow vole, *Microtus*, deer mouse, *Peromyscus*, pocket gopher, *Thomomys*, and pocket mouse, *Perognathus*, at a depth of 16 feet below the surface.

Surface grading or very shallow excavations in the younger Quaternary Alluvium of the proposed project area are unlikely to encounter significant fossil vertebrate remains. Deeper excavations that extend down into older Quaternary deposits, however, may well uncover significant vertebrate fossils. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Sediment samples 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,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

Appendix B: Qualifications

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Geraldine Aron, MS
Principal Paleontologist

SUMMARY

YEARS OF EXPERIENCE
17 Total Years

EDUCATION
MS Geological Sciences
CSU Long Beach, 2008

BS Geological Sciences
CSU Long Beach, 2000

CERTIFICATIONS

BUREAU OF LAND MANAGEMENT
Paleontological Permit - CA
Paleontological Permit - AZ
Paleontological Permit - NV

UNITED STATES FOREST SERVICE
Permit - Angeles National Forest

CARTOGRAPHY & GIS SYSTEMS
CSU Long Beach, 2000

QUALIFIED PALEONTOLOGIST
Orange County
Riverside County
County of San Diego
City of San Diego

AFFILIATIONS

Society of Vertebrate Paleontology
Geological Society of America
Association for Women Geoscientists
Society for Sedimentary Geology (SEPM)

PROFILE

Geraldine is President and a Principal Investigator at Paleo Solutions, Inc. (PSI). She has more than 17 years of experience as a professional paleontologist in natural resources management. She meets the professional standards as a paleontological Principal Investigator for the Society of Vertebrate Paleontologists, BLM, USFS, San Bernardino County, Orange County, San Luis Obispo County, San Diego County, and other agencies that retain a professional list for qualified paleontologists. Geraldine has produced hundreds of technical reports, which include paleontological assessments, DEIRs, EIR/EIS, Paleontological Mitigation and Monitoring Plans, document reviews, and survey reports for CEQA/NEPA compliance. Geraldine has worked on dozens of transportation projects from San Diego County to Humboldt County. She is responsible for maintaining the overall scientific integrity and oversight of all paleontological projects for PSI. Her areas of expertise include: Paleontological resources project scoping and management; compliance with Federal and State of California laws; Federal and California State agency consultation; preparing and implementing research designs; serving as Principal Investigator for surveys, significance evaluations and data recovery excavations; development of Paleontological Resources Management Plans and Treatment Plans; public outreach and involvement.

PROJECT EXPERIENCE

Aliso Canyon Turbine Replacement Project
Southern California Gas | Los Angeles County, CA

Principal Investigator/Project Manager. As field manager and principal investigator, Ms. Aron is responsible for surveying and developing and implementation of the field mitigation monitoring program for the project. Additionally, Paleo Solutions performed a Paleontological Records Search, Monitoring and Treatment Plan. Routinely provided submittals to the California Public Utilities Commission to reduce monitoring efforts where possible. She is also overseeing both paleontological and archaeological monitoring during ground-disturbing activities.

Astoria Solar Project
Recurrent Energy | Kern County, CA

Principal Investigator/Project Manager. Ms. Aron co-authored a Paleontological Resource Survey Report in order to evaluate the paleontological resource potential for the Recurrent Energy Astoria Solar Project that will produce a total of 175 MW of electricity from approximately 2,300,000 solar PV panels on 2,060 acres of land in southern unincorporated Kern County. The goal of the report was to identify the paleontological sensitivity of the Project area and develop recommendations for the mitigation of adverse affects on paleontological resources that may result from the proposed construction. The study was performed in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, §21000 et seq.), State CEQA Guidelines (California Code of Regulations, Title 14,§15000 et seq.), and County of Kern (2009) Archaeological, Paleontological, Cultural, and Historical Preservation Policy.

Catalina Solar Photovoltaic Generating Facility Project
EDF Renewable Energy | Kern County, CA

Principal Investigator/Project Manager. Ms. Aron developed the Survey Strategy, Paleontological Mitigation Monitoring Resource Plan, oversaw all monitoring during construction, and wrote the final paleontological monitoring report. The Catalina Project site was found to have minimal potential for scientifically significant paleontological resources that could be impacted by construction-related ground disturbance. The purpose of the Paleontological Resource Mitigation Plan (PRMP) was to outline the procedures that should be followed during to construction in order to reduce adverse impacts on paleontological resources within the Project area to below the level of significance. The mitigation

program was designed to comply with the California Environmental Quality Act (CEQA), the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and the Public Resources Code Section 5097.5, and Kern County Guidelines.

Contra Costa-Moraga 230 kV Reconductoring Project
Pacific Gas & Electric | Contra Costa County, CA

Principal Investigator/Project Manager. Ms. Aron established the database of a very complex paleontological survey which had approximately 29 different rock formations over 32 miles. She was able to shorten an extensive survey that could have taken 2-3 weeks to 5 days by strategizing which rock formations to focus survey on. This investigation was conducted in compliance with CEQA. The tasks required to accomplish the inventory include pre-field research, GIS and geologic mapping tasks, published literature research, paleontological surveys, and preparation of the technical report.

Coolwater-Lugo Transmission Line Project Southern California Edison
Southern California Edison | San Bernardino County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw cultural and paleontological investigations of the alternative routes and substation locations identified by Southern California Edison for the construction of approximately 47-52 miles double-circuit 220 kV transmission lines, approximately 15-20 miles of single-circuit 550 kV transmission lines, removal of approximately 15-6 corridor miles of existing 220 kV transmission lines, and construction of a new 500/220/115 kV substation for completion of a Programmatic Environmental Assessment (PEA) required by the CPUC and an Environmental Impact Report/Environmental Impact Statement. Ms. Aron was the leader author on the facilitation of production of the paleontology sections in support of the EIR/EIS and PEA. Ms. Aron was also the permit holder for a BLM authorization and permit to conduct surveying and a research design for field reconnaissance related to the preparation of a Proponent's Environmental Assessment (PEA), as well as EIS/EIR documentation for the proposed transmission line.

Desert Sunlight Solar Farm
First Solar | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron is the Principal Investigator/PM for all aspects of paleontological resources for the DSSF Project. This includes proper BLM authorization and permitting to conduct surveying and a research design for field reconnaissance and documentation for 4,000 acres in the Desert Center near Palm Springs. The Protocol was developed as a practical tool for managing compliance with laws relating to paleontological resources, among which are CEQA and NEPA compliance. Ms. Aron was responsible for developing a paleontological mitigation plan, field survey, and coordinating all monitors for fieldwork. Several significant ice age fossils have been recovered, identified, and curated from this project.

Devers-Palo Verdes No. 2 500 kV Transmission Line
Southern California Edison | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw all paleontological project management and compliance monitoring for this project, including surveying, recordation, and mitigation procedures. Daily reporting in FRED was required to comply with CPUC and BLM requirements. During monitoring in the highly sensitive Palm Springs unit, a bed of finely preserved leaf impressions were discovered, in the vicinity of another fossiliferous layer containing small rodent-sized bones. After consultation with SCE, a representative sample of this unit, approximately 2000 pounds, was retrieved and taken back to the Paleo Solutions laboratory for analysis. Portions of this sediment were soaked in water to break it down, then the resulting sediments were finely screened and sorted under a microscope to retrieve potentially scientifically significant microfossils including rodent bones and teeth that will help constrain the exact age of the sediments. Other portions were carefully split in order to reveal the leaf impressions, and preserved in a fashion so that a paleobotanist will be able to identify the plant species. Proper monitoring of the earthmoving in this highly sensitive formation ensured that these specimens were safely retrieved with no construction down time. These specimens will be identified, catalogued, and deeded to the Western Science Center so their scientific value will not be lost, and to provide new data points for a formation that is not well studied in the Project area, and add to the scientific literature about the paleoenvironmental history of this Pliocene-aged formation.

El Casco System Transmission Line
Southern California Edison | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw all project management and compliance monitoring, which included salvaging small and large fossils, screen washing, sorting fossils, including stratigraphic and fossils documentation. Our rapid fossil techniques allowed us to keep construction projects on track. This project includes the proposed El Casco Substation site, upgrades to the Zanja and Banning Substations and the SCE's Mill Creek Communications Site, upgrades to a total of 15.4 miles of existing 115 kV sub-transmission line and associated structures, and the installation of fiber optic cables within existing conduits in public streets and on existing SCE structures between the Cities of Redlands and Banning. All portions of the Proposed Project are located within Riverside and San Bernardino Counties, California. Daily reporting via an electronic portal was required to comply with the CPUC requirements.

Gates I and II Solar Projects
Pacific Gas & Electric | Fresno County, CA

Principal Investigator/Project Manager. Ms. Aron was the project manager and principal investigator who oversaw the paleontological inventory reviews for both the Gates I and Gates II Solar Projects in Fresno County, California. Paleontological work for this project met an aggressive planning and execution schedule. The report was written in accordance with CEQA, and Fresno County requirements.

