APPENDIX F
BIOLOGICAL TECHNICAL REPORT

BIOLOGICAL TECHNICAL REPORT

BREA BOULEVARD CORRIDOR IMPROVEMENT PROJECT

Prepared for:

Orange County Public Works
601 N. Ross Street
Santa Ana, CA 92701

Contact:

Austin Morgan, P.E.

Prepared by:

AECOM
999 Town and Country Road
Orange, CA 92868

September 2022

TABLE OF CONTENTS

Chapter **Page**

LIST OF FIGURES

LIST OF TABLES

This page intentionally left blank.

CHAPTER 1.0
INTRODUCTION

Orange County Public Works (OC Public Works) has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). AECOM was retained by OC Public Works to prepare a biological resource assessment of the Project in accordance with the California Environmental Quality Act (CEQA). The following report has been completed in compliance with CEQA requirements.

1.1 PROJECT LOCATION

The Brea Boulevard Corridor Improvement Project (Project) is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route (SR) 57 southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road (Figures 1 and 2), a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor, or "corridor").

The corridor lies within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda (1981) 7.5-minute quadrangle map.

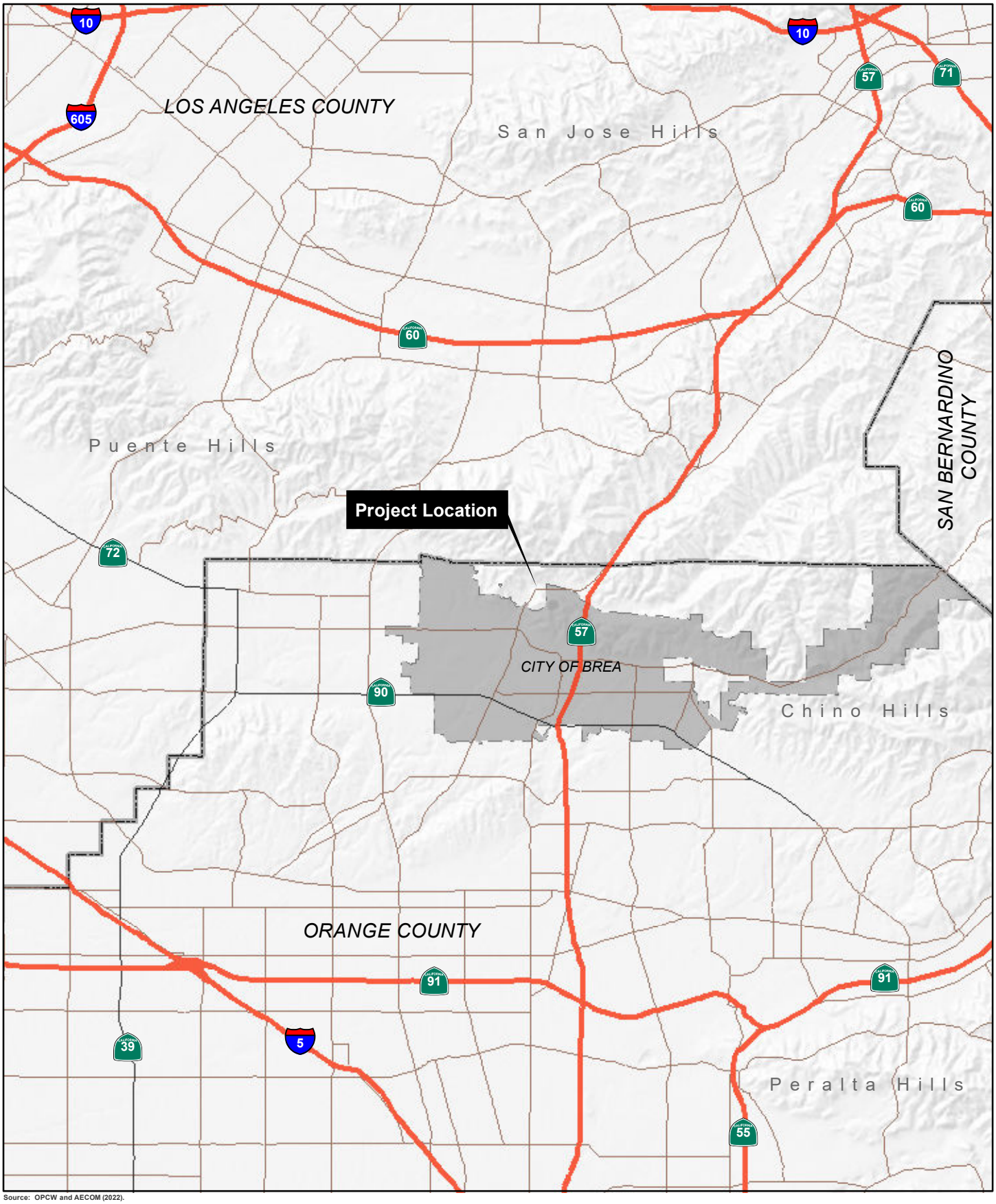
1.2 PROJECT PURPOSE, NEED, AND OBJECTIVES

Brea Boulevard presently meets the classification for a Collector Arterial Highway in the Orange County General Plan Transportation Element (2020), which should accommodate between 7,500 to 10,000 Average Daily Traffic (ADT, is the number of vehicles two-way passing a specific point in a 24-hour period). With traffic volumes for Brea Boulevard between 17,000 to 22,000 ADT as of November 4, 2019, the roadway should match the OCTA MPAH designation for a Primary Arterial Highway which can accommodate 20,000 to 30,000 ADT.

The three bridges within the corridor are functionally obsolete, meaning they have exceeded their design lives, do not have the adequate geometry to accommodate the proposed corridor improvements, and should be replaced. Replacing the bridges will present an opportunity to increase the flood conveyance under the bridges to current design standards and avoid emergency response delays during larger storm events.

The Project is located along the southern perimeter of a regional wildlife corridor, Puente Hills-Chino Hills Wildlife Corridor, that connects the Santa Ana Mountains in the southeast to the Whittier Hills area to the northwest. Enhancing wildlife movement will conserve and provide greater connectivity for wildlife while potentially reducing the risk for wildlife collisions with traffic.

Throughout the corridor, sight distance (the distance a driver can see unobstructed) does not meet current design standards and the Project provides an opportunity to enhance driver sight distance.

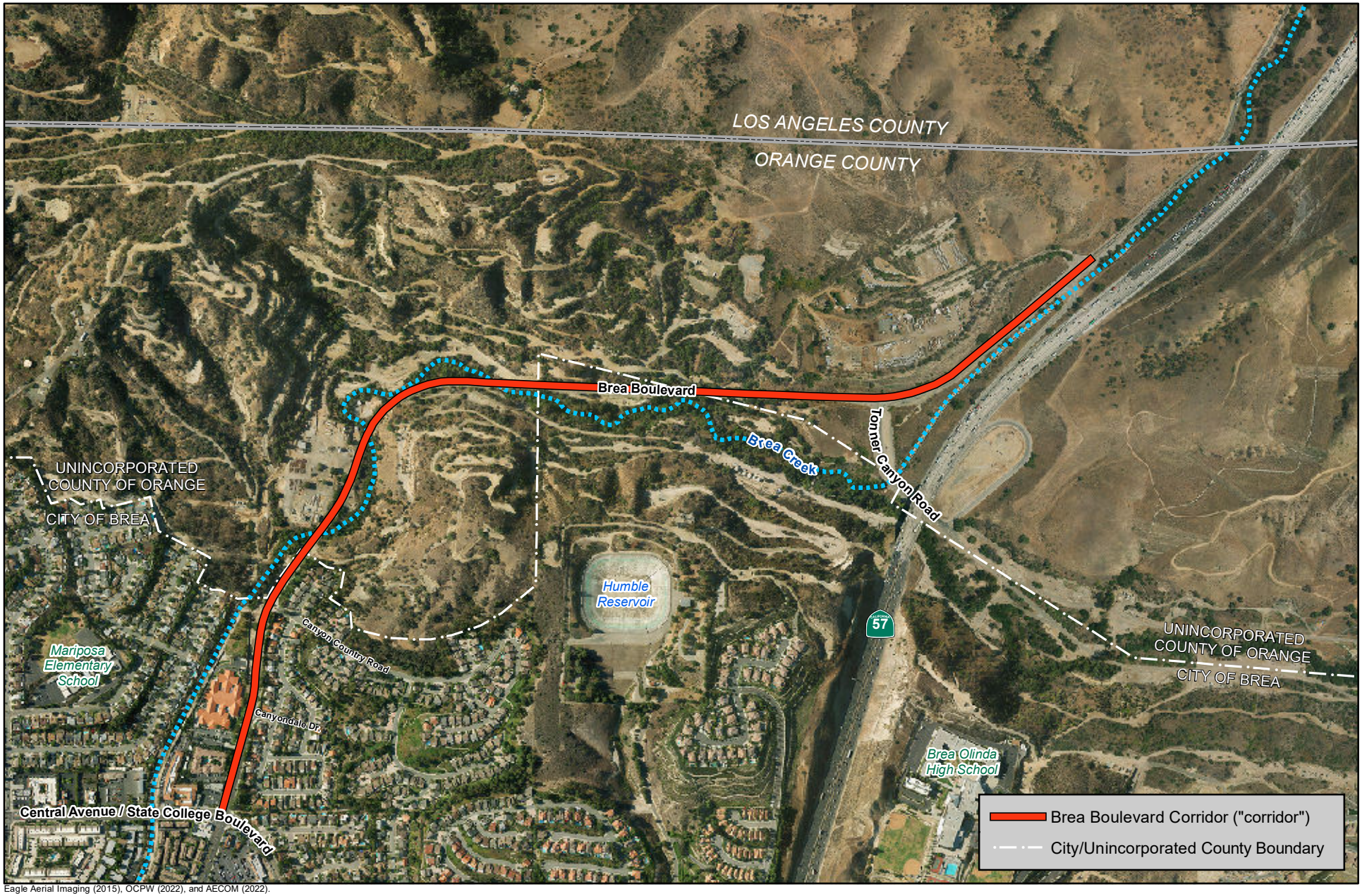


Source: OPCW and AECOM (2022).

Scale 1 : 126720
1" = 2 miles

0 1 2 4 Miles

Figure 1
Regional Map



Eagle Aerial Imaging (2015), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 2
Vicinity Map

Currently, there are multiple driveways throughout the corridor that serve as access for the adjacent active oil field. There is an opportunity with the Project to improve and enhance the ingress and egress to limit potential traffic delays from large, specialized equipment accessing the field.

The intersection of Brea Boulevard and Tonner Canyon Road is an unsignalized, three-way t-intersection with stop control on Tonner Canyon Road. Motorists on Tonner Canyon Road suffer undue delay at Brea Boulevard, and traffic control features will be added to improve traffic flow at this intersection as part of the Project.

Project objectives include the following:

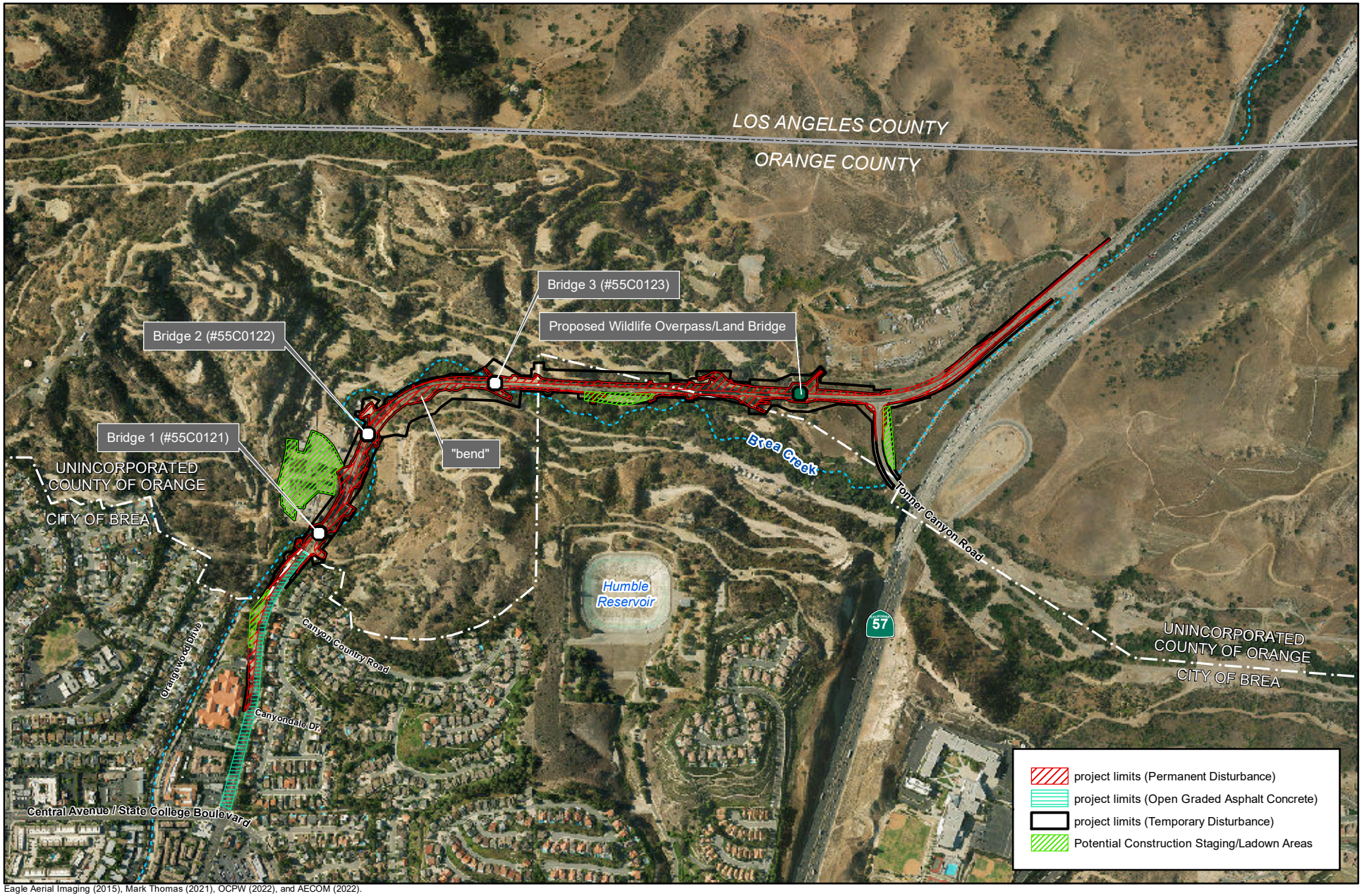
- Improve Brea Boulevard to be consistent with the designated Primary Arterial Highway classification per the MPAH;
- Replace three functionally obsolete bridges over Brea Creek with bridges that meet current design standards;
- Increase flood conveyance of Brea Creek under the three bridges;
- Enhance safe wildlife movement across the roadway within the corridor;
- Improve roadway to meet current design standards;
- Redesign the Brea Boulevard/Tonner Canyon Road intersection;
- Minimize impacts to the surrounding habitat and wildlife; and
- Minimize impacts to above/underground utilities.

1.3 PROJECT DESCRIPTION

The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the corridor (approximately 1.5 miles), replacing and widening three functionally obsolete bridges, installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge, adding open graded asphalt concrete (OGAC) paving at the southern end of the corridor, and providing striping and installing new signage. Construction of these improvements would be conducted within permanent and temporary limits of disturbance (project limits). The Project's main elements that would affect biological resources are described below and depicted in Figure 3.

Roadway Widening

Brea Boulevard will be widened from two to four lanes (two lanes each direction) with 12-foot width lanes, shoulders that will vary from 6-feet to 10-feet wide, and a median that is either 12-foot wide raised with limited landscaping, 6-foot wide with a concrete barrier, or striped of varying widths. Widening would occur between Canyondale Drive and the SR-57 southbound on-ramp, a total length of approximately 8,100 linear feet or 1.5 miles. In an effort to limit the footprint of the Project the design will utilize a modified



Eagle Aerial Imaging (2015), Mark Thomas (2021), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 3
Proposed Project

Primary Arterial Highway per OC Public Works' Standard Plan 1103 for Standard Street Sections which includes: right-of-way (R/W) width less than 100 feet; reducing the median width to less than 14-foot; and no sidewalk throughout the limits within unincorporated County. Within the City of Brea, the roadway section will be a modified Primary Arterial Highway Section per City of Brea's Standard Plan 109-0 to match the existing roadway configuration south of the corridor by reducing the shoulder width.

Bridge Replacement and Culvert Crossing Modifications

Road widening will require replacement of the three bridges within the corridor, all of which are over 80 years old and functionally obsolete. The creek underneath Bridge 2 and Bridge 3 will be converted from concrete to a natural soft bottom and Bridge 1 will remain a natural soft bottom. To increase the hydraulic capacity underneath the three bridges, the height and span of each bridge will increase. The new bridge sections are considered a modified Primary Arterial Highway Bridge Sections per OC Public Works' Standard Plan 1104 for Standard Street Sections because the median width is increased but it will not include sidewalk.