Grid Reliability and Maintenance, Seawolf 12 kV, Argonaut 12 kV, Thresher 12 kV, Alligator 12 kV Distribution Substation Planning
Southern California Edison | Temecula, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring during grading and excavating for the Seawolf, Argonaut, Thresher, and Alligator 12 kV lines. A Final Paleontological Monitoring report was completed in accordance with CEQA, as well as Riverside county requirements and was consistent with the recommendations made in the Paleontological Resources Treatment Plan for Triton Substation Project located adjacent to the four Distribution Substation Planning (DSP) circuits.

Haskell Canyon Interim Road and Switching Station Project
Los Angeles Department of Water and Power | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron provided project management during excavation activities within paleontologically sensitive portions of the project area on a full-time basis since 2013. Excavations within the Castaic Formation produced 96 fossil specimens from four localities.

Horsetown Substation Project
Southern California Edison | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw the coordination of the preparation of compliance and environmental documentation including a paleontological inventory for this project in Riverside County, utilizing CEQA and Riverside County paleontological guidelines.

Jefferson to Stanford No. 2 60 kV Feasibility Project
Pacific Gas & Electric | San Mateo County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw the preparation of the paleontological resources review, including the paleontological inventory report (PIR) and Proponent's Environmental Assessment (PEA) for the project. Several potential routes were assessed for this project, and the feasibility and paleontological potential was determined for this project. The report and PIR were prepared according to CEQA guidelines.

Line 107/131 Projects
Pacific Gas & Electric | Alameda County, CA

Principal Investigator/Project Manager. Ms. Aron was the project manager and principal investigator who oversaw the preparation of mitigation recommendations, a paleontological inventory report, managed planned survey of proposed pipeline locations, and oversaw construction monitoring including WEAP training. The work conducted for these projects was completed in accordance with CEQA and Alameda County requirements.

Line 300A/MP 147.7 and 180.8 Projects
Pacific Gas & Electric | San Bernardino County, CA

Principal Investigator/Project Manager. Ms. Aron managed the preparation of mitigation recommendations and a paleontological inventory report for this project, as well as managing planned surveys on BLM and United States Marine Corps lands, along with production of technical reports. All project related work was in accordance with CEQA, San Bernardino County and Federal requirements. This project was located in several locations throughout the Mojave Desert extending from Rosamond to Adelanto. Part of the project required gaining security clearances to access Edwards Air Force Base.

Manzana Wind Express Project
Iberdrola Renewables | Kern County, CA

Principal Investigator/Project Manager. Ms. Aron developed the Paleontological Mitigation Monitoring Resource Plan, oversaw all monitoring during construction, and wrote the final paleontological monitoring report. The Manzana Wind Energy Project site was found to have the potential for scientifically significant paleontological resources that could be impacted by construction-related ground disturbance. Project construction consisted of the installation of 107 to 300 wind energy turbines, aligned along approximately 26 rows, on the 6,275-acre proposed site. The limits of project surface disturbance included staging, access and temporary construction easements, as well as temporary construction signage. The purpose of the Paleontological Resource Mitigation Plan (PRMP) was to outline the procedures that will be followed during to construction in order to reduce adverse impacts on paleontological resources within the Project area to below the level of significance. The mitigation program was designed to comply with the California Environmental Quality Act (CEQA), the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, the Public Resources Code Section 5097.5 and Kern County Guidelines.

Mesa 500 kV Substation Project
Southern California Edison | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw a paleontological investigation to evaluate the expansion, upgrade, and loop-in of existing substation and associated facilities with respect to the paleontological resource potential of the Mesa 500 kV Substation project. Upgrading the existing Mesa Substation and connecting existing transmission lines to the substation will address future reliability concerns related to the projected retirement of older coastal power plans and the previous retirement of the San Onofre Nuclear Generating Station (SONGS), without requiring new transmission lines or substations. The existing Mesa Substation is approximately 202-acres and is located in Monterey Park, Los Angeles County, California.

Natural Substation Project
Southern California Edison | Los Angeles County and Ventura County, CA

Principal Investigator/Project Manager. Ms. Aron is responsible for surveying and developing and implementation of the field mitigation monitoring program for the project. Additionally, performed Paleontological Records Search, Monitoring and Treatment Plan. The California Public Utilities Commission has approved all of our monitoring mitigation plans.

Ocotillo Wind Express Facility Project
Pattern Energy | Bureau of Land Management | Imperial County, CA

Principal Investigator/Project Manager. Ms. Aron conducted all paleontological related services. This included proper BLM authorization and permitting to conduct surveying and a research design for field reconnaissance related to EIS/EIR documentation for 15,000 acres in Ocotillo. A specific protocol was developed as a practical tool for managing compliance with laws relating to paleontological resources, among which are CEQA and NEPA compliance. This included the oversight of third party monitoring for archaeological and paleontological resources, once construction was underway.

Pacific Wind Express Project
EDF Renewable Energy | Kern County, CA

Principal Investigator/Project Manager. Ms. Aron developed the Paleontological Mitigation Monitoring Resource Plan, oversaw all monitoring during construction, and wrote the final paleontological monitoring report. The Pacific Wind Express Project site was found to have the potential for scientifically significant paleontological resources that could be impacted by construction-related ground disturbance. The purpose of the Paleontological Resource Mitigation Plan (PRMP) was to outline the procedures that will be followed during to construction in order to reduce adverse impacts on paleontological resources within the Project area to below the level of significance. The mitigation program is designed to comply with the California Environmental Quality Act (CEQA), the California Code of Regulations, Title 14, Division 3, Chapter 1, Sections 4307 and 4309, and the Public Resources Code Section 5097.5, and Kern County Guidelines.

Path 46 Transmission Line
Los Angeles Department of Water and Power | Los Angeles County, CA to Clark County, NV

Principal Investigator/Project Manager. Ms. Aron oversaw all paleontological services, including identifying and analyzing possible effects to scientifically important paleontological resources resulting from the implementation of the LADWP Path 46 project. This included obtaining California and Nevada Bureau of Land Management paleontological permits, a pre-survey paleontological analysis of existing data, field surveys of 15 of the 16 grading locations-to-date on approximately 507 acres of the project (additional sites remain to be surveyed in Nevada), preparation of a Paleontological Monitoring and Mitigation Plan (PMMP), construction monitoring and technical reports.

Palermo-East Nicolaus 115 kV Transmission Line
Pacific Gas & Electric | Butte, Sutter, Yuba Counties, CA

Principal Investigator and Project Manager. PG&E proposes to construct about 314 new poles and/or metal lattice tower supporting a 115-kV transmission line along an approximately 40-mile transmission line segment. The project route would follow the existing Palermo–East Nicolaus 115-kV Transmission Line between PG&E's Palermo and East Nicolaus substations within unincorporated areas of Butte, Sutter, and Yuba Counties. Ms. Aron conducted a desktop level review of the Paleontological Monitoring Plan (PMP), including geologic maps and taking into account PG&E's Paleontological Resource Standards and Procedures. The review was conducted to determine if additional studies are needed for the project.

Petaluma Line 021 Pipeline Replacement Project
Pacific Gas & Electric | Sonoma County, CA

Principal Investigator/Project Manager. Ms. Aron was the project manager and principal investigator who oversaw the preparation of mitigation recommendations, a paleontological inventory report, and managed planned survey of proposed pipeline locations. She also oversaw construction monitoring and WEAP training. This project was completed in accordance with CEQA and Sonoma County requirements.

San Joaquin Cross Valley Loop Project
Southern California Edison | Tulare County, CA

Principal Investigator/Project Manager. Ms. Aron was responsible for coordination of all surveying, preparation of compliance and environmental documentation for this project, and co-authored the final Paleontological Monitoring Plan for this project in Tulare County, in accordance with CEQA requirements. Once construction commenced, Geraldine oversaw all archaeological and paleontological monitoring, and coordinated with tribal monitors. She also co-authored the monitoring report. She routinely provided submittals to the California Public Utilities Commission to reduce monitoring efforts where possible.

Scattergood-Olympic Line 1 Project
Los Angeles Department of Water and Power | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron managed all paleontological monitoring during potholing investigations to identify locations where underground maintenance vaults would be placed. When fossils were discovered during excavation, Ms. Aron aided in determining significance and identifying the fossils.

SDG&E ETS 31138 Install Cathodic Protection
San Diego Gas & Electric | San Diego County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring services in sensitive sediments for an improvement project within the SDG&E Instl Cathodic Protection, L-3010, Fallbrook project in Fallbrook, CA.

SDG&E Margarita Storage Yard Erosion
San Diego Gas & Electric | San Diego County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring and authored the Monitoring Compliance Report at the SDG&E Margarita Storage Yard Erosion Repair Project located in southern Orange County, east of Ladera Ranch and two miles north of Ortega Highway (State Route 74). The project involved the following construction activities: over excavation beyond the visible erosion, addition of a sub-drain with trench dams buried within the eroded area; and, connection to an energy dissipater.

SDG&E Pendleton Energy Park
San Diego Gas & Electric | San Diego County, CA

Principal Investigator/Project Manager. Ms. Aron performed a desktop level review for a High Level Constrains Analysis to be incorporated into an EIR section for the Energy Park Project within currently developed San Onofre Nuclear Generating Station (SONGS) Mesa Site on Marine Corps Base Camp Pendleton. This included overlaying the geology, record search and literature search, analyzing aerial photos, and summarized in a technical report. While conducting paleontological monitoring for geotechnical work, Paleo Solutions recommended to reduce monitoring efforts since the auger size was not conducive for paleontological resources.

SDG&E Talega Substation - Synchronous Condenser Facility Project
San Diego Gas & Electric | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw a records search at the Los Angeles County Museum of Natural History and the San Diego Natural History Museum in order to determine whether planned excavation to remove existing 230 kV capacitor banks and install a +450/240MVAR synchronous condenser facility at Talega Substation will encroach on previously investigated fossil localities.

SDG&E Transmission Line 13833 Project
San Diego Gas & Electric | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring during construction services for replacement of Tie Line 13833 - a 138 kV single-circuit transmission line. The replacement started at the San Mateo Substation in the City of San Clemente, CA and ended on lands leased to the California State Parks within Marine Corps Base Camp Pendleton, San Diego, CA. The project components included replacing 17 existing wood poles with steel poles, installing two additional steel poles along the alignment, top four existing wooden transmission poles and utilizing one staging yard - SONGS parking lot. She co-authored the Final Paleontological Mitigation Compliance Report.

Soda Mountain Solar Project
Bechtel Development Company | San Bernardino County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw a fully comprehensive resources section for the Draft Environmental Impact Statement/ Environmental Impact Report for the proposed Soda Mountain Solar project that will generate and deliver solar generated power to the California electric grid through an interconnect to the Market Place-Adelanto 500 kV transmission line owned by Los Angeles Department of Water and Power (LADWP).

Springbok 1 Solar Farm and Oryx Solar Farm
8minutenergy | Bureau of Land Management | Kern County, CA

Principal Investigator/Project Manager. Ms. Aron completed paleontological desktop level review conducted for the 8minutenergy Oryx Solar Project, Springbok Solar Project, and potential Gen-Tie Routes. The scope of the paleontological analysis includes reviews of published geologic mapping, similar projects that fall within close proximity, and relevant regional scientific literature. She is currently overseeing paleontological monitoring during construction grading for the 951-acre Springbok I Solar Farm Facility and Springbok 2 Solar Farm Facility covering approximately 1,350 acres.

Stateline Solar Farm Project
First Solar | Bureau of Land Management | San Bernardino County, CA

Project Manager/Principal Investigator. Ms. Aron is the Paleontological Use Permit holder for this project through the BLM Needles Field Office. Initially, she oversaw a pre-construction field survey and analyzed possible effects to paleontological resources resulting from the construction and operation of the project in order to reduce potential adverse impacts on scientifically important fossils. After the survey was completed, she co-authored the Paleontological Monitoring and Mitigation Plan (PMMP), which described the paleontological potential of the project area and provided construction monitoring procedures and locations as originally outlined in the BLM's Record of Decision. Ms. Aron is currently overseeing paleontological field monitors during grading/excavation activities and is responsible for maintaining compliance with the mitigation measures to reduce potential adverse impacts during construction to a level below significance.

Tehachapi Renewable Transmission Project
Southern California Edison | California Public Utilities Commission | Los Angeles, Kern, and San Bernardino Counties, CA

Principal Investigator/Project Manager. Geraldine Aron is the Principal Investigator/PM for all aspects of paleontological resources for Southern California Edison's (SCE) Tehachapi Renewable Transmission project (TRTP), and other associated Areas of Potential Effects (APE's) including but not limited to areas in the counties of Los Angeles, Kern, and San Bernardino, California. The APE's include but are not limited to surveying and grading for access roads, pulling and splicing locations, marshaling and staging yards, shoo-flies, and tower erection sites. Our services are conducted in order to ensure SCE meets compliance responsibilities under California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA) and federal paleontology guidelines, using Society for Vertebrate Paleontology (SVP), and Bureau of Land Management's Potential Fossil Yield Classification System (PFYC) systems and guidelines. Ms. Aron is in charge of project staffing and scheduling needs, permits (BLM and USFS), developing research designs for unique situations, developing and updating monitoring procedures and monitoring plans, and interaction between our client and the lead agencies which allows us to properly mitigate paleontological resources. We have numerous monitors covering multiple areas. Communication and safety on large-scale multi-year,multi-component projects such as this is essential. All of Paleo Solutions documents are reviewed by the CPUC (California Public Utilities Commission) on a regular basis and the Angeles National Forest, as needed.

Topock Compressor Station
Pacific Gas & Electric | San Bernardino County, CA

Principal Investigator/Project Manager. Ms. Aron provided a memorandum summarizing the results that included the understanding of CERCLA. Paleo Solutions provided third party review of Paleontological documents to ensure adequacy of use in preparation of environmental documents. Documents included a report titled Paleontological Resources Management Plan, Topock Groundwater Remediation Project, San Bernardino County California and Mohave County, Arizona, prepared for Pacific Gas and Electric.

Valley-Auld-Triton 115kV Subtransmission Line
Southern California Edison | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw a paleontological field survey and records search and co-authored a Paleontological Resources Technical Report and paleontological section of the Programmatic Environmental Assessment (PEA) for SCE's proposal to upgrade the region's electrical infrastructure and improve its overall electrical reliability. The project is over 15 miles in length and involves the construction of a new 115 kV substransmission line from Edison's existing Valley Substation in Menifee and its existing Auld Substation in Murrieta.

West of Devers Transmission Line Project
Southern California Edison | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw all project management and paleontological related services, including paleontological monitoring for fault trenching and geotechnical drilling. This included proper BLM authorization, and permitting to conduct surveying and a research design for field reconnaissance related to the preparation of a Proponent's Environmental Assessment, EIS/EIR documentation for the proposed transmission line. She was in charge of managing documentation with laws relating to paleontological resources including CEQA and NEPA compliance. The project scope changed several times which allowed for thorough tracking of all field and technical procedures and budget documentation.

Westwind Repowering Project
Tetra Tech & New Dimension Energy Company, LLC | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron managed all paleontological services, including co-authoring a Paleontological Inventory Report for New Dimension Energy Company's proposed project to replace 12 existing wind turbines with ten FloDesign Model 100 wind turbines at the Westwind Wind Energy across 375 acres.

Crenshaw/LAX Mass-Transit Light Rail Line
Los Angeles County Metropolitan Transportation Authority | Los Angeles, CA

Principal Investigator/Project Manager. Ms. Aron is overseeing Paleo Solutions scope as the lead paleontologist firm for Metro's 8.5-mile light rail line through southwest Los Angeles. She is also overseeing as-needed archaeological support and Native American monitoring. The line will run generally north-south and will connect the Crenshaw District and Leimert Park to Inglewood and Los Angeles International Airport (LAX). The line will be a part of the Los Angeles County Metro Rail System. Ms. Aron is overseeing all paleontological monitoring during construction excavation in sensitive sediments.

French Valley Parkway Interchange
California Department of Transportation District 8 | Temecula, CA

Principal Investigator/Project Manager. The French Valley Parkway Interchange is designed to reduce congestion and improve safety by relieving the I-15/Winchester Road Interchange and minimizing weaving movements on I-15 between Winchester Road and the I-15/I-215 Junction. Ms. Aron oversaw paleontological construction monitoring during earth-moving activities, including trenching, grading, and drilling due to the project's proximity to moderately sensitive paleontological formations. This work was conducted in accordance with the California Environmental Quality Act (CEQA), as well as Caltrans SER and Riverside County requirements. During construction monitoring, a partial horse jaw was discovered and salvaged along with a poorly preserved mammoth tusk fragment. Due to Paleo Solutions salvaging methods, construction was not affected. Specimens were prepared to the point of identification and curation at the Paleo Solutions laboratory using industry standard paleontological methods, including utilizing an air abrader, dental tools and preserved with PaleoBond. The specimens were deeded to the Natural History Museum of Los Angeles. A Final Paleontological Monitoring Report was completed in accordance with CEQA, as well as Caltrans Standard Environmental Reference (SER) and Riverside County requirements.

Interstate 805 North HOV/BRT Design Build
Caltrans & San Diego Association of Governments | San Diego County, CA

Principal Investigator/Project Manager. Ms. Aron co-authored the Paleontological Mitigation Plan and is overseeing paleontological construction monitoring as part of the I-805 North project, which is a critical element of the San Diego Regional Transportation Plan's corridor of projects to increase capacity on the I-805.

Laguna Niguel to San Juan Capistrano Passing Siding Project
Orange County Transportation Authority | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw archaeological monitoring in potentially sensitive sediments during site clearing, grading, and excavation activities for OCTA's, in association with the Southern California Regional Rail Authority (SCRRA), proposed 1.8-mile new passing siding project on the LOSSAN rail corridor. She also oversaw and coordinated with the Gabrieleno-Tongva Nation Native American monitor on-site.

Northbound State Route 55 Improvement Project from Interstate 5 to State Route 91
Orange County Transportation Authority | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron will oversee the completion of a Paleontological Identification Report (PIR) and Paleontological Evaluation Report (PER) to identify paleontological resources and to evaluate the significance of those resources. The paleontology study will be undertaken, consistent with CEQA, and following the Caltrans SER, Environmental Handbook, Volume I, Chapter 8 to determine the presence/absence of paleontological resources within the Area of Potential Effect (APE).