The vertical alignment (road elevation) of the road between Canyon Country Road to after Bridge # 3 will increase by 5 feet or less to increase the elevation of the bridge decks which increases hydraulic capacity while not impacting Brea Creek, reduce the volume of exported material from cut slopes, and reduce the retaining wall height at the curve within the corridor (i.e., the "bend" as seen in Figure 2). There are approximately 13 culvert crossings (for drainage or utilities or both) that will need to be extended or reconfigured as part of the widening.

Bridge replacement and culvert work will require dewatering[1]. Dewatering will consist of sand bag cofferdams to divert the water around the piers and abutments depending on phasing of the Project. Additionally, Bridges 1, 2, and 3 will each require abutment facing walls that will extend to 10 feet below the creek surface, which may result in the need to temporarily pump groundwater from the vicinity of the proposed walls during installation. Also, if a bridge requires full closure for construction, surface dewatering may consist of temporary pumping from upstream of bridge to downstream.

Wildlife Movement Enhancements

To enhance wildlife movement across Brea Boulevard between Bridge # 1 and Tonner Canyon Road, the three existing bridges (and their undercrossings) will be widened and a new wildlife overpass/land bridge would be constructed.

All three existing bridges will be enlarged/expanded, resulting in their openness ratios[2] being increased. The existing bridge designs have two to three internal support walls that will be eliminated with the new

[1] For construction work within wet conditions (such as for culverts and bridges) water needs to be removed from the work area to avoid soil erosion and provide a safe workspace.
[2] Openness ratio is defined as the width of an undercrossing (horizontal distance between each wall) multiplied by the height and divided by the length (the distance an animal has to travel to pass through the undercrossing). In general, the greater the openness ratio of an undercrossing, the more likely it is to be used by a variety of species, especially large herbivores.

bridge designs. Hence the openness ratio post-construction will be greatly improved for Bridges 1, 2, and 3. Because existing culverts will need to be lengthened commensurate with the wider roadway, their openness ratios will decrease if their cross sections are not also expanded. Widening of some culverts would occur where culverts have the potential to function for small animal passage, along with improvements such as using alternative erosion treatments (e.g., articulated hydraulic block) at culvert outlets in lieu of other more common treatments that limit wildlife passage such as rock rip-rap.

A new wildlife overpass/land bridge would be installed approximately 550 feet west of the Brea Boulevard/Tonner Canyon Road intersection, where the roadway is presently situated approximately 25 feet lower than the adjacent ridges on both sides. The wildlife overpass/land bridge structure will be a single-span cast-in-place (CIP) prestressed concrete box girder that is 85-feet-long by 75-feet-wide, spanning the full width of the widened roadway and matching the existing top of ridge on either side (with minimum vertical clearance of over 19 feet above the widened roadway). Three feet of earthen fill will be placed on top of the structure to preserve a natural appearance for wildlife and allow for growth of shallow-rooted vegetation. Cast-in-place parapet walls will be used to retain the fill and to provide a visual barrier for wildlife. Parapet mounted fencing is required to provide continuity with fences at the approaches to the bridge to guide animals to the crossing location. The structure will be supported by seat type abutments on cast-in-drilled-hole (CIDH) concrete piles with CIP fascia walls.

To ensure effective use of existing bridge undercrossings, culverts, and the overpass/land bridge and to promote motorist safety by preventing wildlife vehicle collisions, wildlife fencing (6.5 to 8 feet in height) will be constructed on both sides of the widened roadway throughout the corridor where concrete retaining walls (>8 feet in height) that supersede the need for fencing are not present. Wildlife fencing is a critical element that funnels animals to the overpass/land bridge and/or through underpasses (bridge and culverts) where below-grade crossings are unaffected by vehicular traffic that otherwise presents a barrier to at-grade crossings.

While an essential element, there are several considerations for erecting fence along the roadway. There are multiple driveway access roads along the corridor requiring control measures to prevent animal breaches of wildlife fencing. Control measures at these locations may include cattle guards/grates, swinging metal gates, or electrified mats imbedded into the pavement which safely deter wildlife entry. To address breaches of wildlife fencing, wildlife “jump-outs”/escape ramps will be provided to facilitate escape. Cost-effective and maintenance-free jump-outs (5.5−6 feet above the outside terrain) will be integrated at suitable retaining walls and bridge abutments. In order to provide at least two escape points (one on each side of the road) spaced along each 0.5 mile of roadway, engineered escape ramps will be integrated with fencing to provide elevated escapes where retaining walls and bridge abutments do not already provide for escape. The beginning and ending of the corridor and at Tonner Canyon Road as it approaches SR-57 will include fence termination designs at structural, topographic, or other barriers to minimize wildlife entry.

Construction Schedule and General Activity

The Project is anticipated to be divided into two phases:

- Phase I will include utility relocations, the infrastructure necessary for utility companies to relocate their utilities, wildlife overpass/land bridge, bridge replacement, retaining walls, associated temporary transition pavement, and associated grading; and
- Phase II will include the widening of the road, OGAC paving, the three intersections at Canyon Country Road, 1,200 feet north of Canyon Country Road, and at Tonner Canyon Road along with other associated roadway features.

Construction is expected to last approximately 5 years and is anticipated to begin in the year 2026.

The normal hours of construction for the Project would be between 7:00 am and 7:00 pm, Monday through Saturday, consistent with the City of Brea Municipal Code, which does not regulate noise from construction activities that are limited to these daytime hours. However, due to bridge replacement-related work construction will require periodic full closure of Brea Boulevard from north of Canyon Country Road to Tonner Canyon Road from Friday at 8:00 pm to Monday at 5:00 am. During these times (up to a maximum 26 weekends with the full roadway closure), construction activities would occur outside the normal hours of construction, as crews will work extended hours, night shifts, and weekends. During night shifts and extended hours, construction lighting will be required. Access will remain for emergency responders and oil field operators.

A construction crew of approximately 40 construction workers (daily) will be in the project area during construction. For safety purposes, a temporary fence will be installed to secure the construction site and restrict public access while maintaining vehicular access to Brea Boulevard.

CHAPTER 2.0
EXISTING BIOLOGICAL CONDITIONS

2.1 PROJECT SETTING

The corridor is situated along the southern edge of the Puente-Chino Hills in northern Orange County and is located along the east-central edge of the La Habra, California U.S. Geological Survey (USGS) 7.5-minute quadrangle map, with the far eastern portion of the corridor, from Tonner Canyon Road east and north to the Orange/Los Angeles County line, occurring at the west-central edge of the Yorba Linda, CA quadrangle map. Elevations in the BSA generally range from 370 feet above mean sea level (amsl) in the far southwestern portion of the BSA, to 750 feet amsl in the far northeastern portion of the BSA. The elevation of Brea Boulevard itself ranges from approximately 380 feet amsl at the southeastern end of the roadway, to 500 feet amsl at the northeastern end of the corridor.

Areas surrounding the corridor consist primarily of residential development at the southwestern end of the corridor, oil field development associated with the Brea-Olinda Oil Field at the middle portion of the corridor, and primarily undeveloped land from Tonner Canyon Road east and north to the county line.

2.2 FIELD SURVEYS AND DATABASE REVIEW

Prior to conducting field surveys, California Department of Fish and Wildlife (CDFW), California Native Plant Society (CNPS), and U.S. Fish and Wildlife Service (USFWS) special-status species and sensitive community occurrence databases were reviewed for the project vicinity. These sources are cited in relevant sections of the following report.

AECOM biologists initiated field surveys to document existing conditions within the project limits plus a 500-foot survey buffer around the project limits, combined with the Biological Study Area (BSA), in May 2016. Project limits are defined as the limits of Project construction, including the temporary and permanent disturbance areas and staging areas. A 500-foot buffer around the Project limits was included to capture potential indirect effects to biological resources from implementation of the Project. Indirect effects could include elevated noise and dust levels, soil erosion, and increased human activity. A 500-foot survey buffer is standard for capturing potential indirect impacts from a Project on biological resources. It is anticipated that indirect impacts beyond 500 feet would diffuse and would not significantly impact biological resources. The initial survey did not include areas of the survey buffer occurring west of the intersection of Brea Boulevard and Tonner Canyon Road; these areas of the survey buffer were not accessible to biologists at the time. Field surveys of buffer areas north of Brea Boulevard were conducted later in 2016, as access to conduct surveys in these areas was agreed upon with the landowners. Further field surveys were conducted in 2018 to verify and confirm the findings made during 2016 field surveys and a wildlife movement corridor study was initiated in 2019 and completed in 2021.

During general biological surveys conducted in 2016 and subsequent visits to the BSA in 2018, vegetation communities and land cover types, and plant and wildlife species within the BSA were surveyed and noted.

Protocol surveys were conducted in 2016 for coastal California gnatcatcher (*Polioptila californica californica*; federally threatened), least Bell's vireo (*Vireo bellii pusillus*; State and federally endangered), and southwestern willow flycatcher (*Empidonax traillii extimus*; State and federally endangered) to determine presence or absence in the Project area. Surveys focusing for rare plants were conducted in both 2016 and 2018 and followed CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018). Protocol wildlife surveys were performed by biologists permitted by FESA Section 10(a)(1)(A), following *Coastal California Gnatcatcher 1997 Presence/Absence Survey Protocol* (USFWS 1997), *Least Bell's Vireo Survey Guidelines* (USFWS 2001), and *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (Sogge et al. 2010). Coastal California gnatcatcher surveys consisted of six focused surveys spaced at one-week intervals between March 15 and June 30. Least Bell's vireo surveys consisted of 8 surveys spaced at least 10 days apart between April 10 and July 31. Southwestern willow flycatcher surveys consisted of 5 surveys spaced at least 5 days apart between May 15 and July 17. Separate field surveys to delineate jurisdictional wetland and other water resources in the BSA were also conducted. The survey dates, times, weather conditions, personnel, and purpose for all biological and jurisdictional resources are provided in Appendix A.

Additionally, in 2019, OC Public Works determined that a Wildlife Movement Study should be conducted prior to Project construction to determine if potential impacts would occur due to implementation of the Project. The goal of the wildlife movement study was to understand animal movement within the Brea Boulevard Corridor to evaluate potential impacts and identify possible project design features that would maximize the permeability of the road to wildlife while minimizing wildlife-traffic interactions. Wildlife movement and mortality data were collected throughout the Brea Boulevard Corridor utilizing wildlife camera and roadkill surveys. Camera surveys were used to evaluate wildlife activity at potential crossing locations at the road grade or at undercrossings such as the Project bridges and culverts that occur below the road grade. Roadkill surveys were designed to document patterns of roadkill within the Brea Boulevard Corridor and potentially identify areas of high mortality. Additionally, the cross section and length of each bridge and culvert crossing were measured to determine the openness ratio. All field work for the wildlife movement study was conducted between January 2020 and February 2021, beginning with an initial reconnaissance site visit conducted on January 17, 2020. Wildlife camera surveys were performed during the months of March, May, July, September, and November 2020 and January and February 2021. An additional week of wildlife camera surveys was performed from January 28-February 4 due to the loss of data from several cameras during the week of January 2021.

2.3 VEGETATION COMMUNITIES AND LAND COVER TYPES

Vegetation communities and land cover types observed within the BSA during the field surveys have generally been disturbed by past anthropogenic activities associated with roadway and oil field development. The BSA is comprised of varying densities of native and non-native vegetation, and developed areas, such as the oil fields, roadways, and residential development at the southwest end of the Project. The Manual of California Vegetation (MCV), Second Edition (Sawyer et al. 2009) was utilized to classify and describe vegetation communities occurring within the BSA. It should be noted that as a result of the disturbed and developed nature of much of the BSA, the vegetation communities and land cover

types present do not always correspond directly with vegetation classifications typically used to describe vegetation communities.

Native vegetation communities such as California walnut, coast live oak, coastal sage scrub (although disturbed), and willow riparian habitats occurring in the BSA reflect coastal foothill and mountain habitats of southern California such as those in the nearby Puente Hills, Chino Hills, and Santa Ana Mountains. Non-native vegetation in the BSA consists of common ornamental species, primarily eucalyptus and pepper tree, and other non-native trees that were likely planted during development of the oil fields and have over time become naturalized within the BSA. No vegetation communities exist within the BSA that are unique from the surrounding area. The extent of vegetation communities and land cover types within the BSA are depicted in Figures 4a through 4d and acreages of each are provided in Table 1 below. Plant species observed within the BSA during field surveys are provided in Appendix B, Table A. Native, non-native, aquatic and riparian communities, and other land cover types occurring in the BSA are identified within Table 1 and described below.

Table 1 Vegetation Communities and Land Cover Types in the BSA

Vegetation Communities/Land Cover Types	Acres in the BSA
Native Vegetation Communities	
Blue Elderberry Stands	1.27
Blue Elderberry - Toyon	8.34
California Walnut Groves	0.88
California Walnut - Laurel Sumac	6.58
Coast Live Oak Woodland	8.09
Disturbed Coastal Sage Scrub	20.87
Poison Oak Scrub	1.35
Toyon - Laurel Sumac	6.09
Subtotal	*53.46*
Non-Native Vegetation Communities	
Eucalyptus Groves	9.18
Pepper Tree Groves	33.67
Tree of Heaven Groves	0.50
Upland Mustards and Ruderal Forbs	28.56
Ornamental–Landscape Plants	9.68
Ruderal	3.73
Subtotal	*85.32*
Aquatic and Riparian Communities	
Arroyo Willow Thickets	4.84
Black Willow Riparian Forest	8.70
Coast Live Oak Riparian Forest	0.43
Unvegetated Channel	3.74
Subtotal	*17.71*
Land Cover Types	
Developed	95.64
Disturbed	35.61
Subtotal	*131.25*
TOTAL ACREAGE IN BSA	**287.76**

Note: Totals may not add up due to rounding.

Native Vegetation Communities

This category includes vegetation communities dominated by plant species native to California.

Blue Elderberry Stands

Blue elderberry (*Sambucus nigra*) is dominant in the shrub canopy of Blue Elderberry Stand, with a minimum 50 percent in shrub overstory. This community typically occurs along stream terraces and in bottomlands; however, the stands that occur within the BSA are localized and in a more upland setting. Elderberry Stands have a variable canopy that ranges from open to continuous, with a height that does not typically exceed 8 meters (approximately 26 feet). Upland mustards and ruderal forbs, as described below, are present within the understory of this community.

Only two small areas of Blue Elderberry Stand occur in the BSA, one northeast of Bridge 3 and a second south of Bridge 1, which total approximately 1.27 acres (Figure 4c).

Blue Elderberry-Toyon Stands

This community is an association of Blue Elderberry Stand. It is distinguished by the presence of a co-dominant, toyon (*Heteromeles arbutifolia*) in the shrub community. This community is more common in the BSA than Blue Elderberry Stands. It also includes a number of the native plants species that the MCV indicates are associated with stands of blue elderberry, such as California sagebrush (*Artemesia californica*), coyote brush (*Baccharis pilularus*), mulefat (*Baccharis salicifolia*), saw toothed goldenbush (*Hazardia squarrosa*), laurel sumac (*Malosma laurina*), willow thickets (*Salix spp.*), poison oak scrub (*Toxicodendron diversilobum*), and California grape (*Vitis californica*).

This community totals approximately 8.34 acres in the BSA and occurs primarily along stream terraces on the south side of Brea Creek, between Bridges 2 and 3, and as a significant stand approximately 1,500 feet west of Bridge 3 (Figure 4c).

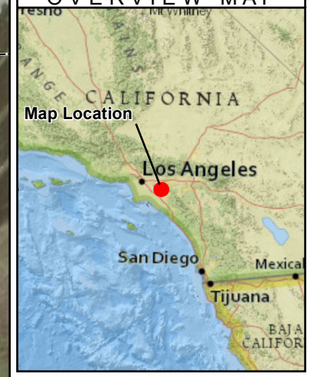
California Walnut Groves

This community is dominated by a greater than 50 percent cover of California walnut (*Juglans californica*) trees and is found mostly on hillsides, but also in riparian corridors. Understory shrubs are sparse to intermittent and the herbaceous layer is also generally sparse, often consisting of grasses. In the BSA, blue elderberry shrubs were noted in association with California walnut trees and the understory consists of non-native short-pod mustard (*Hirshfeldia incana*), and non-native brome and wild oat (*Avena fatua*) grasses.

There are approximately 0.88 acres of California Walnut Grove within the BSA. Two walnut grove communities occur in the far northeastern corner of the BSA, on hillsides along the north side of Brea Boulevard (Figure 4d). Another walnut grove community occurs as a riparian community along the south side of Brea Creek (Figure 4c).

Los Angeles County
Orange County
Unincorporated County of Orange
City of Brea
Page b
Page c
Page d
Bridge 1
Bridge 2
Bridge 3
Brea Creek
Brea Canyon Channel
Tonner Canyon Creek
Brea Boulevard
Tonner Canyon Road
57

OVERVIEW MAP



- Biological Survey Area
- Existing Bridges
- City Boundary
- Map Index

Natural Vegetation Communities

Natural Vegetation Communities

- Blue elderberry stands
- Blue Elderberry - Toyon
- California walnut groves
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black Willow Riparian Forest
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 620
Feet

NORTH

Scale 1:7,500
1 inch = 625 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 4a

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\Bio\Figure_4a-4d_BreaCanyon_Vegetation_Baseleine.mxd | Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet | User: jang.seo

Bridge 1

Unincorporated County of Orange

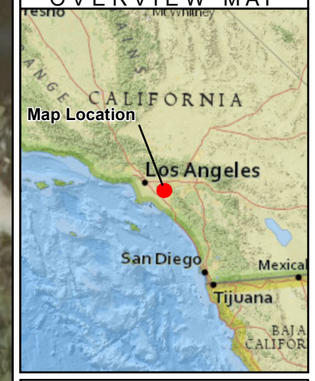
City of Brea

Brea Creek

Brea Canyon Channel

Brea Boulevard

OVERVIEW MAP



Biological Survey Area
Existing Bridges
City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue elderberry stands
- Blue Elderberry - Toyon
- California Walnut - Laurel Sumac
- Coast live oak woodland

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300

Feet

NORTH

Scale 1:3,600

1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 4b

Bridge 3

Unincorporated County of Orange

Bridge 2

Bridge 1

Brea Creek

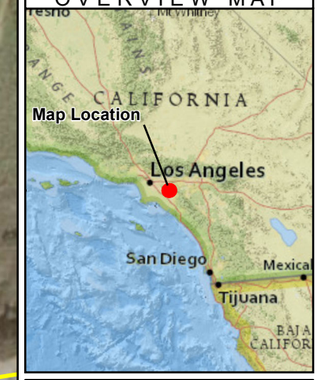
City of Brea

Brea Creek

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP



- Biological Survey Area
- Existing Bridges
- City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue elderberry stands
- Blue Elderberry - Toyon
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black Willow Riparian Forest
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300

Feet

Scale 1:3,600

1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

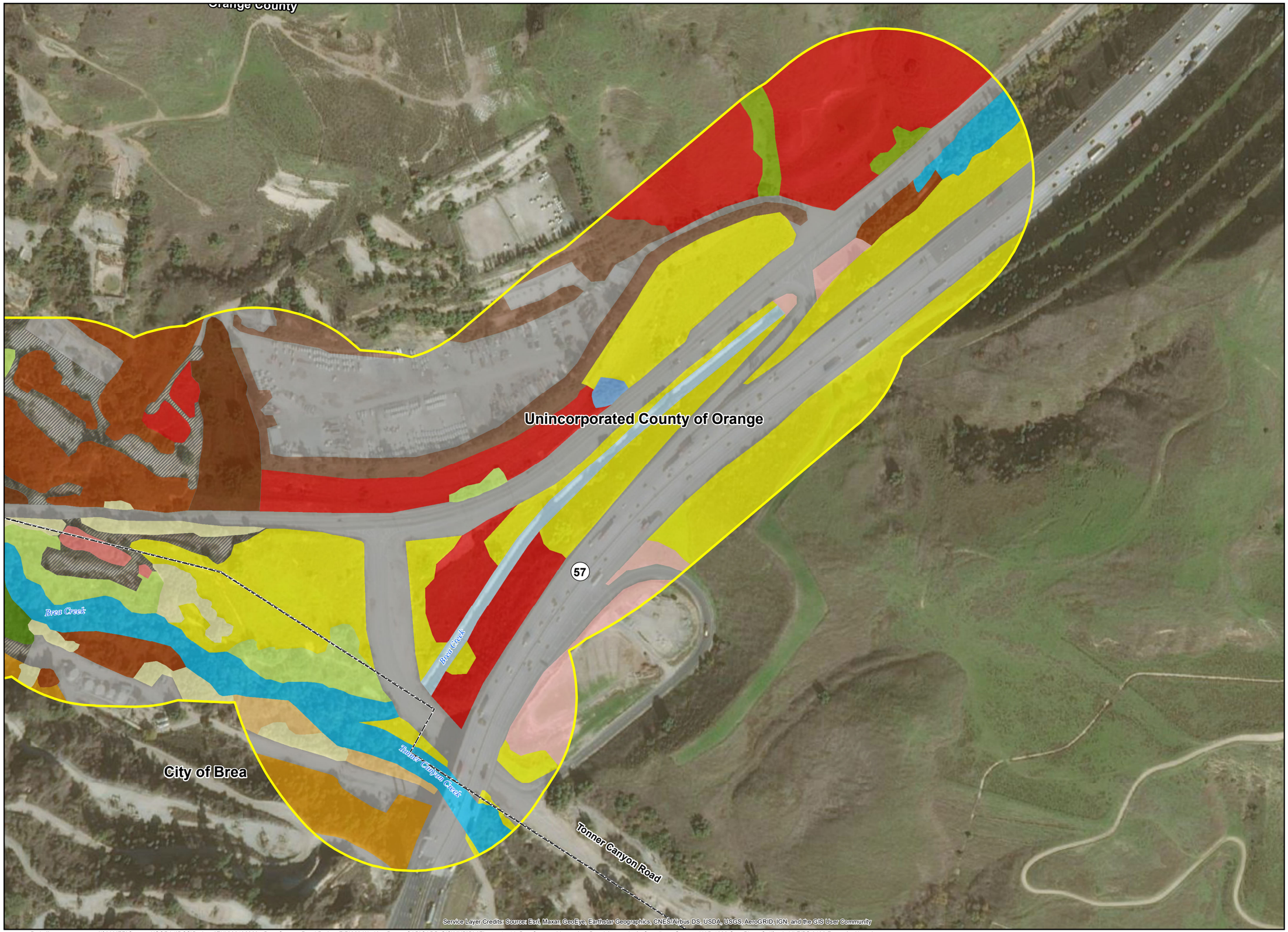
Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

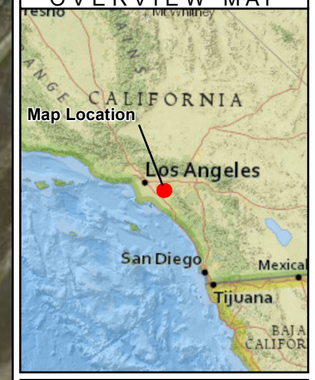
AECOM

Figure 4c

Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\Bio\Figure_4a-4d_BreaCanyon_Vegetation_Baseleine.mxd | Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet | User: jang.seo



OVERVIEW MAP



Biological Survey Area
City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue Elderberry - Toyon
- California walnut groves
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black Willow Riparian Forest
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300
Feet
NORTH

Scale 1:3,600
1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 4d

California Walnut-Laurel Sumac

This community is an association of California Walnut Groves. It is distinguished by the presence of a co-dominant, laurel sumac (*Malosma laurina*), in the shrub community and occurs in the same hillside and riparian habitats as the California Walnut Groves.

In the BSA, three remnant stands of this community totaling approximately 6.58 acres occur among stands of non-native tree groves that dominate hillside vegetation on the north side of Brea Boulevard (Figure 4c). A fourth community occurs in the riparian corridor on the northside of the Brea Creek.

Coast Live Oak Woodland

This community is dominated by a greater than 50 percent cover of coast live oak (*Quercus agrifolia*) trees and is found mostly on canyon bottoms, slopes, and flats where soils are sandy or loamy with high organic matter.

This community covers approximately 8.09 acres within the BSA, occurring primarily adjacent to the riparian corridor along the Brea Creek, and occasionally in upland communities that exist as stands isolated from the riparian corridor by oil field and roadway development (Figures 4b-4d).

Coastal Sage Scrub (Disturbed)

Coastal sage scrub consists of a greater than 60 percent cover of California sagebrush and often contains other native associated species in the shrub layer. This community was considered disturbed due to a sparse cover of California sagebrush and other native shrubs, and predominance of non-native herbaceous species occurring between scattered native shrubs. Native shrubs scattered through this community include laurel sumac, blue elderberry, deerweed (*Acmispon glaber*), coastal goldenbush (*Isocoma menziesii*), lemonade berry (*Rhus integrifolia*), California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), and coyote brush. Non-native species that have colonized this community to varying degrees include brome and wild oat grasses, tocalote (*Centuarea melitensis*), milk thistle (*Silybum marianum*), Russian thistle (*Salsola tragus*), castor bean (*Ricinus communis*), and fennel (*Foeniculum vulgare*).

There are approximately 20.87 acres of disturbed coastal sage scrub within the BSA, all located in the eastern end of the corridor, in the vicinity of the intersection of Brea Boulevard and Tonner Canyon Road, and on slopes along Brea Boulevard and SR 57 (Figure 4d).

Poison Oak Scrub

Poison Oak Scrub consists of a greater than 50 percent cover in the shrub layer of poison oak. This community is often associated with native upland coastal sage and chaparral scrub habitats but is also common as dense stands in riparian areas in southern California.

There are approximately 1.35 acres of Poison Oak Scrub within the riparian corridor along Brea Canyon where the species has formed dense stands in association with Black Willow Riparian Forest that dominate the riparian corridor (Figures 4c and 4d).

Toyon-Laurel Sumac

This community is an association of the toyon shrub alliance and consists of co-dominants toyon and laurel sumac. This community often occurs on steep north-facing slopes and may include California walnut or coast live oak trees in low cover. The understory generally has a sparse cover of herbaceous species, often dominated by non-natives.

There are approximately 6.09 acres of this shrub association in the BSA, all occurring within the southern portion of the BSA (Figure 4c), in uplands on the south side of Brea Creek, west of Tonner Canyon Road. Stands of this community have been fragmented by existing dirt access roads and oil field infrastructure.

Non-Native Vegetation Communities

This category includes vegetation communities dominated by plant species not native to California and/or have become naturalized in California.

Eucalyptus Groves

This community is dominated by eucalyptus trees with greater than 80 percent cover in the tree layer, with sparse to intermittent shrub and herbaceous layers. Eucalyptus trees have a long history in California, having for over 100 years been planted as groves and windbreaks. The species has become naturalized, occurring on uplands or bottomlands, adjacent to streams or lakes. In the BSA, red gum (*Eucalyptus camaldulensis*) dominates this community. Peruvian pepper trees (*Schinus molle*) were also noted in association with eucalyptus trees in this community and were in some localized areas a co-dominant with eucalyptus trees.

There are approximately 9.18 acres of this community in the BSA, occurring both north and south of Brea Boulevard (Figures 4b and 4c). Eucalyptus groves in the BSA exist primarily as fragmented stands adjacent to developed areas of the oil fields.

Pepper Tree Groves

This community is dominated by Peruvian pepper trees with greater than 80 percent cover in the tree layer, with shrubs infrequent to common and a simple to diverse herbaceous layer. This community is common in coastal canyons, washes, slopes, riparian areas, roadsides, and within developed areas. Similar to eucalyptus, Peruvian pepper tree species have commonly been planted in California and have become naturalized in the BSA.

There are approximately 33.67 acres of pepper tree groves within the BSA, occurring both north and south of Brea Boulevard (Figures 4b-4d). Laurel sumac shrubs are common in the shrub layer of this community,

often nearly a co-dominant with Peruvian pepper trees. Similar to eucalyptus groves, pepper tree groves occur as fragmented stands in the oil fields.

Tree of Heaven Groves

This community is dominated by tree of heaven (*Ailanthus altissima*) with greater than 80 percent cover in the tree layer, with shrubs and herbaceous species sparse to intermittent in the understory. Similar to eucalyptus and pepper tree groves, this community has been planted as groves and windbreaks, and has become naturalized, occurring on uplands or often bottomlands adjacent to stream and lakes.

There are four small tree of heaven communities in the BSA south of Brea Boulevard (Figures 4c and 4d), totaling approximately 0.50 acre. Stands of tree of heaven were associated with stands of eucalyptus and pepper tree and distinguished from these communities by the occurrence and dominance of tree of heaven in the tree canopy.

Upland Mustards and Ruderal Forbs

This community is dominated by species of non-native mustards that comprise 80 percent or more cover of the herbaceous layer. Other non-native forbs are common in the community, often including non-native grasses, such as ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* spp. *rubens*) and wild oat. This community is common along roadsides, often covering engineered slopes along freeways. The community is also common on fallow fields, rangelands, grasslands, disturbed coastal sage scrub, and riparian areas, but is generally most common in areas that have experienced disturbances.

This community covers approximately 28.56 acres and is scattered across the BSA but is most prevalent in the eastern portion of the BSA on hillsides with California walnut (Figures 4b-4d). In the BSA, this community is generally dominated by black mustard (*Brassica nigra),* wild mustard (*Hirschfeldia incana*), common mustard (*Brassica rapa*), and poison hemlock (*Conium maculatum*), and includes Russian thistle (*Salsola tragus*), wild radish (*Raphanus sativus*) and sporadic occurrences of castorbean (*Ricinus communis*) and tree tobacco (*Nicotiana glauca*).

Ornamental Landscape Plants

No habitat equivalent of this community is described in the MCV or Holland (1986) (another handbook for describing California vegetation communities). Areas of ornamental landscape plants are generally associated with developed areas where significant landscape plantings of non-native and/or native trees, shrubs, and herbaceous species that originate from a plant nursery occur. The plant species in this community are wide-ranging and generally mirror the ornamental species that are commonly used in landscape settings in the region.

Landscape ornamental plants total approximately 9.68 acres within the BSA, primarily occurring in the eastern portion of the BSA, north of the intersection of Brea Boulevard and Tonner Canyon Road as stands of planted non-native trees (primarily eucalyptus and pepper tree) around the commercial vehicle storage facility (Figure 4d). Ornamental landscape plantings including eucalyptus, pepper tree, elm (*Ulmus* sp.),

and pine (Pinus sp.), were also mapped in the southwestern portion of the BSA in association with residential development (Figure 4b).

Ruderal

No habitat equivalent of this cover type is described in the MCV or Holland (1986). Ruderal areas have often been altered by past anthropogenic activities where existing vegetative cover has been altered and ground disturbance may have occurred. Such areas often consist of bare ground or are colonized by invasive, non-native herbaceous plants.

Ruderal areas cover approximately 3.73 acres in the BSA and are associated with roadsides and other development where vegetative cover has been removed and areas of bare ground with sparse vegetation occur (Figures 4c and 4d). Vegetation common in ruderal areas of the BSA include non-native mustards, bromes, Russian thistle, castor bean, poison hemlock, and foxtail (*Hordeum* sp.).

Aquatic and Riparian Communities

This category includes vegetation communities dominated by native hydrophytic plant species adapted to growing in low-oxygen conditions associated with prolonged saturation or flooding.

Arroyo Willow Thickets

This community is dominated by an open to continuous canopy of arroyo willow (*Salix lasiolepis*) with a greater than 50 percent cover in the shrub or tree canopy and a variable herbaceous layer. This community occurs on steam banks and benches and seeps along drainages.

This community covers approximately 4.84 acres in the BSA along Brea Creek. It is most prevalent along the creek in the western portion of the BSA, growing along the creek in the vicinity of Bridges 2 and 3 (Figures 4b and 4c). The community includes native and non-native tree and shrub species interspersed throughout, reflecting a riparian corridor along the creek that has been disturbed over the years by roadway and oil field development. Trees observed within this community include eucalyptus, pepper tree, Fremont cottonwood (*Populus fremontii*) and Mexican fan palm (W*ashington robusta*). Shrub species observed within this community include laurel sumac, blue elderberry, mulefat, and sugarbush shrubs (*Rhus ovata*).

Black Willow Riparian Forest

This community is dominated by an open to continuous canopy of black willow (*Salix gooddingii*) with a greater than 50 percent cover in the shrub or tree canopy and a variable herbaceous layer. This community occurs on terraces along large rivers, canyons, along floodplains of streams, seeps, springs, ditches, and lake edges where low-gradient depositions occur.

This community covers approximately 8.70 acres in the BSA along Brea Creek. Where arroyo willow was dominant in the western portion of the BSA along the creek, black willow dominates the creek around and east of Bridge 3 (Figure 4c and 4d). This community also includes native and non-native tree and shrub

species interspersed throughout, similar to arroyo willow thicket above. Poison oak was also common in this community.

Coast Live Oak Riparian Forest

This community is an open to locally dense riparian community dominated by coast live oak with a greater than 50 percent tree canopy. It is generally associated with valley bottoms and outer floodplains along larger streams, in soils that are deep, and sandy or loamy with high organic matter.

The coast live oak riparian community within the BSA covers only approximately 0.43 acre and occurs along the north bank of Brea Creek, where a few mature coast live oak occur, adjacent to black willow riparian habitat that dominates along the creek east of Bridge 1 (Figure 4c). A few Mexican fan palms also occur in this community which lies between the creek and Brea Boulevard.

Unvegetated Channel

Unvegetated channels occur where banks have been stabilized with rock or other materials inhibiting the growth of vegetation, where flows are persistent enough to keep vegetation from becoming established or conditions are otherwise inhospitable for the establishment of persistent vegetation, or where maintenance activities along a channel keep vegetative growth down.