Orange Line Bus Enhancement to North Hollywood Red Line
Los Angeles County Metropolitan Transportation Authority | Los Angeles, CA

Principal Investigator/Project Manager. Ms. Aron was responsible for overseeing HAZWOPER-certified archaeological and paleontological monitors during excavation and tunneling for the project. Paleo Solutions qualified archaeologist led one-hour worker training meetings for all personnel participating in project ground-disturbing activities. Consultation to Metro staff to support on-going Native American consultation between Metro and interested Native American parties was also be provided. At the completion of the Project, Ms. Aron co-authored a final monitoring report.

Palo Alto Highway 101 Overcrossing Project
California Department of Transportation District 4 | Santa Clara County

Principal Investigator/Project Manager. Ms. Aron was the lead author of a Paleontological Inventory Report (PIR) to provide general guidance for development paleontological monitoring efforts in compliance with the Standard Environmental Reference for this Caltrans District 4 project to replace an existing seasonal underpass at Adobe Creek, which currently provides access under the highway via a Santa Clara Valley Water District maintenance road.

Regional Connector Transit Corridor
Los Angeles County Metropolitan Transportation Authority | Los Angeles, CA

Principal Investigator/Project Manager. Ms. Aron is overseeing paleontological, archaeological, and Native American monitoring of preconstruction and construction ground-disturbing work conducted by Metro's contractors in association with the Regional Connector Transit Corridor – a light rail subway corridor through Downtown Los Angeles to connect the Blue and Expo lines to the current Gold Line and Union Station.

Universal City Pedestrian Bridge
Los Angeles County Metropolitan Transportation Authority | Los Angeles, CA

Principal Investigator/Project Manager. Ms. Aron was responsible for overseeing the Archaeological and Paleontological Worker Awareness Training and monitoring services during construction at the Universal City Pedestrian Bridge. Paleo Solutions provided as-needed archaeological and paleontological monitoring for a total of eight weeks. To acquire cost-savings, monitors were cross-trained in paleontological and archaeological monitoring. Paleo Solutions provided 40-hour HAZWOPER monitor(s), when ground disturbing activities encountered contaminated soils or water.

Van Duzen-Peanut State Route 36 Highway Project
Caltrans District 1 | Humboldt County, CA

Principal Investigator and Project Manager. Caltrans proposed to improve State Route 36 from MP36.1 to MP40.5 adjacent to the Van Duzen River in Humbodlt County, CA. Cooperating agencies included the FHWA, CFLHD and Caltrans. Ms. Aron coauthored a Paleontological Inventory Report (PIR) to determine the relative levels of paleontological sensitivity in geological formations that will be encountered during construction of the project.

Abajo to Resolute Transmission Line Upgrade Project
Rocky Mountain Power | San Juan County, UT

Paleontologist. Ms. Aron took part in fossil salvaging of approximately 100 bone fragments and one significant fossil locality for Rocky Mountain Power's project to expand the existing Resolute Greater Aneth Substation in addition to other upgrades of transmission towers between this facility and the Abajo Substation covering approximately 171.34 acres of BLM lands.

Basin Gardens Play Area Project
Bureau of Land Management | Big Horn County, WY

Paleontologist. Ms. Aron participated in the paleontological survey for the project, located in northern Wyoming east of the town of Basin, encompassing approximately 4,421 acres of BLM land.

United States Gypsum Well Project
Bureau of Land Management | Ocotillo, CA

Principal Investigator/Project Manager. Ms. Aron provided an analysis of existing data for paleontological resources for the proposed United States Gypsum well project. USGS is proposing to drill two test wells on a one-acre site on lands administered by the Bureau of Land Management.

Los Angeles Regional Interoperable Communications System Authority (LA-RICS)
LA-RICS Joint Powers Authority | Los Angeles County, CA

Principal Investigator. Ms. Aron co-authored a Paleontological Resource Impact Evaluation Report (PRIMP) and the paleontological resources section for the Environmental Impact Report in order to evaluate the paleontological resource potential of 78 discrete sites located throughout Los Angeles County. The proposed project will provide improved radio and broadband communication for the public safety providers of the greater Los Angeles region.

Mira Loma Union Pacific Railroad (UPRR) Project
SBA Communications Corporation | Jurupa Valley, CA

Principal Investigator. Ms. Aron co-authored the Final Paleontological Monitoring Compliance Report for this project consisting of the installation of a new 70'-0" II Monopine Tower for multiple carriers and being developed by Union Pacific Railroad.

Bella Linda Residential Project
Coyne Development Corporation | Temecula, CA

Principal Investigator/Project Manager. Coyne Development Corporation proposed to construct a two phase residential project in Temecula, CA. The first phase will consist of 325 apartment units totaling 462,622 square feet. Phase two of the project will consist of creating lots for 49 senior single family units. In accordance with the City of Temecula, an Environmental Impact Report for the project was required by the Temecula City Council. Ms. Aron co-authored a Paleontological Resources Assessment for the Bella Linda Residential Project for inclusion in the Environmental Impact Report in accordance with Riverside County Guidelines.

Columbia Square Redevelopment Project
Kilroy Realty Corporation | Hollywood, CA

Principal Investigator/Project Manager. Ms. Aron oversaw the paleontological monitoring program during construction activities for the Columbia Square Project located in the community of Hollywood within the City of Los Angeles, Los Angeles County, CA. Columbia Square is a mixed-use development, including a 21-story residential tower, four 2-6 story office/retail buildings, and a 4-5 level subterranean parking garage covering approximately 4.7-acres. The paleontological monitoring program consisted of examinations of previously undisturbed deposits of older alluvium. Monitoring consisted of on-site inspections of exposed older alluvium and spoils piles for any contained paleontological resources between October 2013 and April 2014. Construction excavations impacted Quaternary age older alluvium deposits up to 62 feet in depth. One non-significant fossil locality was observed during excavation.

Gateway Village Phase IV
Casa-Treh IX, LLC | Chino Hills, CA

Principal Investigator/Project Manager. Ms. Aron provided oversight of paleontological monitoring and authored the Final Paleontological Monitoring Report for this 14,950 square foot multi-tenant commercial building project located north of the existing Gateway Village shopping center and west of State Route 71 and the concrete drainage channel.

Glenwood at Aliso Project, Phase I and II, Tract 16969
Shea Homes | Aliso Viejo, CA

Principal Investigator/Project Manager. Ms. Aron provided and oversaw paleontological monitoring and mitigation services during earth moving operations at the Glenwood at Aliso project - a 502 residential dwelling unit, community conference, aquatic center with three pools, and a clubhouse facility with parks and hiking trails. The project included grading of an approximately two million cubic yards of previously disturbed bedrock and soil. Paleontological monitoring occurred over a period of 14 months between 2006 and 2008. Vertebrate fossils were located during earth moving equipment while in undisturbed bedrock. At each fossil locality, the lithology of the fossil-bearing strata were recorded along with UTM (NAD 83) coordinates and elevation. Fossils were salvaged employing the “pluck and run” method for smaller fossils, quarrying and plaster for jacketing of larger fossils, and dry screening of matrix for microfossils. The recovery of the assemblage of Micoene-age fossils collected from Glenwood represents an important contribution to the study of the geologic and biologic history of southern California.

Laguna Woods Village GP802 Drainage Improvement Project
Golden Rain Foundation of Laguna Woods | Laguna Woods, CA

Principal Investigator/Project Manager. Ms. Aron co-authored a Phase I Cultural Resources Assessment prior to construction grading, which included a field survey, records search and a report summarizing the finding for Laguna Woods Village two-story starter building/golf building project located adjacent to Laguna Woods Village Senior Community. Ms. Aron oversaw archaeological and paleontological monitoring during grading activity and co-authored separate Final Paleontological and Archaeological reports.

Newkirk Alumni Project
University of California, Irvine | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron was responsible for managing all archaeological and paleontological monitoring of the 12,500 square foot center on the campus of the University of California, Irvine. As co-author, separate final paleontological and archaeological construction monitoring reports were completed in accordance with CEQA and Orange County requirements.

Parkmerced Vision Plan
Parkmerced Investors, LLC | San Francisco, CA

Principal Investigator/Project Manager. Ms. Aron oversaw and co-authored the preparation and submission of a Paleontological Resources Monitoring and Mitigation Program (PRMMP) for this proposed project, which seeks to demolish 1,538 existing units and construct 5,679 new residences, retail and commercial establishments, and open spaces. Project construction will involve substantial soil disturbance related to demolition of existing structures and excavation for new structure foundations, and a subterranean parking garage. The project, located in southwest San Francisco, will consist of transforming an existing neighborhood over the next 20 to 30 years. Ms. Aron will also oversee the paleontological

mitigation monitoring program when construction begins for this project.