Unvegetated channel in the BSA is represented by the approximately 3.74-acre rip-rapped Brea Canyon Channel (the name changes from Brea Creek to Brea Canyon Channel where the creek transitions to an engineered channel [Orange County Flood Control District Facility Number A04] within the City of Brea) that exists downstream of Bridge 1, in the far southwestern portion of the BSA (Figure 4b). This portion of the stream has been stabilized as its course enters the residential development area of the City of Brea that occurs in the far southwestern portion of the BSA.

Land Cover Types

This category includes non-vegetated or sparsely vegetated areas with species generally not native to California. Developed areas often include ornamental vegetation in landscaped areas.

Developed

No habitat equivalent of this cover type is described in the MCV or Holland (1986). Developed lands are areas that have been altered by clearing and construction activities to support man-made structures such as buildings, roads, parking lots, and sidewalks, and often include associated ornamental landscaped areas.

Developed areas comprise the largest land cover type in the BSA, covering approximately 95.64 acres. Substantial areas mapped as development in the BSA include residential development in the southwestern portion of the BSA (Figure 4b), oil field development along the west side of Brea Boulevard between Bridges 1 and 2 (Figure 4b), and the commercial truck storage facility in the northeastern portion of the

BSA (Figure 4d). A small area mapped as developed also coincides with oil field infrastructure on the south side of Brea Boulevard (Figure 4c).

Disturbed

No habitat equivalent of this cover type is described in the MCV or Holland (1986). Disturbed areas include lands in an altered and often non-vegetated state that, due to man-made or natural disturbances have had their vegetative cover removed or altered from its original composition.

Disturbed areas are prevalent in the BSA, covering approximately 35.61 acres. Dirt roads and other areas of bare ground associated with the oil fields were mapped as disturbed (Figures 4b-4d).

2.4 WILDLIFE SPECIES

Wildlife species detected during general field surveys, protocol level surveys, and the Wildlife Movement Study include 74 bird, 13 mammal, three reptile, and two amphibian species. No active nests or bird breeding behaviors were observed in the BSA, or in areas immediately adjacent to the BSA, during the surveys. All bird observations were of individuals that were resting or foraging on the ground in the BSA or flying overhead both inside and outside the BSA. A list of wildlife species detected during all biological surveys is included in Appendix B, Table B.

Two bird species listed under the state or federal Endangered Species Acts were detected during the field surveys, including coastal California gnatcatcher (federally threatened) and least Bell's vireo (state and federally endangered). Yellow-breasted chat (*Icteria virens*), yellow warbler (*Setophaga petechia*), and western pond turtle (*Emys marmorata*), CDFW Species of Special Concern, were also detected, as was Cooper's hawk (*Accipter cooperii*), a CDFW Watch List species. Regional special-status wildlife species are discussed further in Chapter 3.2 of this report.

2.5 WILDLIFE MOVEMENT CORRIDORS

A wildlife movement corridor can be defined as a linear landscape feature of sufficient width and buffer to allow animal movement between two comparatively undisturbed habitat fragments, or between a habitat fragment and some vital resource that encourages population growth and diversity. Habitat fragments are isolated patches of habitat separated by otherwise foreign or inhospitable areas, such as urban/suburban tracts, agricultural lands, or highways. Habitat fragments can isolate species populations by limiting migration, foraging, and breeding opportunities. Isolation of populations can have many harmful impacts and may contribute significantly to local species extinction.

Two types of wildlife movement corridors are regional corridors, defined as those linking two or more large areas of natural open space, and local corridors, defined as those allowing resident animals to access critical resources (food, cover, and water) in a smaller area that might otherwise be isolated by development. Wildlife movement corridors are essential in geographically diverse settings, and especially in urban settings, for the sustainability of healthy and diverse animal communities. At a minimum, corridors promote colonization of habitat and genetic variability by connecting fragments of like habitat and help sustain

individual species distributed in and among habitat fragments. They are also important features for dispersal, seasonal migration, foraging, and breeding.

The Brea Boulevard Corridor is located along the southern perimeter of what is known as the Puente Hills-Chino Hills Wildlife Corridor. This wildlife corridor exists as a peninsula of mostly undeveloped hills reaching about 25-30 miles between the Cleveland National Forest in Orange County, west to the end of the Puente Hills above Whittier Narrows in Los Angeles County. The Puente-Chino Hills contain some of the last remaining stands of natural habitats that are declining in the Los Angeles Basin, including coastal sage scrub, walnut woodlands, riparian woodlands, and grasslands (PHLNHPA and WCCA 2012). Public interest in conserving open space has created a series of reserves and parks along most of this wildlife corridor's length; however, development and numerous busy roadways are viewed as having fragmented the corridor, creating hazards and in some cases barriers to wildlife movement. Of particular concern is degradation or even severing of the wildlife corridor by development within its so-called "Missing Middle", where it is not conserved or protected. The Brea Boulevard Corridor is within the missing middle.

As introduced in Section 2.2, AECOM conducted a Wildlife Movement Study in 2020 and 2021 to identify potential impacts on wildlife movement that could arise with implementation of the Project and to recommend design features for incorporation into the Project to improve wildlife movement along Brea Creek. Background information, the methods and results of the study, and Project design and construction recommendations are presented in the Wildlife Movement Study report prepared by AECOM (2021a).

Roads can impact wildlife movement by acting as barriers, semi-permeable filters, or highly permeable filters (Spencer 2005) depending on road design, presence of undercrossings (e.g., bridge openings and culverts) and overpasses (e.g., land bridges), and traffic patterns. Results of the Wildlife Movement Study indicate there were large differences in wildlife activity between wildlife size classes (i.e. large, medium, small mammals, reptiles, birds, etc.), as well as among the sample locations and crossing types (i.e. bridges vs culverts). There was minimal roadkill data, which limited the ability to draw broad inferences about wildlife mortality in the Brea Boulevard Corridor. Overall results indicate that Brea Boulevard currently functions as either a semi-permeable or highly permeable filter for wildlife, allowing them to pass over the road at grade, or below grade using existing undercrossings (bridges/culverts). The number of mortalities detected during standardized roadkill surveys in this study were insufficient to create a hotspot map and identify potential locations of increased roadkill. Nonetheless, general activity patterns of both large and medium wildlife indicate crossing activity at grade is higher in the eastern portion of the Brea Boulevard Corridor and that this may be due to a lack of suitable undercrossings there, relative to the western portion of the Brea Boulevard Corridor, which includes the three bridges.

This page intentionally left blank.

CHAPTER 3.0
SPECIAL-STATUS BIOLOGICAL RESOURCES

The California Natural Diversity Data Base (CNDDB) (CDFW 2021a) and the CNPS online Inventory of Rare and Endangered Plants of California (CNPS 2021) were initially reviewed in 2016, prior to the first field survey, for the most recent distribution information for regional special-status plant and wildlife species and sensitive natural communities within the La Habra quadrangle and the surrounding eight quadrangles including: El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange. The USFWS Information for Planning and Conservation (IPaC) (USFWS 2021) online database was also reviewed for special-status species, sensitive natural communities, and protected areas known from the Project vicinity. These databases have been periodically reviewed following the 2016 surveys to determine if additional special-status species and sensitive resources have been identified in the Project vicinity; this report presents and evaluates results of the most recent review conducted February 11, 2021.

Information on special-status plant and wildlife species was also compiled through a review of:

- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2021b)
- Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2021c)
- State and Federally Listed Endangered and Threatened Animals of California (CDFW 2020a)
- Special Animals List (CDFW 2020b)

3.1 SPECIAL-STATUS PLANTS

Special-status plant species include those listed as Endangered, Threatened, Rare or those species proposed for listing by the USFWS under the federal Endangered Species Act (FESA) and CDFW under the California Endangered Species Act (CESA) (CDFW 2021b). The CNPS inventory is sanctioned by the CDFW and serves essentially as the list of candidate plant species for State listing. CNPS's California Rare Plant Rank (CRPR) 1B and 2 species are considered eligible for State listing as endangered or threatened.

A total of 39 regional special-status plant species were identified during searches of the CNDDB (CDFW 2021a) and CNPS (2021) online inventory to have historically been recorded from the La Habra and surrounding eight quadrangles, and from a search of IPaC (USFWS 2021) for the Project area. None of these species, however, have been recorded from within the BSA. Additionally, no USFWS-designated critical habitat for plants listed under FESA coincides with the BSA.

The special-status plant species identified during database reviews are combined and presented in Appendix D, Table A. Of the 39 species, five species are federally and/or State-listed as threatened, endangered, rare, or candidates for listing, including:

- Salt Marsh birds-beak (*Chlorophyron maritimum* ssp. *maritimum*), federally and State-listed endangered
- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*), federal candidate for listing as threatened, and State-listed endangered
- Santa Ana River woollystar (*Eriastrum densifolium* spp. *sanctorum*), federally and State-listed endangered
- Gambel's watercress (*Nasturtium gambellii*), federally-listed endangered and State-listed threatened
- California orcutt grass (*Orcuttia californica*), federally and State-listed endangered

No species listed or proposed for listing under FESA and/or CESA were detected within the BSA during field surveys; however, one regional special-status species, southern California black walnut (*Juglans californica*) was detected, primarily associated with California Walnut Woodland occurring within the northeastern portion of the BSA. This species has a CRPR of 2B.1 (plant species that is seriously threatened in California but is more common elsewhere).

The potential for the 39 special-status plants identified during the database reviews to occur within the BSA are classified as "Not Expected," "Low," "Moderate," "High," or as "Present." These classifications are derived from an evaluation comparing existing habitat in the BSA to the presence and suitability of habitats preferred by the species of interest. The potential for each special-status plant species to occur within the BSA is based on the following general guidelines.

- **Present**: Species was observed in or immediately adjacent to the BSA during the field survey, or survey conducted within the past five years.
- **High**: Habitat (including soils and elevation factors) and known historical range for the species occurs in the BSA and a known occurrence has been recorded from within five miles within the past 30 years.
- **Moderate**: Habitat for the species occurs in the BSA and a known occurrence exists from between five and ten miles of the BSA, within the past 30 years.
- **Low**: Limited habitat for the species occurs in the BSA and a known occurrence is from greater than 10 miles from the BSA or over 30 years old, or habitat to support the species is of marginal quantity or quality. A low potential to occur is also assigned when focused surveys for a species have been conducted numerous times within the past 10 years without positive results.
- **Not Expected**: Beyond those factors listed for Low Potential, the species is easily identifiable throughout the year and was not observed, or specific habitat requirements are not found within or adjacent to the BSA.

The project limits are generally disturbed, and vegetation in the survey buffer has been disturbed by past anthropogenic activities associated with roadway and oil field development. However, an assessment of the habitat requirements of the regional special-status wildlife species listed in Appendix D, Table A, indicates the BSA likely provides habitat potentially suitable for some special-status plants. When evaluated against the potential for occurrence guidelines presented above, it was determined that two special-status plant species have High potential, one has Moderate potential, and 24 species a Low potential to occur within the BSA. As previously indicated, one special-status plant species, southern California black walnut was detected within the BSA during the field surveys. The total of 27 special-status plant species with a potential to occur within the BSA and one species that was detected during field surveys within the BSA, are presented in Table 2.

Special-status plants detected in the BSA during field surveys and those with at least a Moderate potential to occur are discussed further below following Table 2. References to historic records in the table and species discussions that follows are from CDFW (2021a) and CNPS (2021), unless otherwise noted. Descriptions of the habitats preferred by these species are also from CNPS.

Table 2
Special-Status Plant Species Detected and With Potential to Occur in the BSA[1]

Common Name ***Scientific Name*[2]**	**Status[3]**	**General Habitat Description[4]**	**Habitat Present/ Absent in BSA**	**Potential for Occurrence[5,6]**
California androsace *Androsace elongata* ssp. *acuta*	Federal: None State: None CRPR: 4.2	Found in chaparral, cismontane woodland, coastal scrub, meadow and seep, pinyon and juniper woodland, and valley and foothill grassland habitats. Occurs between 165 and 4280 feet (50 to 1,305 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	Federal: None State: None CRPR: 1B.2	Found in alkaline habitats, including coastal scrub and coastal bluff scrub. Occurs between 30 and 650 feet (10 to 200 meters). Blooms April to October.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Catalina mariposa-lily *Calochortus catalinae*	Federal: None State: None CRPR: 4.2	Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Occurs between 50 and 2,300 feet (15 to 700 meters). Blooms February to June.	Present	**Low.** Although potentially suitable habitat for this species is present, no historic CNDDB records occur within the BSA or the surrounding quadrangles.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Plummer's mariposa-lily *Calochortus plummerae*	Federal: None State: None CRPR: 4.2	Granitic or rocky habitats. Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grassland. Occurs between 330 and 5,580 feet (100 to 1,700 meters). Blooms May to July.	Present	**Moderate.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2005 and occurs approximately 6 miles northwest of the BSA.
intermediate mariposa-lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CRPR: 1B.2	Found in chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest and valley and foothill grassland. Occurs between 100 to 4,920 feet (30 to 1,500 meters). Blooms April to June.	Present	**High.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2017 and occurs approximately 3 miles east of the BSA.
lucky morning-glory *Calystegia felix*	Federal: None State: None CRPR: 1B.1 Other: None	Usually found in wetland and marsh habitats, occasionally in drier habitats, including meadows and seeps and riparian scrub. May inhabit areas with silty loam and alkaline soils. Occurs between 98 and 700 feet (30 to 215 meters). Blooms March to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1905 and occurs approximately 13 miles west of the BSA.
Lewis' evening-primrose *Camissoniopsis lewisii*	Federal: None State: None CRPR: 3	Inhabits sandy or clay soils in coastal bluff-scrub, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland. Occurs between 0 and 985 feet (0 to 300 meters). Blooms March to May (June).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CRPR: 1B.1	Found in vernal pools, vernally mesic valley and foothill grasslands, and around margins of marshes and swamps. Occurs between 0 and 1,575 feet (0 to 480 meters). Blooms May to November.	Absent	**Low.** Potentially suitable habitat for this species is absent from the BSA. No historic CNDDB records occur within the BSA or surrounding quadrangles. The nearest CNPS record is from 2003 and occurs approximately 4 miles southeast of the BSA within the Orange quad.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: None State: SE CRPR: 1B.1	Preferred habitat includes sandy coastal scrub, valley and foothill grasslands. Occurs between 495 and 4,000 feet (150 to 1,220 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
small-flowered morning-glory *Convolvulus simulans*	Federal: None State: None CRPR: 4.2	Found in clay, serpentine seeps in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 98 and 2,430 feet (30 to 740 meters). Blooms March to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
paniculate tarplant *Deinandra paniculata*	Federal: None State: None CRPR: 4.2	Usually prefers vernally mesic, sometimes sandy coastal scrub, valley foothill grassland, and vernal pool habitats. Occurs between 80 to 3,085 feet (25 to 940 meters). Blooms (March) April to November.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles. The nearest CNPS record is from 1932 and occurs approximately 7 miles southeast of the BSA within the Orange quad.
many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CRPR: 1B.2	Found in chaparral, coastal scrub, and valley and foothill grassland habitats. Often in clay soils. Occurs between 50 and 2,520 feet (15 to 790 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1991 and occurs approximately 11 miles northeast of the BSA.
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CRPR: 1B.1	Found in sandy or gravelly sites in chaparral and coastal scrub habitats. Occurs between 300 and 2,000 feet (91 to 610 meters). Blooms April to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1927 and occurs approximately 13 miles southeast of the BSA.
mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: None State: None CRPR: 1B.1	Prefers sandy or gravelly sites in chaparral, cismontane woodland, and coastal scrub habitats. Occurs between 230 and 2,660 feet (70 to 810 meters). Blooms February to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1921 and occurs approximately 15 miles northeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Southern California black walnut *Juglans californica*	Federal: None State: None CRPR: 4.2	Found in alluvial sites in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. Occurs between 164 and 2,955 feet (50 to 900 meters). Blooms March to August.	Present	**Present.** This species is present in the BSA.
Robinson's pepper grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CRPR: 4.3	Chaparral or coastal scrub habitats. Occurs between 5 to 2,905 feet (1 to 885 meters). Blooms January to July.	Present	**High.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2010 and occurs approximately 5 miles northeast of the BSA. CNPS records occur from the native habitats in the Santa Ana Mountain, 10 plus miles to the southeast.
mud nama *Nama stenocarpa*	Federal: None State: None CRPR: 2B.2	Found in marshes, swamps, lake margins, and riverbanks. Occurs between 15 and 1,645 feet (5 to 500 meters). Blooms January to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 25 miles southwest of the BSA.
prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CRPR: 1B.2	Found in mesic habitats, including coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Occurs between 9 and 3,970 feet (3 to 1,210 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1895 and occurs approximately 15 miles west of the BSA.
Hubby's phacelia *Phacelia hubbyi*	Federal: None State: None CRPR: 4.2	Prefers gravelly, rocky, or talus sites in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 0 and 3280 feet (0 to 1000 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
south coast branching phacelia *Phacelia ramosissima* var. *austrolitoralis*	Federal: None State: None CRPR: 3.2	Prefers sandy or rocky areas in chaparral, coastal dune, coastal scrub, and coastal salt marsh and swamp habitats. Occurs between 15 and 985 feet (5 to 300 meters). Blooms March to August.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Brand's star phacelia *Phacelia stellaris*	Federal: None State: None CRPR: 1B.1	Inhabits coastal dune and coastal scrub habitats. Occurs between 3 and 1315 feet (1 to 400 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 15 miles southwest of the BSA.
white rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CRPR: 2B.2	Prefers sandy, gravelly areas in chaparral, cismontane woodland, coastal scrub, or riparian woodland habitats. Occurs between 0 to 6890 feet (0 to 2100 meters). Blooms (July) August to November (December).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB records are from over 85 years ago and occur approximately 21 miles north of the BSA.
Engelmann oak *Quercus engelmannii*	Federal: None State: None CRPR: 4.2	Found in chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland habitats. Occurs between 164 and 4265 feet (50 to 1300 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Parish's gooseberry *Ribes divaricatum* var. *parishii*	Federal: None State: None CRPR: 1A	Inhabits riparian woodland habitats. Occurs between 210 and 985 feet (65 to 300 meters). Blooms February to April.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1979 and occurs approximately 16 miles northwest of the BSA.
Coulter's matilija poppy *Romneya coulteri*	Federal: None State: None CRPR: 4.2 Other: NCCP	Often found in burns in chaparral or coastal scrub habitats. Occurs between 65 to 3940 feet (20 to 1200 meters). Blooms March to July (August).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
chaparral ragwort *Senecio aphanactis*	Federal: None State: None CRPR: 2B.2	Sometimes alkaline. Prefers areas of chaparral, cismontane woodland, or coastal scrub habitats. Occurs between 50 to 2625 feet (15 to 800 meters). Blooms January to April (May).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 14 miles northeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
salt spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CRPR: 2B.2	Prefers alkaline or mesic areas in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playa habitats. Occurs between 45 and 5020 feet (15 to 1530 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1952 and occurs approximately 10 miles south of the BSA.
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CRPR: 1B.2	Found near ditches, streams, and springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and vernally mesic valley and foothill grassland habitats. Occurs between 6 and 6700 feet (2 to 2040 meters). Blooms July to November (December).	Present	**Low.** Although potentially suitable habitat for this species is present within the BSA, the nearest CNDDB record is from 1896 and occurs approximately 9 miles southwest of the BSA. Additionally, all historic populations within the BSA and surrounding quadrangles are thought to be extirpated or possibly extirpated.