Polo Ranch Project
Lennar Communities | Santa Cruz County, CA

Principal Investigator/Project Manager. Ms. Aron is overseeing paleontological monitoring, fossil salvage, laboratory preparation, and will co-author the final monitoring report upon conclusion of the project for a 113.5-acre parcel known as the Polo Ranch, which will include approximately 40 single-family homes. While monitoring grading activities in compliance with the City of Scott's Valley conditions of approval, an approximately 25 foot long mysticete (baleen) whale was discovered that met conditions of being scientifically significant. While excavating and jacketing the fossils, an additional whale was unearthed approximately 2.5 feet underneath the original discovery. Ms. Aron mobilized fossil salvage and determined best practices to preserve the fossils integrity and transport to Paleo Solutions lab in Los Angeles County where it is being prepared for curation and eventual transportation to an approved repository.

Sandia Vineyard, De Luz Vineyards, Project 3 - Walker Basin Projects
Walker Basin Holding Properties | Temecula, CA

Principal Investigator/Project Manager. Ms. Aron co-authored the Paleontological Assessments for three projects in Temecula, CA. The De Luz Vineyards property is an approximately 64-acre site located north of the Cross Creek Golf Club in Temecula, CA. Project 3 is an approximately 73-acre site located north of the Cross Creek Golf Club in Temecula, CA. The Sandie Vineyards property is an approximately 59-acre site located west of Interstate 15 and the Cross Creek Golf Club in Temecula, CA. The proposed development includes construction of five-acre residential lots, each including a single acre graded pad for house construction. Requisite improvements to existing infrastructure, such as road expansion and inclusion of preservation areas, will also accommodate the new development.

Summit Phase V
Parker Properties | Aliso Viejo, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological and archaeological compliance services in conjunction with the City of Aliso Viejo's mitigation measures for the Site Specific Plan for Parker Properties Summit Phase V project, which included 20 Enterprise - a 117,856 square foot, four-story LEED building; 30 Enterprise - a 136,596 square foot, four-story LEED building; and 50 Enterprise - a 174 room hotel. During paleontological monitoring, a vertebrate mammal fossil (Baleen whale), a Boney Fish, and one shark were collected. All fossils were recovered from the project site by stabilizing the matrix in the field and transporting to the Paleo Solutions lab for further preparation. All fossils collected during the paleontological mitigation program were offered to the San Diego Natural History Museum for accessioning into the museums paleontological curation facility for permanent storage and research. A Final Technical Report was submitted to Parker Properties upon conclusion of grading and laboratory analysis.

Tapestry Project
Shea Homes | La Habra, CA

Principal Investigator/Project Manager. Ms. Aron provided paleontological mitigation services for Shea Homes 112 single-family residential development project in the City of La Habra, Orange County, CA. The paleontological mitigation included monitoring the site during excavations for significant fossil resources, salvaging exposed fossils, and collecting pertinent geologic and stratigraphic data. Collected specimens were stabilized and removed from the site and prepared to the point of identification. The fossils discovered at the Tapestry Project represent a variety of taxa. Fossils from the Tapestry site included vertebra from both horse and camel, which are not uncommon in the La Habra Formation of Orange County. The final paleontological report was submitted to Shea Homes and the City of La Habra upon conclusion of grading and laboratory identification.

Temecula Valley Hospital
Universal Health Services, Inc. | Temecula, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological and archaeological monitoring during grading and excavating activities for Universal Health Services, Inc. and Turner Construction's approximately 566,160 square foot facility, which included a hospital, medical office, cancer center and fitness rehabilitation center and a helipad space on 35.1 acres in Temecula, CA. Representatives of the Pechanga tribe were also present when excavations impacted native sediment. Excavation in the project area occurred for building footings, infrastructure, and parking lots and involved the systematic inspection of trenches, scrapings and excavations, including spoils piles, within the project.

Vantis Parking Structure
Shea Properties | Aliso Viejo, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring and mitigation services during earth moving operations conducted at the Vantis Parking Structure 122 Development in the City of Aliso Viejo, CA. The Vantis Parking Structure included grading of an approximately 10,000 square foot lot along the east side of Aliso Viejo Parkway. Paleontological monitoring took place over 9 months and over a hundred fossil invertebrates were collected from one locality in the Monterey Formation on the project site. All fossils recovered from the project were stabilized in matrix in the field and transported to the laboratory for further preparation. A relative dating technique was undergone for the analysis of

the microfossils present in the sample collected from the site. A Final Monitoring Report was submitted to Shea Properties and the City of Aliso Viejo upon completion of grading and laboratory procedures.

The Village at Calabasas
The New Home Company | Calabasas, CA

Principal Investigator/Project Manager. Ms. Aron co-authored a Paleontological Monitoring and Treatment Plan in compliance with CEQA, Los Angeles County, the City of Calabasas regulations, and the project Final Environmental Impact Report. The Village at Calabasas is a new community involving the construction of seven four-story buildings containing 80 condominiums, a commercial component, and underground parking. For nearly two years, Ms. Aron managed the paleontological mitigation program during ground disturbing activities, including paleontological monitoring, salvaging of unearthed fossils, laboratory preparation and analysis, and curation of all recovered fossils determined to be scientifically significant. Excavations within the Modelo Formation produced specimens of baleen whale, porpoise and plant material. Upon conclusion of paleontological mitigation, Ms. Aron co-authored the Paleontological Monitoring Report.

Anderson Dam Seismic Retrofit Project - Phase 1B
Santa Clara Valley Water District | Santa Clara County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological monitoring and co-authored the Paleontological Technical Report for this major project to retrofit and strengthen Anderson Dam, which included excavation and reconstruction of embankments, mining of rocks from nearby borrow areas, and raising the dam crest.

Baker Water Treatment Plant Project
Irvine Ranch Water District | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron was the project manager and principal investigator who oversaw the preparation of mitigation recommendations, a paleontological inventory report, and managed planned survey of proposed pipeline locations. She also oversaw construction monitoring and WEAP training. This project was completed in accordance with CEQA and Sonoma County requirements.

Cantua Creek Stream Group Improvement Project
California Department of Water Resources | Fresno County, CA

Principal Investigator/Project Manager. Ms. Aron co-authored a Paleontological Memorandum Report, which included a literature review at the Natural History Museum of Los Angeles County and the University of California Museum of Paleontology, Berkeley and the development of paleontological sensitivity maps. The project includes improving storage in the ponding basins through flood easement acquisition and raising the Canal embankment and adjacent roads.

Carmel River Floodplain Restoration and Environmental Enhancement Project
Monterey County Resource Management Agency (MCRMA) & Big Sur Land Trust | Monterey County, CA

Principal Investigator/Project Manager. Through a cooperative agreement with Caltrans District 5, MCRMA & Big Sur Land Trust have partnered to improve flood control and to enhance native riparian and floodplain habitat and hydrologic function to a portion of the lower floodplain along the Carmel River. Ms. Aron was a co-author of a Paleontological Memorandum Report, which concluded that the preparation of a formal Caltrans Paleontological Identification and Evaluation Report (PIR/PER) was required. Currently, Ms. Aron is overseeing the completion of the PIR/PER conforming to Caltrans SER Volume 1 Chapter 8.

City Trunk Line South, Unit 3
Los Angeles Department of Water and Power | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron provided a paleontological archival map and paleontological technical report to document paleontological resources for analysis within a CEQA document for LADWP's proposed project to construct approximately 10,250 linear feet of new 60-inch welded steel pipe to serve as a potable water line in an urban portion of the North Hollywood-Valley Village area.

Dola and Lanzit Ditch Bridge Replacement
San Bernardino County Flood Control District | San Bernardino County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw the completion of a Technical Report/Initial Study of paleontological resources for the Donnell Basin project. The scope of the paleontological analysis included a review of geologic maps, relevant scientific literature, and museum records. The report was prepared in accordance with San Bernardino County General Plan recommendations and California Environmental Quality Act requirements. Paleo Solutions recommended five mitigation measures to reduce any potential negative impacts on paleontological resources to a less than significant level and meet San Bernardino County requirements.

Griffith Park South Water Recycling Project
Los Angeles Department of Water and Power | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron managed an archival-level paleontological investigation and resource study in support of an initial study of the Griffith Park project.

Nacimiento Water Project
San Luis Obispo County Flood Control District | San Luis Obispo, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological resources monitoring services during the construction phase of project. The purpose of the monitoring was to reduce potential adverse effects to paleontological resources resulting from construction to below the level of significance. The project area contains 16 mapped geological formations, five of which have high paleontological sensitivity. Seven fossil localities were discovered during monitoring. Fossils collected in the field were transferred to the Paleo Solutions laboratory where protective wrapping and plaster jackets were removed and the fossils were cleaned of encrusting matrix in order to evaluate their scientific significance.

Owens Lake Master Project
Los Angeles Department of Water and Power | Inyo County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw all project management and review of the technical studies and museum record searches, including development of a paleontological sensitivity map for future construction of the Owens Lake Project.

Perris Dam Remediation Program
California Department of Water Resources | Riverside County, CA

Principal Investigator/Project Manager. Ms. Aron authored an update to the Paleontological Resource Monitoring and Mitigation Plan (PRMMP) to assist with compliance with mitigation measures in the Draft Environmental Impact Report, California State requirements, and Riverside County General Plan requirements for DWRs proposed project to remediate Lake Perris, replace the outlet tower, and construct an outlet conveyance to connect with the Perris Valley Storm Drain.

Recycled Water Storage Pond No. 5 Project
Rancho California Water District | Temecula, CA

Principal Investigator/Project Manager. Ms. Aron oversaw paleontological and archaeological monitoring during grubbing, grading, trenching, excavations, and other earth-moving operations in the immediate area adjacent to a known archaeological site, as well as areas of excavations identified as likely to contain paleontological resources for this project, which included the construction of an additional storage pond, one 16-inch diameter inlet pipeline, one 24-inch diameter outlet pipeline, paving the existing access road along Elm Street, lining the existing Pond No. 4, and constructing access ramps with turnarounds in Ponds No. 1/2 and 3.

Rehabilitation of Western Regional Sewers
Orange County Sanitation District | Orange County, CA

Principal Investigator/Project Manager. Ms. Aron co-authored a Cultural Resources Constraints Report for the Initial Study and provided a Cultural Resources Assessment Report for the Environmental Impact Report for Orange County Sanitation District's proposed project to rehabilitate or reconstruct the entire length of the Orange Western Sub-trunk, Los Alamitos Sub-trunk, and the Westside Relief Interceptor located in western Orange County.

Silver Lake Reservoir Complex Storage Replacement Project and the River Supply Conduit Unit 1A Project
Los Angeles Department of Water and Power | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron oversaw all project aspects associated to paleontology and archaeology including scheduling and implementation of the monitoring mitigation plan. Paleontological resources were discovered in the Castaic Formation.

Composite Linear System-Phase 6: Puente Hills Landfill
County Sanitation Districts of Los Angeles County | Los Angeles County, CA

Principal Investigator/Project Manager. Ms. Aron was the co-author of the Final Paleontological and Archaeological Monitoring and Mitigation Report and conducted paleontological and archaeological monitoring during grading of approximately 250,000 cubic yards of bedrock. She recovered significant fossils and cultural remains, prepared and identified fossil specimens to the lowest taxonomic level, and prepared them for curation.

The Tustin Legacy Project
City of Tustin | Tustin, CA

Principal Investigator/Project Manager. Ms. Aron oversaw archaeological and paleontological monitoring compliance services for a 1,600-acre

planned community in Tustin, California being developed on the former Marine Corp Air Station Base (MCASB). She co-authored multiple reports relating to various segments of the project. Numerous archaeological artifacts were discovered and collected including one prehistoric site and one historic site.

RESUME

Courtney Richards, MS
Principal Paleontologist

SUMMARY

YEARS OF EXPERIENCE
12 Years

EDUCATION
MS Biological Sciences
Marshall University, 2011

BS Earth and Space Science
University of Washington, 2006

CERTIFICATIONS

MINE SAFETY & HEALTH ADMINISTRATION
24-hr New/Inexperienced Metal/Non-Metal Surface Miners Certification

FIRST AID/CPR CERTIFIED

THE PRINCIPAL ACADEMY 2.0, ZWEIGWHITE

AFFILIATIONS

Society of Vertebrate Paleontology

SELECT PUBLICATIONS

Murphey, P.C., Zubin-Stathopoulos, K.D., Richards, C.D., and Fontana, M.A., 2015, Paleontological resource overview of the Royal Gorge Field Office Planning Area, Colorado: U.S. Department of Interior Bureau of Land Management Report, 178 p., and standalone confidential fossil locality geodatabase.

Richards, C. D., 2011. Plesiosaur Body Shape and its Impact on Hydrodynamic Properties: Master's thesis, Marshall University, 68 pp.

O'Keefe, F. R., H. Street, B. Wilhelm, C. Richards, and H. Zhu, 2011. A new skeleton of the cryptoclidid plesiosaur Tatenectes laramiensis reveals a novel body shape among plesiosaurs. Journal of Vertebrate Paleontology 31(2):330-339.

PROFILE

Ms. Richards is a qualified Principal Paleontologist with extensive research, field, and laboratory experience across the western United States. She has extensive experience with supervision of field crews; paleontological surveys; construction monitoring; geologic mapping; fossil salvage; and fossil preparation for transportation, water, energy, and land development projects. Ms. Richards maintains a comprehensive understanding of CEQA and NEPA regulations as they relate to paleontology, including Caltrans Standard Environmental Reference - Chapter 8, FHWA, FTA, BLM, and other various laws and regulations governing paleontological resources. Her master's thesis research focused on plesiosaur body shape and its influence on hydrodynamic properties. She has conducted paleontological field work in Mesozoic, Eocene, and Oligocene rock units in Montana, Utah, and Wyoming and Pliocene and Pleistocene surficial deposits throughout California. Her previous professional experiences includes appointments as the vertebrate paleontology collection assistant at the Burke Museum of Natural History and Culture and field director at a cultural resources firm in southern California.

PROJECT EXPERIENCE

Elvira to Morena Double Track
San Diego Association of Governments SANDAG (San Diego, CA)

Paleontologist. Ms. Richards was crucial in completing a paleontological resources sensitivity assessment and completed chapters of the final Paleontological Resources Report addressing potential impacts and mitigation measures as required by SANDAG and North County Transit District to meet their responsibilities as lead agencies under CEQA and NEPA. The project study areas covers 3.1 linear miles along the LOSSAN corridor adjacent to Interstate 5 and an additional 0.3-miles along the LOSSAN corridor to Rose Creek near Universal City.

San Diego River Bridge Double Track
San Diego Association of Governments SANDAG (San Diego, CA)

Paleontologist. Ms. Richards conducted a pedestrian survey of project alignment along a 1.1-mile long segment of the LOSSAN corridor and authored sections of the subsequent Paleontological Identification Report in accordance with CEQA and NEPA.

California High Speed Rail Project: Palmdale to Burbank Segment EIR/EIS
California High Speed Rail Authority (Los Angeles County, CA)

Principal Investigator. Ms. Richards is overseeing all paleontological resources related services in conjunction with the Palmdale to Burbank Section. As the Paleontology Lead, she is managing the completion of a CEQA/NEPA level paleontology study to support development of the EIR/EIS. To date, she has co-authored a Paleontological Memo Report which assessed the current work and recommendations for additional paleontological tasks.

Crenshaw/LAX Mass-Transit Light Rail Line
Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA)

Principal Investigator. Ms. Richards coordinates with field technicians while overseeing paleontological monitoring and laboratory preparation, completing weekly and monthly reports, and corresponds with agencies regarding fossil discoveries for Metro's 8.5-mile light rail line through southwest Los Angeles. The line will run generally north-south and will connect the Crenshaw District and Leimert Park to Inglewood and Los Angeles International Airport (LAX). The line will be a part of the Los Angeles County Metro Rail System. She is also overseeing laboratory preparation of matrix samples for collection and screening to test for the presence of microvertebrate fossils.

University Drive Widening
City of Irvine (Orange County, CA)

Paleontologist. Ms. Richards prepared geology and paleontology sections of a Technical Report to support a restraints analysis within the 26-acre project Area of Potential Effect for the University Drive Widening project, which aimed to add a third travel lane and sidewalk in both directions on University Drive between State Route 73, MacArthur Boulevard, and Campus Drive, adjacent to the University of California, Irvine campus and the San Diego Creek.

Woods Valley Ranch Reclamation Facility Phase 2 Expansion Project
Valley Municipal Water District (San Diego County, CA)

Principal Paleontologist. Ms. Richards is overseeing paleontological monitoring associated with the implementation of the environmental compliance measures specified by the Mitigation Monitoring and Reporting Program (MMRP) Mitigation Measures No. 4.4-3 through 4.4-8 for this 200,000 gpd expansion from the existing 70,000 gpd facility.

Vue on 5th: Banker's Hill Residential Development
ColRich Communities (San Diego, CA)

Principal Paleontologist. Ms. Richards co-authored the Final Paleontological Monitoring Compliance Report in accordance with the City of San Diego regulations for ColRich Communities seven-story, luxury residence building on .46-acres one block from Balboa Park.

Grid Communication System - Basilone, Las Pulgas, and Stuart Substations, Camp Pendleton
San Diego Gas & Electric (unincorporated San Diego County, CA)

Principal Paleontologist. Ms. Richards oversaw paleontological monitoring and co-authored the final monitoring compliance report for this project that consisted of the installation of new structures, foundations, microwave electronics equipment, and under cable and conduit routes to support substation communications. The paleontological mitigation program was completed in compliance with NEPA, CEQA, and County of San Diego guidelines.

San Luis Rey Substation Modification Synchronous Condenser Project
San Diego Gas & Electric (Oceanside, CA)

Principal Paleontologist. Ms. Richards attended the pre-construction meeting and is overseeing paleontological monitoring during grading activity for construction of a new wall that will support the weight of a synchronous condenser for SDG&E's construction of a new synchronous condenser facility along with 230 kV Gas Insulated Switchgear that will be used to connect the condensers to SDG&E's 230 kV transmission system.

San Mateo Substation Landslide Evaluation Project
San Diego Gas & Electric (San Clemente, CA)

Principal Paleontologist. Ms. Richards provided quality control for paleontological monitoring and performed a technical review of the final paleontological monitoring report for SDG&E's geotechnical study of past landslide debris and slope stability of soils at the San Mateo Substation, Calle Bahia, San Clemente, CA. Paleontological monitoring was performed during drilling at three bore holes, which an initial geological review indicated that boring would impact paleontologically sensitive sediments of the Pliocene to Miocene aged San Mateo Formation.