[1] Special-Status plant species known from the CNDDB and CNPS to occur on the La Habra, El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange quadrangles, and from a search of IPaC for the Project vicinity.

[2] Nomenclature for special-status plant species conforms to CNPS.

[3] Sensitivity Status Codes

Federal
- **FT** - Federally Threatened under the Federal Endangered Species Act
- **FE** - Federally Endangered under the Federal Endangered Species Act
- **FC** – A Federal Candidate for listing under the Federal Endangered Species Act

State
- **ST** - State Threatened under the California Endangered Species Act
- **SE** - State Endangered under the California Endangered Species Act

CRPR — CNPS California Rare Plant Rank (CRPR)
- **1A:** Plants presumed extinct in California
- **1B**: Plants rare, threatened, or endangered in California and elsewhere
- **2**: Plants rare, threatened, or endangered in California, but more common elsewhere
- **3**: Plants more information is needed for
- **4**: Plants of limited distribution – a watch list
  - **0.1**: Seriously threatened in California
  - **0.2**: Fairly endangered in California
  - **0.3**: Not very endangered in California

[4] General Habitat Descriptions from CNPS (2021). Note that the blooming months for certain species include identification of early and/or late extensions of their blooming season, which are indicated by the months in parentheses.

[5] Historical CNDDB records from CDFW (2021a) and CNPS (2021).

Plummer's Mariposa Lily

Plummer's mariposa lily is a CRPR 4.2 species (limited distribution, fairly endangered in California), in the Liliaceae (Lily) family. This species is a perennial bulbiferous herb that produces thin, branching stems and a few long curling leaves. On the stem is a lily bloom with long, pointed sepals and petals which may be up to 2 inches long. Petals are pink, lavender or white with a wide yellow band across the middle. The center contains large white or yellow anthers and the fruit is up to about 4 inches long. Plummer's mariposa lily blooms May through July and prefers granitic, rocky substrates in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grasslands between 100-1,700 meters (330-5,575 feet) amsl.

Eight regional records of this species were identified during the database review, with seven of these recorded in 2005 from the Puente Hills area, 5-7 miles northwest of the BSA. Although habitat suitable for this species is limited in the BSA, the presence of multiple recent records within 10 miles of the BSA results in this species having Moderate potential to occur within the BSA.

Intermediate Mariposa Lily

Intermediate mariposa lily is a CRPR 1B.2 species (Plants rare, threatened, or endangered in California and elsewhere, fairly endangered in California) in the Lily family. Related to Plummer's mariposa lily, this species is also a perennial bulbiferous herb that produces thin, branching stems and a few long curling leaves. On the stem is a lily bloom with long, pointed sepals and petals which may be up to 2 inches long. Petals are pink, lavender or white with a wide yellow band across the middle. The center contains large white or yellow anthers and the fruit is up to about 4 inches long. Intermediate mariposa lily blooms May through July and prefers rocky, calcareous substrates in chaparral, coastal sage scrub, and valley and foothill grasslands between 30 to 1,500 meters (100 to 4,920 feet) amsl.

Fifteen regional records of this species were identified during the database review, with 11 of these recorded since 2000, with the nearest reported occurrence located 3 miles east of the BSA in 2017. Habitat suitable for this species is present in the BSA and with multiple regional records within the past 20 years and some within close proximity and from recent years, this species has High potential to occur within the BSA.

Robinson's Pepper Grass

Robinson's pepper grass is a CRPR 4.3 species (Limited distribution in California, not very endangered in California) in the Brassicaceae (Mustard) family. This species is an annual herb that grows up to about 28 inches tall and has white flower petals. Its most identifiable characteristic is its cluster of flowers attached by short equal stalks at equal distances along the central stem, giving it the appearances of a bottlebrush. Robinson's pepper grass blooms January through July and prefers chaparral and coastal sage scrub habitats between 1 to 855 meters (3-2,805 feet) amsl.

Two regional records of this species were identified during the database review, with one of these recorded from 2010 from 5 miles northeast of the BSA. Additional records occur from 10 plus miles to the southeast in the Santa Ana Mountains. Habitat suitable for this species is present in the BSA and with a regional

record from approximately 10 years ago, and with further records from the Santa Ana Mountains to the southeast, this species has High potential to occur within the BSA.

3.2 SPECIAL-STATUS WILDLIFE

Special-status wildlife species include those listed as Endangered, Threatened, or those species proposed for listing by the USFWS under FESA and CDFW under CESA (CDFW 2020a). Additional species receive federal protection under the Bald Eagle Protection Act (e.g., bald eagle, golden eagle), the Migratory Bird Treaty Act (MBTA), and state protection under the California Environmental Quality Act (CEQA) Section 15380(d) and CFGC.

All birds, except European starlings, English house sparrows, rock doves (pigeons), and non-migratory game birds such as quail, pheasant, and grouse are protected under the MBTA. However, non-migratory game birds are protected under California Fish and Game Code (CFGC) Section 3503. Many other species are considered by CDFW to be California species of special concern (SSC), listed in Remsen (1978), Williams (1986) and CDFW (2020b), and others are on a CDFW Watch List (WL) (CDFW 2020b). The CNDDB tracks species within California for which there is conservation concern, including many that are not formally listed, and assigns them a CNDDB Rank (CDFW 2020b). Although SSC and WL species, and species that are tracked by the CNDDB, but not formally listed, are afforded no official legal status, they may receive special consideration during the CEQA review process.

CDFW further classifies some species under the following categories: "Fully Protected", "Protected birds" (CDFW Code §3511), "Protected mammals" (CDFW Code §4700), "Protected amphibian" (CDFW Code §5050 and Chapter 5, §41), "Protected reptile" (CDFW Code §5050 and Chapter 5, §42), and "Protected fish" (CDFW Code §5515). The designation "Protected" indicates that a species may not be taken or possessed except under special permit from CDFW; "Fully Protected" indicates that a species can be taken for scientific purposes by permit only (CDFW 2020b). CDFW Code §3503, 3505, and 3800 prohibit the take, destruction or possession of any bird, nest or egg of any bird except English house sparrows and European starlings unless express authorization is obtained from CDFW.

All bat species, regardless of administrative designation by CDFW, and other non-game mammals are protected by CFGC Section 4150, which states that all nongame mammals or parts thereof may not be taken or possessed except as provided otherwise in the CFGC or in accordance with regulations adopted by the California Fish and Game Commission. Construction activities that result in the mortality of nongame mammals (e.g., destruction of an occupied bat roost, resulting in the death of bats) or disturbance that results in the loss of a maternity colony of bats (including the death of young) may be considered “take” by CDFW. Furthermore, any habitat or structure occupied by a bat maternity colony of any species is considered a native wildlife nursery site that is essential to the viability of local populations.

A total of 58 regional special-status wildlife species were identified during a search of the CNDDB (CDFW 2021a) online inventory to have historically been recorded from the La Habra and surrounding eight quadrangles, and from a search of IPaC USFWS 2021) for the Project area. One record, of coastal California gnatcatcher, overlaps a portion of the BSA in the vicinity of the intersection of Brea Boulevard and Tonner

Canyon Road. Additionally, USFWS-designated critical habitat for the species coincides with the BSA (Figure 5).

The wildlife species identified from database reviews are combined and presented in Appendix D, Table B. Of the 58 species, 15 species are federally and/or State-listed as threatened, endangered, rare, or candidates for listing, including:

- Crotch bumble bee (*Bombus crotchii*), candidate State-listed endangered
- Quino checkerspot butterfly (*Euphydryas editha quino*), federally-listed endangered
- Santa Ana sucker (*Catostomus santaanae*), federally-listed threatened
- Steelhead – southern California Distinct Population Segment (DPS) (*Oncorhynchus mykiss irideus* pop. 10), federally-listed endangered
- Green turtle (*Chelonia mydas*), federally-listed threatened
- Tricolored blackbird (*Agelaius tricolor*), State-listed threatened
- Swainson's hawk (*Buteo swainsoni*), State-listed threatened
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), federally-listed threatened, State-listed endangered
- Southwestern willow flycatcher (*Empidonax traillii extimus*), federally and State-listed endangered
- California black rail (*Laterallus jamaicensis coturniculus*), State-listed threatened
- Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), State-listed endangered
- Coastal California gnatcatcher, federally-listed threatened, and CDFW SSC
- Bank swallow (*Riparia riparia*), State-listed threatened
- California least tern (*Sternula antillarum browni*), federally and State-listed endangered
- Least Bell's vireo, federally and State-listed endangered

Two federally and/or State-listed species, coastal California gnatcatcher and least Bell's vireo, were detected within the BSA during field surveys. Three CDFW SSC were also observed, including yellow-breasted chat, yellow warbler, and western pond turtle, as well as one CDFW WL species, Cooper's hawk.

The potential for the 58 special-status wildlife species identified during the database reviews to occur within the BSA are classified and evaluated in the same manner as special-status plants in Chapter 3.1 (i.e. "Not Expected," "Low," "Moderate," "High," or "Present"). As previously indicated, the project limits are primarily disturbed and vegetation communities in survey buffer have generally been altered by roadway

and oil field development. However, an assessment of the habitat requirements of the regional special-status wildlife species listed in Appendix D, Table B, indicates the BSA likely provides habitat potentially suitable for some special-status wildlife. When evaluated against the potential for occurrence guidelines presented in Chapter 3.1, it was determined that two special-status wildlife species have Moderate potential and seventeen species a Low potential to occur within the BSA. As previously indicated, six special-status wildlife were detected within the BSA during the field surveys. The total of 25 special-status wildlife species with a potential to occur within the BSA, or that were detected during field surveys within the BSA, are presented in Table 3.

Special-status wildlife detected in the BSA during field surveys and those with at least a Moderate potential to occur are discussed further below following Table 3. Although not detected or expected to occur within the BSA, a discussion of southwestern willow flycatcher is also included since protocol level surveys were conducted for the species in 2016. A general discussion of other regional special-status wildlife is also included. References to CNDDB records in the table and species discussions that follows are from CDFW (2021a), unless otherwise noted. Descriptions of the habitats preferred by these species is from *California's Wildlife* (Zeiner et al 1990).

Table 3
Special-Status Wildlife Species Detected and With Potential to Occur in the BSA[1]

Common Name ***Scientific Name*[2]**	**Status[3]**	**General Habitat Description[4]**	**Habitat Present/ Absent**	**Potential for Occurrence[5]**
Amphibians				
western spadefoot *Spea hammondii*	Federal: None State: None Other: SSC	Inhabits grassland, oak woodland, coastal sage scrub, and chaparral vegetation in washes, floodplains, alluvial fans, playas, and alkali flats.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 1978 and occurs approximately 7 miles southwest of the BSA. The most recent CNDDB record is from 2005 and occurs approximately 10 miles northwest of the BSA.
Reptiles				
southern California legless lizard *Anniella stebbinsi*	Federal: None State: None Other: SSC	Occurs in moist warm loose soils in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Often under leaf litter or other surface objects.	Present	**Low.** Although potentially suitable habitat for this species occurs within the BSA, the nearest CNDDB record is from 1964 and occurs approximately 8 miles south of the BSA. The most recent CNDDB record is from 2018 and occurs approximately 15 miles northeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
coastal whiptail *Aspidoscelis tigris stejnegeri*	Federal: None State: None Other: SSC	Occurs in coastal sage scrub, chaparral, riparian areas, woodlands, and rocky areas.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 2017 and occurs approximately 9 miles northwest of the BSA.
red-diamond rattlesnake *Crotalus ruber ruber*	Federal: None State: None Other: SSC	Occurs in coastal sage scrub, chamise chaparral, redshank, desert slope scrub, desert washes, grassy fields, orchards, cactus patches, and rocky areas.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB records are from 1995 and occur approximately 7 miles east of the BSA. The most recent CNDDB record is from 2017 and occurs approximately 8 miles northeast of the BSA.
western pond turtle *Emys marmorata*	Federal: None State: None Other: SSC	Occurs in aquatic water bodies including flowing rivers and streams, permanent lakes, ponds, reservoirs, settling ponds, marshes and other wetlands. Semi-permanent water bodies such as stock ponds, vernal pools and seasonal wetlands can also be utilized on a temporary basis.	Present	**Present.** This species was incidentally observed during wildlife crossing surveys in 2019 and 2020. A CNDDB record from 2013 coincides with the BSA, near the confluence of Brea and Tonner Canyons. Further CNDDB records of this species exist from Brea and Tonner Canyons.
coast horned lizard *Phrynosoma blainvillii*	Federal: None State: None Other: SSC	Inhabits coastal sage scrub and chaparral in arid and semiarid climates. Prefers friable, rocky, or shallow sandy soils.	Present	**Low.** Although potentially suitable habitat for this species occurs within the BSA, the nearest CNDDB record is undated and occurs approximately 13 miles southeast of the BSA. Two additional CNDDB records, one undated and one from 1960, occur 14 miles northwest of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
Birds				
Cooper's hawk *Accipiter cooperii*	Federal: None State: None Other: WL	Found in woodlands, chiefly of open, interrupted or marginal type. Nest sites are mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains. Also known to nest in live oaks and now nests in many cities.	Present	**Present.** This species was observed during general field surveys conducted in the BSA. The nearest CNDDB record is from 2012 and occurs approximately 12 miles northeast of the BSA.
southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	Federal: None State: None Other: WL	Resident in southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. Steep, rocky hillsides covered by coastal sage scrub or chaparral preferred by this species are generally absent from the BSA. The nearest CNDDB record is from 2005 and occurs approximately 3 miles east of the BSA.
great blue heron *Ardea herodias*	Federal: None State: None Other: CNDDB	Prefers shallow estuaries and fresh and saline emergent wetlands.	Present	**Moderate.** Brea Canyon may provide potentially suitable foraging habitat for this species and eucalyptus groves within the BSA may provide potentially suitable nesting habitat for the species. A CNDDB record from 2004 occurs approximately 5 mile south-southeast of the BSA.
long-eared owl *Asio otus*	Federal: None State: None Other: SSC	Prefers dense foliage, such as willow thickets and evergreen trees. Nests in conifer groves adjacent to open fields and wetlands.	Present	**Low.** Although potentially suitable habitat for this species is present within the BSA, the nearest CNDDB record is from 1925 and occurs approximately 14 miles northeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
ferruginous hawk *Buteo regalis*	Federal: None State: None Other: WL	Inhabits arid grasslands and adjacent farmlands. Nests in isolated trees or on rock outcrops.	Absent	**Low.** Although habitats preferred by this species are generally absent from the BSA, this species may cross through the BSA as a migrating transient. One CNDDB record from 1997 exists 10 plus miles southwest of the BSA.
white-tailed kite *Elanus leucurus*	Federal: None State: None Other: FP	Associated with rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Prefers open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Present	**Low.** Rolling foothill habitat potentially suitable for this species is present in the far northeastern portion of the BSA. The nearest CNDDB record is from 2009 and occurs approximately 10 miles southeast of the BSA.
California horned lark *Eremophila alpestris actia*	Federal: None State: None Other: WL	Prefers expansive open areas, with barren or sparsely vegetated ground, such as beaches, plowed fields and occasionally parking lots or runways.	Present	**Moderate.** Barren and sparsely vegetated habitats potentially suitable for this species are present within the BSA. The nearest CNDDB record is from 2008 and occurs approximately 3 miles east-northeast of the BSA.
merlin *Falco columbarius*	Federal: None State: None Other: WL	Inhabits coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stage habitats below 3,900 feet (1,500 meters).	Present	**Low.** Potentially suitable wetland edge habitat for this species is present within the BSA. The nearest CNDDB record is from 1993 and occurs approximately 12 miles northeast of the BSA.
American peregrine falcon *Falco peregrinus anatum*	Federal: Delisted State: Delisted Other: FP	Occurs along coast and western Sierra Nevada in spring and fall. Utilize woodland, forest, and coastal habitats for breeding.	Absent	**Low.** Potentially suitable habitat for this species is generally absent from the BSA; however, the species may occur in the BSA as a transient forager. The nearest CNDDB record is from 2015 and occurs approximately 15 miles south of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
yellow-breasted chat *Icteria virens*	Federal: None State: None Other: SSC	Occurs in dense tangled brushy patches, hedgerows and wood edges, in open sunny areas and along riparian woodland ecotones.	Present	**Present.** This species was detected during protocol bird surveys in 2016, and has been incidentally observed within the BSA since then. The nearest CNDDB record is from 2013 and occurs approximately 5 miles east of the BSA.
coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: None Other: SSC	Obligate, permanent resident of coastal sage scrub below 2,500 feet (760 meters) in southern California. Inhabits low, coastal sage scrub in arid washes, on mesas and slopes.	Present	**Present.** A family group of this species was detected during protocol bird surveys in 2016 and was incidentally observed in the same locale during subsequent site visits. The BSA occurs within Critical Habitat for the species.
yellow warbler *Setophaga petechia*	Federal: None State: None Other: SSC	Occupy riparian vegetation in close proximity to water along streams and in wet meadows. Associated with willow and cottonwoods.	Present	**Present.** This species has been incidentally observed within the BSA. A CNDDB record from 2016 occurs approximately 5 miles east of the BSA.
least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE	Occupy willow and cottonwood riparian woodland, usually associated with water or adjacent to a water source.	Present	**Present.** Although not detected during protocol surveys conducted for this species in 2016, a lone male of this species was incidentally detected during general field surveys in 2016 and 2017. The species has also been incidentally detected during surveys associated with the Wildlife Movement Study. A family group was recorded in the CNDDB from 2000, approximately 0.50 mile east-southeast of the BSA along Tonner Canyon in riparian habitat very similar to that occurring within the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
Mammals				
western mastiff bat *Eumops perotis californicus*	Federal: None State: None Other: SSC, WBWG-H	Roosts in rock crevices, on cliff faces and also uses crevices in buildings and structures. Limited to roosts that allow at least 10 feet of free fall.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 1990 and occurs approximately 9 miles southwest of the BSA.
western yellow bat *Lasiurus xanthinus*	Federal: None State: None Other: SSC, WBWG-H	Occurs below 2,000 feet (600 meters) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees and palms.	Present	**Low.** Habitat marginally suitable for this species is present in the BSA. The nearest CNDDB record is from 1985 and occurs approximately 14 miles northeast of the BSA.
Yuma myotis *Myotis yumanensis*	Federal: None State: None Other: CNDDB, WBWG-LM	Occurs from sea level to 11,000 feet (3,300 meters), though uncommon above 8,000 feet (2,560 meters). Inhabit open forests and woodlands with water sources. Roosts in buildings, caves, mines, bridges, and abandoned swallow nests during the day. Roost in more open areas at night.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 1998 and occurs approximately 11 miles southeast of the BSA.
pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None Other: SSC, WBWG-M	Occurs in pinyon-juniper woodlands, desert scrub, desert succulent scrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis habitats. Roost in rock crevices, caverns, or buildings.	Present	**Low.** Habitat marginally suitable for this species is present in the BSA. The nearest CNDDB record is from 1989 from an unknown location in the City of Brea.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5]
big free-tailed bat *Nyctinimops macrotis*	Federal: None State: None Other: SSC, WBWG-MH	Often found in urban areas. Roost in buildings, caves, hollow trees, high cliffs, and rocky outcrops.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 1987 and occurs approximately 13 miles northeast of the BSA.
American badger *Taxidea taxus*	Federal: None State: None Other: SSC	Occurs in dry, open stages of shrub, forest, and herbaceous habitats. Prefers areas with fine-textured or sandy soils for digging burrows.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 2006 and occurs approximately 9 miles northwest of the BSA; however, this record is of a dead specimen. A record from 2008 occurs 12 plus miles north of the BSA.

[1] Special-Status wildlife species known from the CNDDB to occur on the La Habra, El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange quadrangles and from a search of IPaC for the project vicinity.
[2] Nomenclature for special-status wildlife conforms to CNDDB.
[3] Sensitivity Status Codes

Federal	**FT -**	Federally Threatened under Federal Endangered Species Act (FESA)
	FE -	Federally Endangered under FESA
	BGEPA -	Bald and Golden Eagle Protection Act
State	**ST -**	State Threatened under California Endangered Species Act (CESA)
	SE -	State Endangered under CESA
	SC -	State Candidate for listing under CESA
Other	**SSC -**	Designated as a Species of Special Concern by CDFW
	WL -	Designated as a Watch List species by CDFW
	CNDDB -	Tracked by CDFW in the California Natural Diversity Data Base or considered locally sensitive
	WBWG-H -	Designated by the Western Bat Working Group (WBWG 2017) as High Priority - species that are imperiled or are at high risk of imperilment
	WBWG-M -	Designated by the WBWG (2017) as Medium Priority – a level of concern that should warrant closer evaluation, more research, and conservation actions of both species and possible threats.
	WBWG – L -	Designated by the WBWG (2017) as Low Priority – while local concerns may exist, data supports stable populations that are unlikely to change in the near future.

[4] General Habitat Descriptions from Zeiner et al. (1990).
[5] Historical records from CDFW 2021a.

3.2.1 Invertebrates, Fish, and Amphibians

Regional special-status invertebrate, fish, and amphibian species identified during the database review are generally not expected to occur in the BSA (see Appendix D, Table B), generally due to the absence of habitat conditions preferred by these species. One amphibian, western spadefoot (*Spea hammondii*; CDFW SSC), has Low potential to occur (Table 3).

3.2.2 Reptiles

Of the nine special-status reptile species identified during the database review, one, western pond turtle, was detected in the BSA, four have Low potential to occur in the BSA, and four are not expected to occur in the BSA due to the absence of habitats preferred by these species (see Appendix D, Table B). The four species with Low potential for occurrence include, southern California legless lizard (*Anniella stebbinsi*; CDFW SSC), coastal whiptail (*Aspidoscelis tigris stejnegeri*; CDFW SSC), red-diamond rattlesnake (*Crotus rubra rubra*; CDFW SSC), and coast horned lizard (*Phrynosoma blainvillii*, CDFW SSC) (see Table 3). Western pond turtle is discussed further below.

Western Pond Turtle

Western pond turtle, a CDFW SSC, is uncommon to common in suitable aquatic habitat throughout California west of the Sierra Cascade Mountain Range and except for the Mojave River and tributaries is absent from desert regions. Occurs in aquatic water bodies including flowing rivers and streams, permanent lakes, ponds, reservoirs, settling ponds, marshes and other wetlands. Semi-permanent water bodies such as stock ponds, vernal pools and seasonal wetlands can also be utilized by Western pond turtle on a temporary basis. Pond turtles require basking sites such as partially submerged logs, rocks, or open mud banks (CDFW 2000).

A focused visual survey for western pond turtle was conducted by AECOM on June 16, 2016 following U.S. Geological Survey (USGS) visual survey protocols for the Southcoast Ecoregion (USGS 2006). Access to the entire reach of Brea Canyon occurring in the BSA, however, was not consistent at the time of this survey and as a result, not all reaches of Brea Canyon were surveyed during the time period prescribed by the USGS protocols. Biologists were able to survey stream reaches that were not accessible in June, September, and December 2016. No western pond turtle were detected during these 2016 visual surveys and none were incidentally observed during general biological resource surveys conducted in 2018. Western pond turtle was; however, incidentally observed by AECOM biologists along Brea Creek in 2019 and 2020 during the Wildlife Movement Study. Additionally, a record of the species from 2013 near the confluence of Brea Canyon and Tonner Canyon coincides with the BSA, and additional records are known from areas upstream of the BSA in both Brea and Tonner Canyons. This species is considered Present in the BSA.

3.2.3 Birds

3.2.3.1 Raptors

Common raptor species, such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), turkey vulture (*Cathartes aura*), and Cooper's hawk (*Accipiter cooperii*), a CDFW WL species, were observed during field surveys (see Appendix B, Table B). Regional special-status raptors identified during database reviews (Table B, Appendix D), build nests in mature, large coniferous or deciduous trees, using twigs or branches as nesting material, or nest in cavities in trees or on cliffs. Tall mature eucalyptus, pine, cottonwood, and other tree species occurring in the BSA provide suitable nesting habitat for raptors. A nesting red-tailed hawk was observed within the BSA during field surveys conducted in 2016, providing

evidence of the BSA's suitability to provide nesting habitat for raptors. The nesting period for raptors generally occurs between January 15 and August 31.

In addition to the detection of Cooper's hawk in the BSA, five special-status raptor species were determined to have Low potential to occur in the BSA as migrating or foraging transients, but likely not as nesters in the BSA (see Table 3). No special-status raptor species identified during the database reviews was determined to have a moderate or high potential of occurrence in the BSA. However, as a group, raptor species have been both detected and observed nesting within the BSA. Cooper's hawk, observed during field surveys, is discussed further below.

Cooper's Hawk

Cooper's hawk is designated as a WL species by CDFW. This species is a breeding resident throughout most of the wooded portion of California, ranging in elevation from sea level to above 2,700 meters (approximately 8,860 feet) amsl. Outside of the breeding season, it disperses widely from southern Canada to northern Mexico and locally occurs less frequently in mountain areas than at lower elevations. In natural environments, Cooper's hawk nests primarily in oaks, eucalyptus, and riparian willows (Asay 1987), where it builds high in trees, but beneath the canopy. It forages in broken woodland and habitat edges, hunting mammals, birds, amphibians, and reptiles. A study in Orange County, California, has demonstrated that this species has successfully adapted to nesting and foraging in urban environments, where smaller birds are plentiful, and tall trees and buildings provide nesting sites (Chiang et al. 2012).

Cooper's hawk was incidentally observed during general biological resource surveys in 2016 and during the Wildlife Movement Study in 2020. Three CNDDB records of this species from the La Habra and surrounding eight quadrangles were identified during the database review, with the nearest record from 2012 approximately 12 miles northeast of the BSA. Trees suitable for nesting Cooper's hawk occur within the BSA.

3.2.3.2 Special-Status Passerine and Non-Passerine Landbirds

Passerines (perching birds) are a taxonomic grouping that consists of several families including swallows (*Hirundinidae*); larks (*Alaudidae*); crows, ravens, and jays (*Corvidae*); shrikes (*Laniidae*); vireos (*Vireonidae*); finches (*Fringillidae*); and Emberizids (*Emberizidae*; warblers, sparrows, blackbirds, etc.), among others. Non-passerine land birds are a non-taxonomic-based grouping typically used by ornithologists to categorize a loose assemblage of birds. Families grouped into this category include kingfishers (*Alcedinidae*), woodpeckers (*Picidae*), swifts (*Apodidae*), hummingbirds (*Trochilidae*), and pigeons and doves (*Columbidae*), among others. Habitat, nesting, and foraging requirements for these species are wide ranging; therefore, outlining generic habitat requirements for this grouping is difficult. These species typically use most habitat types and are known to nest on the ground; in shrubs and trees; on buildings; under bridges; and within cavities, crevices, and manmade structures. Many of these species migrate over long distances and all species, except starlings, English house sparrows, and rock doves (pigeons), are protected under the federal MBTA and CFGC. The nesting period for passerines and non-passerine land birds generally occurs between February 15 and September 15, depending on species

and climatic conditions. Suitable nesting and foraging habitat is present within the BSA for passerine and non-passerine land birds that were observed during the field surveys and are listed in Appendix B, Table B.

Several regional special-status passerine and non-passerine land bird species were considered during the preparation of this report (Appendix D, Table B). Four special-status passerine and non-passerine landbird species including, coastal California gnatcatcher, least Bell's vireo, yellow warbler, and yellow-breasted chat were detected in the BSA and an additional two species, great blue heron (*Ardea herodias*; tracked by CDFW in CNDDB) and California horned lark (*Eremophila alpestris actia*; CDFW WL), have Moderate potential to occur due to the presence of habitats in the BSA potentially suitable for nesting and/or foraging by these species (see Table 3). These six species are discussed further below.

Coastal California Gnatcatcher

Coastal California gnatcatcher (CAGN) is listed as threatened under FESA (USFWS 1993) and is designated as a SSC by CDFW. In 2007, USFWS published a final rule designating revised Critical Habitat for the species (USFWS 2007). As previously indicated, the BSA coincides with Critical Habitat for this species, which is discussed further in Chapter 3.3. CAGN is a local and uncommon year-round resident of southern California, found in the six southern-most California counties located within the coastal plain (San Bernardino, Ventura, Los Angeles, Orange, San Diego, and Riverside). The species generally inhabits Diegan coastal sage scrub and Riversidian coastal sage scrub dominated by California sagebrush and California buckwheat, generally below 1,500 feet amsl along the coastal slope. When nesting, this species typically avoids slopes greater than 25 percent that include dense, tall vegetation.

Focused surveys following USFWS (1997) protocols were conducted in 2016 across two locations with habitat potentially suitable for the species. Surveys covered disturbed coastal sage scrub habitat southwest of the intersection of Brea Boulevard and Tonner Canyon Road and another area approximately 0.30 mile to the northeast, where disturbed coastal sage scrub occurs along the north side of Brea Boulevard. A CAGN pair were detected during all six protocol surveys in 2016 at the southwest corner of Brea Boulevard and Tonner Canyon Road (see Figure 5). This pair was observed using the entire disturbed coastal sage scrub habitat at that location. During the sixth (last) survey conducted, on June 13, 2016, two juvenile CAGN were observed flying into the area from the north side of Brea Boulevard. This family group of four remained in the sage brush habitat throughout the duration of the survey. No CAGN were observed in the disturbed coastal sage scrub habitat located on the north side of Brea Boulevard to the northeast. Habitat at this location is only marginally suitable, with fewer native plant species observed in the survey area, compared to the location where the species was detected. Due to the observed presence of the species during the 2016 protocol surveys, this species is considered present within the BSA. A description of the species and the methods and results of 2016 protocol CAGN surveys are included in the 45-Day Report (AECOM 2017a) prepared at completion of the surveys and included as Appendix E in this report.

Least Bell's Vireo

Least Bell's vireo (LBVI) is listed as endangered under FESA (USFWS 1986) and as endangered under CESA (CDFW 2004). USFWS designated Critical Habitat for the subspecies in 1994 (USFWS 1994) and a draft recovery plan was prepared by USFWS and circulated for review in 1998 (USFWS 1998). The BSA does not coincide with Critical Habitat for this species. The nearest Critical Habitat occurs approximately 15 miles east at Prado Dam in Riverside County.

Historically, this subspecies of Bell's vireo was a common summer visitor to riparian habitat throughout much of California. Currently, least Bell's vireo is found only in riparian woodlands in southern California, with the majority of breeding pairs in San Diego, Santa Barbara, and Riverside Counties.

LBVI is migratory and generally arrives in southern California in late March/early April; it leaves for its wintering grounds in September. The species primarily occupies riparian woodlands that include dense cover within 3 to 7 feet of the ground and a dense, stratified canopy. It inhabits low, dense riparian growth along water or along dry parts of intermittent streams. The understory is typically dominated by species of willow and mulefat. Overstory species typically include cottonwood (*Populus* sp.), western sycamore (*Platanus racemosa*), and mature willows. The subspecies typically builds nests in vegetation 3 to 4 feet above the ground (Salata 1984) where there is moderately open midstory cover with an overstory of willows, cottonwoods, sycamores, or coast live oaks. Nests are also often placed along internal or external edges of riparian thickets at an average of 3.3 feet above the ground (Unitt 2004). Riparian plant succession is an important factor in maintaining vireo habitat.