Transmission Line 13831 Pole Replacement
San Diego Gas & Electric (San Clemente, CA)

Principal Paleontologist. Ms. Richards oversaw a paleontological records search, paleontological monitoring, and co-authored the final memo report for SDG&E's improvement project to replace pole Z101553 with a steel weatherized pole and install new distribution pole P23423.

Universal City Station Pedestrian Bridge
Los Angeles Metropolitan Transportation Authority (Hollywood, CA)

Paleontologist. Ms. Richards performed quality control and quality assurance on the final monitoring compliance report for Metro's project to develop a pedestrian bridge connecting the Universal City Metro Rail Station to the Universal City Tower Plaza over the intersection of Lankershim Boulevard and Universal Hollywood Drive. The elevated pedestrian bridge will allow Metro passengers exiting the Red Line Universal City Station to cross above vehicle traffic to access an entrance to the Universal Studios entertainment complex, located diagonally across the intersection, thereby reducing congestion and increasing safety.

Exposition Light Rail Transit Phase II
Exposition Rail Construction Authority (Los Angeles County, CA)

Paleontologist. Ms. Richards prepared fossil shell material that was collected during paleontological and archaeological monitoring during construction for an 8-mile extension of the Expo Light Rail System from Culver City to Santa Monica.

California High Speed Rail Project: Bakersfield to Palmdale Segment EIR/EIS
California High Speed Rail Authority (Los Angeles County and Kern County, CA)

Paleontologist. Ms. Richards conducted a five-day paleontological survey of the project study area that was determined to be sensitive for fossils. The survey aided the preparation of the paleontology section of the Bakersfield to Palmdale Segment EIR/EIS. This assessed the potential environmental effects associated with the construction, operation, and maintenance of the High Speed Track system, including track and ancillary facilities along the State Route 58/14 corridor from Bakersfield to Palmdale.

Caltrans FOSIL Sensitivity Mapping for Central California
Caltrans Districts 6, 9, & 10 (Central California, CA)

Paleontologist. Ms. Richards evaluated geological rock units for paleontological resources with a 0.5-mile buffer on either side of the major highways and conducted comprehensive research on geological maps available, fossil localities and types of fossils known for over 3,000 miles of proposed construction activities. A comprehensive GIS based paleontology database application using ESRI's ArcGIS software was created. A sensitivity ranking, using a federally defined system, for each rock unit was then linked to the GIS map layer for the buffer.

Gene Autry Way/Interstate 5 Interchange Improvement
City of Anaheim (Orange County, CA)

Paleontologist. Ms. Richards monitored excavations at depths exceeding 8 feet and processed soil samples recovered during monitoring for this improvement project to create an important east-west link within the City of Anaheim's Resort Area and provided direct access to the I-5 freeway for motorists entering and leaving the area during special events.

Gilman Road Curve Realignment
Riverside County Transportation Commission (Riverside County, CA)

Paleontologist. Ms. Richards contributed to a combined Paleontological Identification Report (PIR) and Paleontological Evaluation Report (PER) to assess the potential for impacting significant paleontological resources within the proposed alignment that included flattening the curvature and relocating utilities on Gilman Springs Road in the Moreno Valley.

Interstate 205 & Chrisman New Interchange
City of Tracy (San Joaquin County, CA)

Paleontologist. Ms. Richards conducted a record search, background search, and prepared a Paleontological Identification Report (PIR) to identify any sensitive resources that may be impacted by construction activities in support of the project-related Project Approval-Environmental Document (PA-ED) for the I-205/Chrisman Road New Interchange Project between MacArthur Drive and I-5 based on the direction of an approved Project Study Report/Project Development Support document. The PA&ED required close consultation with the City, as well as the City's engineering department, Caltrans District 10, FHWA, City of Lathrop, and the San Joaquin Council of Governments.

Interstate 605 & Katella Avenue Interchange Constraints Analysis
Orange County Transportation Authority/Caltrans D12 (Los Angeles County, CA)

Paleontologist. Ms. Richards conducted an initial assessment of paleontological resources constraints for the proposed project in support of the Preliminary Environmental Analysis Report (PEAR) that included recommendations for the Standard Environmental Reference-compliant document. The project area consists of the PEAR project area and the Future City project area.

Kettleman City Rehabilitation Improvement Project
Caltrans District 6 (Kings County, CA)

Paleontologist. Ms. Richards prepared and identified fossils recovered from construction monitoring of this project funded by the State Highway Operation and Protection Program, including grinding, cold planning, and shoulder widening of the existing asphalt concrete of approximately nine miles of existing roadway from Kettleman City at Quail Avenue to south of Interstate 5 at Utica Avenue.

Kings River Overflow Bridge Replacement
Caltrans District 6 (Tulare County, CA)

Paleontologist. Ms. Richards prepared sections of the Paleontological Mitigation Plan to Caltrans District 6 requirements and conducted paleontological resources sensitivity training for construction personnel.

McCall Boulevard Interstate 215 Interchange Improvement
Caltrans District 8 (Menifee, CA)

Paleontologist. Ms. Richards prepared the geology and paleontology sections of a Preliminary Environmental Analysis Report (PEAR) to support development of the Project Study Report-Project Development Study for Caltrans clearance on behalf of the City of Menifee.

Purple Line Extension (Westside Subway Exploratory Shaft)
Los Angeles Metropolitan Transportation Authority (Los Angeles County, CA)

Paleontologist. Ms. Richards provided field supervision, conducted paleontological monitoring, and recorded stratigraphy during pre-construction drilling and excavation to a depth of 75' for a 36' by 18' for an exploratory test shaft located at the Fairfax Station in the La Brea Zone. During construction, she supervised and conducted paleontological monitoring, fossil and data recovery, and stratigraphic column recordation. She co-authored the monitoring compliance report for the exploratory shaft phase of the project.

Purple Line Extension Third-Party PRMMP Review
Los Angeles Metropolitan Transportation Authority (Los Angeles County, CA)
Paleontologist. Ms. Richards conducted a third-party review of the Paleontological Resources Monitoring and Mitigation Plan for the Purple Line Extension Project.

Ranchero Road and BNSF Grade Separation
City of Hesperia (San Bernardino County, CA)

Paleontologist. Ms. Richards processed paleontological samples recovered from mitigation monitoring for the Ranchero Road Grade Separation involving the installation of a new crossing under the Burlington North Santa Fe (BNSF) Railroad at the extension of Ranchero Road. This project will directly benefit the entire High Desert area of San Bernardino County by providing a new east-west corridor that will insure a second access for emergency personnel from one half of town to the other, as well as alleviate traffic congestion along Bear Valley Road and Main Street.

Regional Express Lanes Network Phase I Project Approval/Environmental Document
Metropolitan Transportation Commission (Alameda, Contra Costa, and Santa Clara Counties, CA)

Paleontologist. Ms. Richards prepared portions of a Paleontological Identification Report (PIR) for a 2,472-acre HOV lane to toll lane conversion project along portions of Interstates 580, 680, and 880 that aims to close gaps within the existing HOV lane system to increase travel time savings and reliability for carpools and buses in those corridors. The Express Lanes Network converts existing carpool lanes to express lanes and uses the revenue generated to finance completion of the carpool/express lane system.

Regional Connector Transit Corridor
Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA)

Principal Investigator. Ms. Richards is overseeing paleontological monitoring of preconstruction and construction ground-disturbing work that could potentially affect the Puente Formation, Fernando Formation, and Quaternary older alluvium conducted by Metro's contractors in association with the Regional Connector Transit Corridor – a light rail subway corridor through Downtown Los Angeles to connect the Blue and Expo lines to the current Gold Line and Union Station.

Road 80 Widening, Construction Phase I
Tulare County Resource Management Agency (Tulare County, CA)

Paleontologist. Ms. Richards conducted paleontological resources monitoring and prepared portions of the subsequent Paleontology Mitigation Report to Caltrans 6 requirements for the 16-mile segment of Road 80 from Avenue 416 in the City of Dinuba to Airport Drive in the City of Visalia, in cooperation with the County of Tulare, Caltrans District 6, and the Federal Highway Administration, improving an interchange, widening an overcrossing, and upgrading drainage.

State Route 12 & State Route 88 Improvements near Jackson Creek
Caltrans District 10 (Amador County, CA)

Paleontologist. The California Department of Transportation, in cooperation with the San Joaquin Council of Governments and San Joaquin County, proposed a major improvement project in the Lockeford and Clements areas. The project was proposed to relieve existing and projected traffic congestion on State Route 12/88 Ms. Richards attended a pre-construction field meeting and prepared portions of a revised Paleontological Mitigation Plan.

State Route 57 Northbound Widening
Orange County Transportation Authority (Orange County, CA)

Paleontologist. Ms. Richards performed paleontological monitoring, sample processing, sorting and identifying of microfossils recovered from the State Route 57 Northbound Widening Project sponsored by the Orange County Transportation Authority, in partnership with Caltrans, to add a northbound lane from north of State Route 91 near Orangethorpe Avenue in Placentia to Lambert Road in Brea.