Focused surveys for LBVI were conducted in 2016 following current USFWS (2001) protocols across all riparian habitat in the BSA, regardless of quality. This includes the primary riparian corridor that winds along Brea Boulevard through the middle of the BSA and a small riparian area in the northeastern portion of the BSA. LBVI was not observed during protocol surveys, but a lone male was incidentally detected during protocol southwestern willow flycatcher surveys that were conducted across the same riparian habitat in 2016. A lone male LBVI was also incidentally detected in the same general location at Bridge 1 during general biological surveys conducted in 2016. Further incidental observations of least Bell's vireo were made in 2020 by biologists conducting field efforts associated with the Wildlife Movement Study. No nesting LBVI were detected during any field surveys conducted by AECOM since 2016. Due to the incidental observations, this species is considered present within the BSA. A description of the species and the methods and results of 2016 protocol LBVI surveys are included in the 45-Day Report (AECOM 2017b) prepared at completion of the surveys and included as Appendix F in this report.

Los Angeles County

Orange County

Unincorporated County of Orange

Proposed Wildlife Overpass/ Land Bridge

Bridge 3

Bridge 2

Bridge 1

Brea Creek

Brea Creek

Brea Creek

Brea Canyon Channel

Brea Boulevard

57

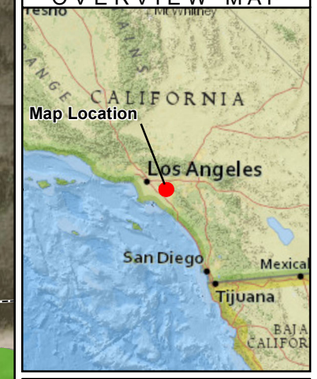
Tonner Canyon Road

Tonner Canyon Creek

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP



Existing Right of Way

City Boundary

Biological Survey Area

Proposed Bridges

USFWS-Designated Critical Habitat

Coastal California Gnatcatcher (Unit #9)

Coastal California Gnatcatcher Occurrences

0 800

Feet

NORTH

Scale 1:9,600

1 inch = 800 feet

Brea Boulevard Corridor Improvement Project

USFWS-Designated Critical Habitat

Date: 9/27/2022 Project: 60492260

AECOM

Figure 5

This page intentionally left blank.

Southwestern Willow Flycatcher

Southwestern willow flycatcher (SWFL), a subspecies of willow flycatcher (*Empidonax traillii*), was listed by CDFW as endangered in California in 1991 (CDFG 1991) as part of the state endangered listing of the full species (willow flycatcher). SWFL was also federally listed as endangered in 1995 (USFWS 1995). This subspecies can only be separated from other willow flycatcher subspecies in the field geographically by breeding range. SWFL breeds in New Mexico, Arizona, southern California, Nevada, Utah, and possibly west Texas (Rourke et al. 1999). In 2005, USFWS issued the final ruling to designate critical habitat for SWFL (USFWS 2005), none of which coincides with the BSA. The nearest Critical Habitat for this species occurs nearly 30 miles to the east-northeast in Riverside County.

SWFL generally begin arriving on breeding territories in southern California in early May, but the northern subspecies (*E. t. brewsteri*) may migrate through southern breeding areas through mid-June. Both male and female migrant willow flycatchers frequently sing, and determining whether an individual is a resident (SWFL) or a migrant (willow flycatcher) cannot be accomplished from a single detection.

Focused surveys for SWFL were conducted in 2016 following protocols adopted by USFWS (Sogge et al. 2010). Similar to LBVI surveys that were conducted, SWFL protocol surveys covered all riparian habitat in the BSA, regardless of quality. No SWFL were observed during any surveys. Riparian habitat in the BSA is narrow, disturbed, and includes significant non-native species. The combination of a narrow riparian corridor with significant disturbances, makes it unlikely that SWFL could or would successfully breed within the BSA. Only one regional CNDDB record was identified during database reviews and this record is from 1906 in the vicinity of the City of Pasadena in Los Angeles County. As a result of negative survey results in 2016, lack of potentially suitable habitat for the species, and lack of recent regional records, this species is not expected to occur within the BSA. A description of the species and the methods and results of 2016 protocol SWFL surveys are included in the 45-Day Report (AECOM 2017c) prepared at completion of the surveys and included as Appendix G in this report.

Great Blue Heron

Nesting colonies of great blue heron are tracked by CDFW in the CNDDB. This species is fairly common throughout most of California in shallow estuaries and fresh and saline emergent wetlands. They are less common along riverine and rocky marine shores, in croplands, pastures, and in mountains above foothills. For nesting, great blue herons prefer secluded groves of tall trees near shallow-water feeding areas.

This species prefers nesting in tall trees, often utilizing eucalyptus trees. A nesting colony of this species has been recorded near Anaheim Lake approximately 6 miles south of the BSA. Tall mature eucalyptus and other trees suitable for nesting herons are present in the BSA, but no evidence of a nesting colony was observed during field surveys. However, this species has Moderate potential to occur in the BSA as a new or relocated nester or as a foraging individual along Brea Creek, due to the presence of potentially suitable habitat.

California Horned Lark

California horned lark, a CDFW WL species, is a ground-dwelling bird common in open, sparsely vegetated areas such as grasslands, deserts, and agricultural areas. They congregate in moderately sized flocks, feeding mostly on insects and other small invertebrates. California horned larks nest on the ground, building a small grass-lined cup in slight depressions in the open. They are year-round residents in much of California, though they are not found at high altitudes in the Sierra Nevada or in dense forests in the northwest of the state. They breed in open areas throughout their range.

One regional record of this species was identified during the database review, from approximately 3 miles east-northeast of the BSA in disturbed habitat with some non-native grass cover and adjacent to development, similar to conditions that also exist within the BSA. Although there is only one regional occurrence of this species, habitat in the BSA is suitable for this species and the regional record from the vicinity is from similar habitat within 3 miles of the BSA. As a result, this species has Moderate potential to occur within the BSA.

Yellow-Breasted Chat

Yellow-breasted chat, a CDFW SSC, is primarily found in dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with a well-developed understory. Nesting areas are associated with streams, swampy ground, and the borders of small ponds. This species is known to breed in southern California mountain ranges and overwinters in Imperial and Colorado River valleys.

This species was incidentally observed during protocol least Bell's vireo and southwestern willow flycatcher surveys conducted in 2016 and has been incidentally observed in the BSA during subsequent general biological field surveys. Eight regional records of this species, all from within the past 20 years were identified during database reviews, with the nearest occurrence from 2016 and approximately 5 miles to the east. This species is considered present in the BSA.

Yellow Warbler

Yellow warbler, a CDFW SSC, prefers wet riparian habitat but is also found in large cottonwoods in drier riparian areas. They breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland.

This species was incidentally observed during protocol CAGN, LBVI, and SWFL surveys conducted in 2016 and has been incidentally observed in the BSA during subsequent general biological field surveys. Six regional records of this species, all from within the past 20 years were identified during the database search, with the nearest occurrence from 2016 and approximately 5 miles to the east of the BSA. This species is considered present in the BSA.

3.2.4 Mammals

Of the 13 special-status mammal species identified from the database review, six species were determined to have Low potential to occur in the BSA, and the remaining seven are not expected to occur in the BSA due to the absence of habitats preferred by these species (see Appendix D, Table B). No special-status mammal species were observed during field surveys or have been recorded from the BSA. The six mammal species with Low potential include American badger (*Taxidea taxus*) and five bat species, western mastiff batt (*Eumpos perotis californicus*), western yellow bat (*Lasiurus xanthinus*), Yuma myotis (*Myotis yumanensis*), pocketed free-tailed bat (*Nyctinomops femorosaccus*), and big free-tailed bat (*Nyctinimops macrotis*) (see Table 3). Bats are discussed further below.

Bats

Mature trees, existing bridges and structures in the BSA provide suitable day and night-roosting habitat for bats; however, records of special-status bats in the region are often 30 plus years old and/or are from 10 or more miles away from the BSA. Suitable habitat for maternity colonies generally includes caves, cliff/rock crevices, and large structures such as bridges or buildings, which are absent from the BSA. Onsite bridges and structures in the BSA are generally small and as a result, bat maternity colonies are not anticipated to occur within the BSA.

During field surveys, AECOM biologists observed that bat panels are installed on the underside of the State Route 57 bridge over Tonner Canyon Road. This bridge occurs in the BSA approximately 200 feet south of the project limits on Tonner Canyon Road and is a large structure with ample room beneath the bridge and ground level. During spring surveys conducted in 2016, no colonial roosting was observed on this bridge during day-time surveys, however, with water sources in the form of Tonner and Brea Creeks and native riparian habitat and other vegetation in the immediate vicinity suitable for foraging, this bridge structure most likely supports bat roosting, and potentially serve as a colonial maternity site.

3.3 SENSITIVE NATURAL COMMUNITIES

Sensitive natural communities are those that are designated as rare in the region by the CNDDB or CDFW, support special-status plant or wildlife species, or receive regulatory protection (i.e., Section 404 of the federal Clean Water Act (CWA) and/or Sections 1600 et seq. of the CFGC).

3.3.1 Sensitive Natural Vegetation Communities

Rare natural vegetation communities are given the highest inventory priority (Holland 1986; CDFG 2010). Based on a review of the CNDDB (CDFW 2021a), eight sensitive vegetative communities have been recorded within the La Habra and surrounding eight quadrangles, including, California Walnut Woodland, Riversidian Alluvial Fan Sage Scrub, Southern California Arroyo Chub/Santa Ana Sucker Stream, Southern Coast Live Oak Riparian Forest, Southern Costal Salt Marsh, Southern Cottonwood Willow Riparian Forest, Southern Willow Scrub, and Walnut Forest. Although these sensitive natural communities are not recorded in the CNDDB from the BSA, MCV-equivalent communities for two of CNDDB communities

were mapped within the BSA, including California Walnut Woodland (MCV=California Walnut Grove) and Southern California Coast Live Oak Riparian Forest (MCV=Coast Live Oak Riparian Forest).

According to the CDFW, funding for the natural community's portion of the CNDDB program was halted in the mid-1990s. At the time, approximately 2,500 occurrences of 96 sensitive natural community types had been entered in the CNDDB, all based on Holland's (1986) classification. No new occurrences have been added into the CNDDB since then, and CDFW's focus is now on completing an updated statewide classification, element ranking, and map of natural vegetation communities. Once the entire state is classified and mapped, the CDFW will be able to review the existing occurrences in the CNDDB and update them individually by existence, type, and global and state rarity ranking. CDFW will not remove these Holland-based elements from the CNDDB before assessing them and reclassifying them in terms of the currently accepted state and national standards for vegetation classification (CDFW 2020c). Based on the most-recent CDFW list of California Sensitive Natural Communities (CDFW 2020d), the following sensitive natural communities occur within the BSA:

- Arroyo Willow Thickets
- Black Willow Riparian Forest
- California Walnut Grove
- California Walnut-Laurel Sumac
- Coast Live Oak Woodland
- Coast Live Oak Riparian Forest

3.3.2 USFWS-Designated Critical Habitat

Critical Habitat areas are designated by USFWS for species listed under FESA as space for individual populations to grow and for normal behavior by the species. Critical Habitat areas provide cover, shelter, food, water, light, minerals and other nutritional or physiological requirements for survival of the species. Critical Habitats provide sites for breeding and rearing offspring and habitat that are protected for disturbances and are representative of the historical geographical distribution of the species (USFWS 2017).

As identified in Chapter 3.2 and depicted in Figure 5, USFWS-designated Critical Habitat for CAGN coincides with the BSA. The BSA lies within Critical Habitat *Unit 9: East Los Angeles County-Matrix NCCP Subregion of Orange County*, which stretches across the Montebello Hills, Puente-Chino Hills, and Western Coyote Hills. Core populations of the species are known to occur along the south slopes of the Puente-Chino Hills, from the City of Whittier east to the City of Yorba Linda (USFWS 2007). Nearly all of the BSA coincides with Unit #9. Approximately 33 acres of developed land cover in the southwestern portion of the BSA and approximately one acre of upland ruderal vegetation in the far northeastern corner of the BSA fall outside Critical Habitat, leaving a total of approximately 232.36 acres of the BSA that coincide with coastal California gnatcatcher Critical Habitat. Of this, 20.78 acres of habitat preferred by this species in the form of disturbed coastal sage scrub occurs within the BSA. This community includes California sagebrush shrubs and other native shrubs; however, as described in Chapter 2.3, it also includes significant cover of non-native herbaceous species.

A family group of CAGN were found utilizing an approximately 5-acre area of disturbed coastal sage scrub habitat occurring at the southwest corner of the intersection of Brea Boulevard and Tonner Canyon Road (see Figure 5). This was the only area of habitat that CAGN were detected in during any of the surveys. Other areas of disturbed coastal sage scrub in the BSA where CAGN were not detected have a greater component of non-native herbaceous cover and occur within close proximity of either Brea Boulevard or SR-57.

3.3.3 Jurisdictional Aquatic Features

As indicated in Chapter 2.2, field surveys were conducted by AECOM to assess and map potential aquatic and riparian jurisdictional features in the BSA subject to CWA and CFGC permitting. Surveys focused on Brea Creek and the location of the three bridges that will be replaced under the Project. An Aquatic Resource Delineation Report (AECOM 2022) was prepared to present the methods, results, regulatory settings, and permitting implications associated with Project impacts to jurisdictional features at the bridge locations.

The BSA is located within the northeastern portion of the Coyote Creek watershed, which drains the City of Brea and neighboring Buena Park, Fullerton, La Habra, and La Palma. Coyote Creek is a principal tributary to the San Gabriel River, draining into Alamitos Bay and the Pacific Ocean. AECOM delineated approximately 6.52 acres of wetlands and other waters within the BSA, including 1.89 acres of wetland waters, subject to the federal CWA (Waters of the U.S. [WoUS]) and approximately 17.73 acres of stream and riparian habitats within the BSA subject to CFGC (Waters of the State [WoST]) regulations. Table 4 below presents WoUS and Table 5 WoST by feature type occurring within the BSA. Delineated resources are depicted in Figure 6.

Table 4
Waters of the U.S. within the BSA

Jurisdictional Agencies: US Army Corps of Engineers (USACE)/ Regional Water Quality Control Board (RWQCB)	**BSA**	
	(acres)	**(linear feet)**
UNVEGETATED		
Non-Wetland WoUS / Open Water Channel (Brea Creek)	2.14	10,798
Tonner Canyon Creek	0.14	772
Non-Wetland WoUS (Under Bridge 1)	0.02	n/a
Non-Wetland WoUS (Under Bridge 2)	0.03	n/a
Non-Wetland WoUS (Under Bridge 3)	0.02	n/a
Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)	1.52	1,760
Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237
Non-Wetland WoUS (Unvegetated; Ephemeral Drainages[1])	0.16	3,398
VEGETATED		
Wetland WoUS	1.89	n/a
USACE/RWQCB Jurisdiction	**6.52**	**17,965**

[1] The ephemeral drainages are jurisdictional to the USACE/RWQCB per Section 404/401, and these features would also be considered jurisdictional to RWQCB as WoST; Note: Totals may not add up due to rounding.

Table 5
Waters of the State within the BSA

Jurisdictional Agency: CDFW	Study Area (Buffer) (acres)	Study Area (Buffer) (linear feet)
UNVEGETATED		
Streambed / Open Water Channel (Brea Creek)	2.14	10,798
Tonner Canyon Creek	0.14	772
Streambed (Under Bridge 1)	0.02	n/a
Streambed (Under Bridge 2)	0.03	n/a
Streambed (Under Bridge 3)	0.02	n/a
Streambed (Unvegetated; Concrete-lined Box Channel)	1.52	1,760
Streambed (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237
Streambed (Unvegetated; Rip rap-lined Trapezoidal Banks)	1.09	n/a
Streambed (Ephemeral Tributary Drainages)[1]	0.16	3,398
VEGETATED		
Streambed Wetlands (equivalent to USACE/RWQCB wetlands)	1.89	n/a
CDFW-Only Riparian Habitat (adjacent to "Streambed Wetlands")	10.12	n/a
CDFW Jurisdiction	**17.73**	**17,965**

[1] The ephemeral drainages are jurisdictional to the USACE/RWQCB per Section 404/401, and these features would also be considered jurisdictional to RWQCB as WoST.

Note: Totals may not add up due to rounding.

Los Angeles County
Orange County
Unincorporated County of Orange
City of Brea
Bridge 1
Bridge 2
Bridge 3
Brea Creek
Brea Canyon Channel
Brea Boulevard
Tonner Canyon Road
57

OVERVIEW MAP

- 500 ft Disturbance Buffer
- City Boundary
- Existing Bridges
- Erosional Feature
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 500
Feet

NORTH

Scale 1:6,400
1 inch = 533 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions)

Date: 9/26/2022 Project: 60492260

AECOM **Figure 6**

This page intentionally left blank.

CHAPTER 4.0
APPLICABLE REGULATIONS

As discussed in some of the previous chapters, several regulations have been established by federal, state, and local agencies to protect and conserve biological resources. The descriptions below provide an overview of agency regulations that may be applicable to the resources that occur within the Project and regulations that require an analysis. The final determination of whether permits are required is made by the regulating agencies.