State Route 91 HOV Lane Addition
Caltrans District 8 (Riverside, CA)

Paleontologist. Ms. Richards performed paleontological monitoring of sensitive sediments during HOV lane construction along a 6-mile segment

between the I-60/SR 91/SR 215 interchange to the Adams Street Bridge in the city of Riverside.

State Route 99 & Arboleda Drive Freeway Project
Caltrans District 10 (Merced, CA)

Paleontologist. The California Department of Transportation constructed a new interchange on State Route 99 at Arboleda Drive and converted a four-land expressway to a six-lane freeway from Buchanan Hollow Road to the Miles Creek Overflow. This project supported Caltrans State Route 99 Corridor Enhancement Master Plan. Upon project construction in 2012, Ms. Richards supervised up to six on-site cross-trained paleontological monitors at a time. During paleontological monitoring, fossils were discovered at 128 locations. Per the PMP, fossils were recovered and documented. Ms. Richards assisted in leading the fossil recovery of 1,667 fossils and the subsequent laboratory work until the fossils were sent for permanent curation at the University of California, Merced. Finally, she prepared stratigraphy portions of the Paleontological Monitoring Report (PMR).

State Route 99 San Joaquin Freeway/Bridge Widening
Caltrans District 6 (San Joaquin County, CA)

Paleontologist. Ms. Richards assisted in preparing a Paleontological Mitigation Plan (PMP), conducted paleontological resources awareness training for construction personnel, paleontological monitoring, and assisted in authoring a Paleontological Mitigation Report (PMR) for a 2.9-mile long freeway expansion project along SR 99.

State Route 178 Morning Drive Interchange Improvement
Thomas Road Improvements Program (Bakersfield, CA)

Paleontologist. Ms. Richards contributed to a combined Paleontological Identification and Evaluation Report (PIR/PER), a Preliminary Paleontological Mitigation Plan (PMP), and a safety plan for a six-mile road widening and interchange development project east of Bakersfield. She developed a paleontological resources awareness training and conducted mitigation monitoring during ground-disturbing activities.

Universal City Station Pedestrian Bridge
Los Angeles Metropolitan Transportation Authority (Hollywood, CA)

Paleontologist. Ms. Richards performed quality control and quality assurance on the final monitoring compliance report for Metro's project to develop a pedestrian bridge connecting the Universal City Metro Rail Station to the Universal City Tower Plaza over the intersection of Lankershim Boulevard and Universal Hollywood Drive. The elevated pedestrian bridge will allow Metro passengers exiting the Red Line Universal City Station to cross above vehicle traffic to access an entrance to the Universal Studios entertainment complex, located diagonally across the intersection, thereby reducing congestion and increasing safety.

RESUME

Barbara Webster, MS
GIS Specialist & Archaeologist

SUMMARY

YEARS OF EXPERIENCE
7 Total Years

EDUCATION
MS Geographic Information Systems
University of Redlands, 2014

BA History and Spanish
Gonzaga University, 2009

Graduate Level Archaeology Field School
Utah State University, 2009

CERTIFICATIONS

ORANGE COUNTY CERTIFIED ARCHAEOLOGIST

FIRST AID/CPR CERTIFIED

AFFILIATIONS

Society for American Archaeology
Society for California Archaeology

SELECT PUBLICATIONS

Webster, B. 2014. Emergency Siren Sound Propagation and Coverage Optimization Analysis. Master's Thesis, University of Redlands. Retrieve from http://inspire.redlands.edu/gis_gradproj/223.

PROFILE

Ms. Webster earned her MS in Geographic Information Systems (2014) from the University of Redlands and a BA in History and Spanish (2009) from Gonzaga University. As Paleo Solutions GIS Specialist, she specializes in GIS applications, spatial density analysis, database creation and management, spatial modeling, and geospatial project management. She creates innovative map products that synthesize and communicate complex information with clarity and elegance. In addition, she implements and regulates field data collection solutions and provides staff personnel with GIS/GPS technologies support, including Trimble and iPad management. Furthermore, Ms. Webster has monitoring experience on archaeological and paleontological projects, including historical and prehistoric archaeology. Finally, she gained paleontological excavation and lab experience as a volunteer at the Page Museum (La Brea Tar Pits). Other work experience includes work at the Smithsonian and with the US National Park Service.

PROJECT EXPERIENCE

TLRR Licensing Projects: Pre-Planning Phase (Archaeological Resources)
Southern California Edison | San Bernardino, Kern, Los Angeles, Inyo & Mono Counties, CA

Archaeologist III. Ms. Webster assisted in performing a large-scale record search at multiple CHRIS information centers. The record search was for over 400 linear miles of transmission lines, and Ms. Webster collected data at the information center, coordinated with the project investigator about project needs, and organized and processed the data that was collected.

Coolwater-Lugo Transmission Line and Supplemental Surveys
Southern California Edison | San Bernardino County, CA

Archaeological Survey Crew. Ms. Webster performed archaeological survey for more than two months in the Mojave Desert. She performed intensive pedestrian survey, recorded historic and prehistoric archaeological resources on DPR forms, and used a Trimble XT unit to navigate and to record sites.

On Call Deteriorated Pole Replacement
Southern California Edison | Southern California Territory, CA

GIS Specialist and Archaeologist III. Ms. Webster assisted with creating budgets, obtained permits, performed the archaeological records searches at the California Historical Resources Information System (CHRIS) information centers, performed the archaeological surveys, wrote the archaeological survey reports, completed DPR forms, produced the field maps, report maps, and DPR form maps, and was responsible for sending the completed reports and GIS to the client, info centers, and appropriate parks.

Vedder Pipeline Project
Bureau of Land Management | Kern County, CA

GIS Specialist. Ms. Webster produced the paleontological records search map and requested the records search. She also produced field maps and report maps that depict the project area, land ownership information, Public Land Survey System data, geologic formations, and paleontological sensitivity.

Royal Gorge Field Office Paleo Class I Report
Bureau of Land Management | Central and Eastern Colorado

GIS Specialist. Ms. Webster provided GIS support for a paleontological resource overview for a 35 million acre area of central and eastern Colorado. The project included the synthesis of previously recorded fossil locality GIS data from multiple data sources.

Tehachapi Renewable Transmission Project: 500kV Underground
Southern California Edison | Los Angeles County, CA

Paleontological Field Monitor. Ms. Webster performs paleontological monitoring on this project, including working in areas of high activity where multiple monitors are required, as well as monitoring ESA's.

Tehachapi Renewable Transmission Project: Segment 8
Southern California Edison | Los Angeles County, CA

Paleontological Field Monitor. Ms. Webster performs paleontological monitoring on this project, including working in areas of high activity where multiple monitors are required, as well as monitoring ESA's and working with helicopter-based construction crews.

Tehachapi Renewable Transmission Project: Segment 6
Southern California Edison | Los Angeles County, CA

Archaeological Field Monitor. Ms. Webster performed archaeological monitoring on this project in very archaeologically sensitive areas. Her responsibilities included monitoring ESAs and communicating with construction crews and Native American monitors. She completed Worker Environmental Awareness Program (WEAP) training and OneTouch PM training.

Tehachapi Renewable Transmission Project: Segment 11
Southern California Edison | Los Angeles County, CA

Archaeological Field Technician. Ms. Webster performed archaeological excavation of thermal features on the Angeles National Forest. This work included laying out, excavating, and documenting shovel test pits and 1m x 1m units.

West of Devers Transmission Line
Southern California Edison | Riverside County

Paleontological Field Surveyor. Ms. Webster performed paleontological surveys and provided GIS support for a proposed transmission line that is located in a mostly-developed area.

Valley South Subtransmission Line
Southern California Edison | Riverside County

Assistant Geospatial Analyst. Ms. Webster produced maps to facilitate the record search for this project.

Line 107/131 Projects
Pacific Gas & Electric | Alameda County, CA

Assistant GIS Specialist/Paleontological Survey Crew. Ms. Webster performed paleontological survey for a proposed pipeline. She also provided project maps and GIS support for this project.

Line 131 Direct Examination
Pacific Gas & Electric | Alameda & Contra Costa Counties, CA

Assistant GIS Specialist/Paleontological Survey Crew Ms. Webster managed and processed the GIS data both from the client and from field collection. She produced field and report maps and assisted with paleontological survey.

Plant Betterment & 2013 Deteriorated Pole Replacement Project
Southern California Edison | Riverside County, CA

Archaeological Technician and Assistant GIS Specialist. Ms. Webster performed archaeological monitoring for the replacement of deteriorated poles. She also produced report maps depicting the project area and the pole locations.

Replacement of One Deteriorated H-Frame Structure
Southern California Edison | Inyo County, CA

GIS Specialist. Ms. Webster post processed geospatial data collected in the field. She also produced report maps and DPR form maps depicting the project area and resources discovered during monitoring.

Aliso Canyon Turbine Replacement Natural Substation
Southern California Edison | Los Angeles County, CA

GIS Specialist, Archaeological and Paleontological Field Technician: Ms. Webster produced field maps and reports maps that depict the project area, geologic formations, and paleontological sensitivity. She also conducted the archaeological and paleontological survey and wrote the paleontological and archaeological survey reports.