4.1 FEDERAL REGULATIONS AND STANDARDS

Federal Endangered Species Act (FESA)

Enacted in 1973, FESA provides for the conservation of threatened and endangered species and their ecosystems (United States Code [U.S.C.] Title 16, Chapter 35, Sections 1531–1544). FESA prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from USFWS through a permit under Section 7 or 10(a) of FESA. "Take" under FESA is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct", as well as has been interpreted to include the adverse modification of critical habitat.

Section 7 of FESA requires all Federal agencies to use their authorities to conserve endangered and threatened species in consultation with USFWS. This is a 'proactive conservation mandate' identified in section 7(a)(1) of FESA. Section 7(a)(2) directs all Federal agencies to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of endangered or threatened species or destroy or adversely modify critical habitat.

Formal consultation under Section 7 of FESA would be required if the Project had the potential to affect a federally-listed species that has been detected within or adjacent to the BSA. Two federally-listed species were detected during field surveys of the BSA, including coastal California gnatcatcher (threatened) and least Bell's vireo (endangered). It is anticipated that during OC Public Works coordination with USACE regarding CWA permitting for impacts to jurisdictional waters, USACE in compliance with Section 7 of FESA, would consult with USFWS regarding potential impacts of the Project to these federally-listed species.

Migratory Bird Treaty Act

Congress passed the MBTA in 1918 to prohibit the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA (U.S.C. Title 16, Chapter 7, Subchapter II, Sections 703–712). The prohibition applies to birds included in the respective international conventions between the United States and Great Britain, the United States and Mexico, the United States and Japan, and the United States and Russia.

No permit is issued under the MBTA; however, the Project would employ measures outlined in Chapter 6 that would avoid or minimize impacts on protected migratory birds.

Clean Water Act

Under Section 404 of the CWA, the Corps regulates the discharge of dredged or fill material into jurisdictional waters of the U.S., which include those waters listed in 33 CFR 328.3 (Definitions) (U.S.C. Title 33, Chapter 26, Sections 101–607). Section 401 of the CWA requires a water quality certification from the state for all permits issued by the Corps under Section 404 of the CWA. RWQCB is the state agency in charge of issuing a CWA Section 401 water quality certification or waiver.

The U.S. Environmental Protection Agency (EPA) and USACE published the Navigable Waters Protection Rule (2020 NWPR) in the Federal Register on April 21, 2020 to finalize a revised definition of "waters of the United States," as regulated under Section 404 of the CWA. The rule, which became effective in June 2020, aims to streamline the definition so that it includes simple categories of jurisdictional waters, provides clear exclusions for water features that traditionally have not been regulated, and defines terms in the regulatory text that were previously undefined in statute. The 2020 NWPR regulates the nation's navigable waters and the core tributary systems that provide perennial or intermittent flow into them. The new definition eliminated the application of a significant nexus test and relies more explicitly on surface water connectivity to determine jurisdiction.

The 2020 NWPR recognizes four categories of waters that are considered jurisdictional waters of the U.S. These categories include (a)(1) territorial seas and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; (a)(2) tributaries; (a)(3) lake and ponds, and impoundments of jurisdictional waters; and (a)(4) adjacent wetlands.

The 2020 NWPR also specifically identifies features that are considered non-jurisdictional. Examples include (b)(2) groundwater; (b)(3) ephemeral features that flow only in direct response to precipitation, including ephemeral streams, swales, gullies, rills, and pools; (b)(5) ditches that are not traditional navigable waters, tributaries, or that are not constructed in adjacent wetlands (subject to certain limitations); (b)(8) artificial lakes and ponds that are not jurisdictional impoundments and that are constructed or excavated in upland or non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the conditions of paragraph (c)(6).

As presented in Chapter 3.3.3, jurisdictional WoUS in the form of Brea Creek and Tonner Creek occur in the BSA. Proposed discharges of fill to Brea Creek during bridge replacement would require authorization by USACE. Per the USACE Los Angeles District's Final Regional Conditions that were issued for USACE's 2017 Nationwide Permit (NWP) Program, the Project may be authorized to proceed under NWP 14 for transportation activities.

4.2 STATE REGULATIONS AND STANDARDS

California Fish and Game Code

CFGC regulates the taking or possession of birds, mammals, fish, amphibians, and reptiles, as well as impacts to natural resources such as wetlands and waters of the state. It includes the California Endangered Species Act (CESA) (Sections 2050–2115) and Lake or Streambed Alteration Agreement regulations (Section 1600 et seq.).

Wildlife "take" is defined by CDFW as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Protection extends to the animals, dead or alive, and all their body parts. Section 2081 of CESA allows CDFW to issue an incidental take permit for state-listed threatened or endangered species, should the Project have the potential to "take" a State-listed species that has been detected within or adjacent to the Project. Certain criteria are required under CESA prior to the issuance of such a permit, including the requirement that impacts of the take are minimized and fully mitigated.

One state-listed endangered species, least Bell's vireo, has been detected in the BSA and may be affected by the Project. It is anticipated that potential impacts of the Project on least Bell's vireo would be addressed with CDFW during the Lake and Streambed Alteration Agreement (LSAA) process. A permit under Section 2081 may be required by CDFW for the Project.

As presented in Chapter 3.3.3, streambed and riparian habitats associated with Brea Creek and Tonner Creek that fall under CDFW jurisdiction occur within the BSA. Impacts to Brea Creek during bridge replacements would require preparation and submittal of a LSAA Notification to CDFW and coordination with CDFW regarding issuance of an LSAA for the Project.

Porter-Cologne Water Quality Control Act

Under Section 13000 et seq., of the Porter-Cologne Act, RWQCB is the agency that regulates discharges of waste and fill material within any region that could affect waters of the state (California Water Code [CWC] 13260[a]), including wetlands and isolated waters as defined by CWC Section 13050(e).

A Water Discharge Report under Porter-Cologne is not anticipated, as activities would impact the vegetated ephemeral drainage feature, potentially considered as waters of the state and under the jurisdiction of the RWQCB.

California Environmental Quality Act[3]

CEQA requires that biological resources be considered when assessing the environmental impacts resulting from proposed actions. CEQA does not specifically define what constitutes an "adverse effect" on a biological resource. Instead, lead agencies are charged with determining what specifically should be considered an impact. This report has been prepared for project compliance with CEQA in support of an Environmental Impact Report prepared for this project.

[3] PRC Section 21000 et seq. and the State CEQA Guidelines, California Code of Regulations, Section 15000 et seq.

4.3 LOCAL REGULATIONS AND STANDARDS

The Project is not located within the Orange County Central Coastal Natural Communities Conservation Plan (NCCP)/Habitat Conservation Plan (HCP).

CHAPTER 5.0
IMPACTS ON BIOLOGICAL RESOURCES

Biological resources may be either directly or indirectly impacted by a project. Direct and indirect impacts may be either permanent or temporary in nature. These impact categories are defined below.

Direct: Any alteration, physical disturbance, or destruction of biological resources that would result from project-related activities is considered a direct impact. Examples include clearing vegetation, loss of individual species and/or their habitats, and encroaching into wetlands or a river.

Indirect: As a result of project-related activities, biological resources may also be affected in a manner that is ancillary to physical impacts. Examples include elevated noise and dust levels, soil erosion, increased human activity, decreased water quality, and the introduction of invasive wildlife (domestic cats and dogs) and plants.

Permanent: All impacts that result in the long-term or irreversible removal of biological resources are considered permanent. Examples include constructing a building or permanent road on an area containing biological resources.

Temporary: Any impacts considered to have reversible impacts on biological resources can be viewed as temporary. Examples include the generation of fugitive dust during construction, or removing vegetation for the preparation of construction activities, and either allowing the natural vegetation to recolonize or actively revegetating impacted areas that haven't been permanently impacted.

Impacts on biological resources due to construction activities and operation of the Project are described in this chapter. Potential direct and indirect impacts from construction and operations activities to vegetation, wildlife, special-status plant and wildlife species, sensitive natural communities, wildlife movement corridors, and potential jurisdictional features are presented in the following sections.

5.1 CONSTRUCTION IMPACTS

5.1.1 Vegetation Communities

Project construction would impact primarily non-native vegetation communities and urban land cover types associated with the existing Brea Boulevard; however, native vegetation communities and aquatic habitats would also be impacted. The permanent and temporary impacts that would occur during Project construction are provided in Table 6 below and depicted in Figure 7a-7d. Acreages of vegetation communities and land cover types in the BSA are also included as reference.

Table 6
Permanent and Temporary Impacts to Vegetation Communities and Land Cover Types in the Project Limits

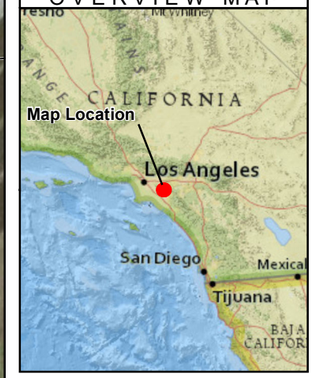
Vegetation Communities/ Land Cover Types	Acres in the BSA	Permanent Impacts (ac)	Temporary Impacts (ac)
Native Vegetation Communities			
Blue Elderberry Stands	1.27	0.07	0.04
Blue Elderberry - Toyon	8.34	0.30	0.81
California Walnut Groves*	0.88	0	0
California Walnut - Laurel Sumac*	6.58	0.27	0.49
Coast Live Oak Woodland*	8.09	1.19	1.17
Disturbed Coastal Sage Scrub	20.87	0.06	0.81
Poison Oak Scrub	1.35	0	0
Toyon - Laurel Sumac	6.09	0	0
Subtotal	***53.46***	***1.89***	***3.32***
Non-Native Vegetation Communities			
Eucalyptus Groves	9.18	0.71	0.83
Ornamental–Landscape Plants	9.68	0.02	0.37
Pepper Tree Groves	33.67	1.46	2.04
Ruderal	3.73	0.33	0.67
Tree of Heaven Groves	0.50	0.03	0.13
Upland Mustards and Ruderal Forbs	28.56	0.38	0.89
Subtotal	***85.32***	***2.91***	***4.93***
Aquatic and Riparian Communities			
Arroyo Willow Thickets*	4.84	0.24	0.50
Black Willow Riparian Forest*	8.70	0.13	0.30
Coast Live Oak Riparian Forest*	0.43	0.07	0.05
Unvegetated Channel	3.74	0	0
Subtotal	***17.71***	***0.44***	***0.86***
Land Cover Types			
Developed	95.64	3.99	5.88
Disturbed	35.61	1.82	2.84
Subtotal	***131.25***	***5.81***	***8.72***
TOTALS	**287.76**	**11.05**	**17.82**

* Denotes a CDFW Sensitive Natural Vegetation Community (CDFW 2021a and CDFW 2020d).
Note: Totals may not add up due to rounding.

Permanent impacts would occur upon ground disturbing activities, including grading to widen Brea Boulevard, installation of new larger bridge spans, retaining wall, and the wildlife overpass, and during modifications and enhancements to driveways connecting to Brea Boulevard. Temporary impacts would occur at temporary work areas from which road widening and installation of new bridge spans, the retaining wall, and the wildlife overpass would occur. Temporary impacts due to the proposed construction staging areas where Project equipment and materials would be temporarily stored would occur in areas where past human disturbances have previously occurred.

Los Angeles County
Orange County
Unincorporated County of Orange
City of Brea
Page b
Page c
Page d
Bridge 1
Bridge 2
Bridge 3
Proposed Wildlife Overpass/ Land Bridge
Brea Creek
Brea Canyon Channel
Tonner Canyon Creek
Tonner Canyon Road
Brea Boulevard
57

OVERVIEW MAP



- Biological Survey Area
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- City Boundary
- Map Index

Natural Vegetation Communities
- Blue elderberry stands
- Blue Elderberry - Toyon
- California walnut groves
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Non-Native Vegetation Communities
- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Aquatic and Riparian Communities
- Arroyo willow thickets
- Black Willow Riparian Forest
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Land Cover Types
- Developed
- Disturbed

0 620
Feet
NORTH

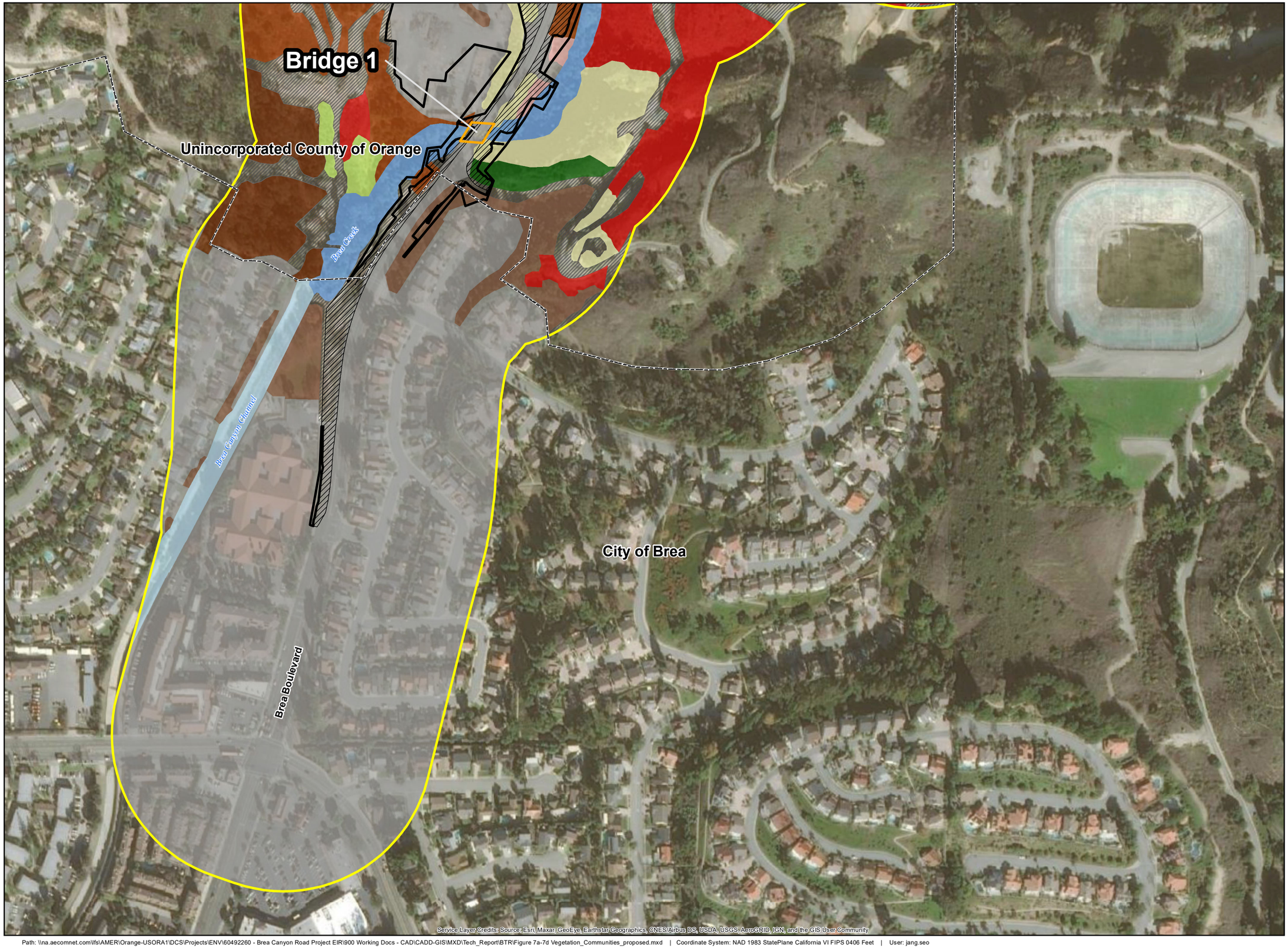
Scale 1:7,500
1 inch = 625 feet

Brea Boulevard Corridor Improvement Project

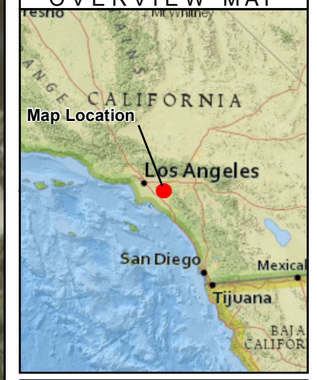
Vegetation Communities (Proposed Project)

Date: 9/26/2022 Project: 60492260

AECOM **Figure 7a**



OVERVIEW MAP



- Biological Survey Area
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Natural Vegetation Communities
- Blue elderberry stands
- Blue Elderberry - Toyon
- California Walnut - Laurel Sumac
- Coast live oak woodland

Non-Native Vegetation Communities
- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Upland mustards and ruderal forbs

Aquatic and Riparian Communities
- Arroyo willow thickets
- Unvegetated Channel

Land Cover Types
- Developed
- Disturbed

0 300
Feet

NORTH

Scale 1:3,600
1 inch = 300 feet

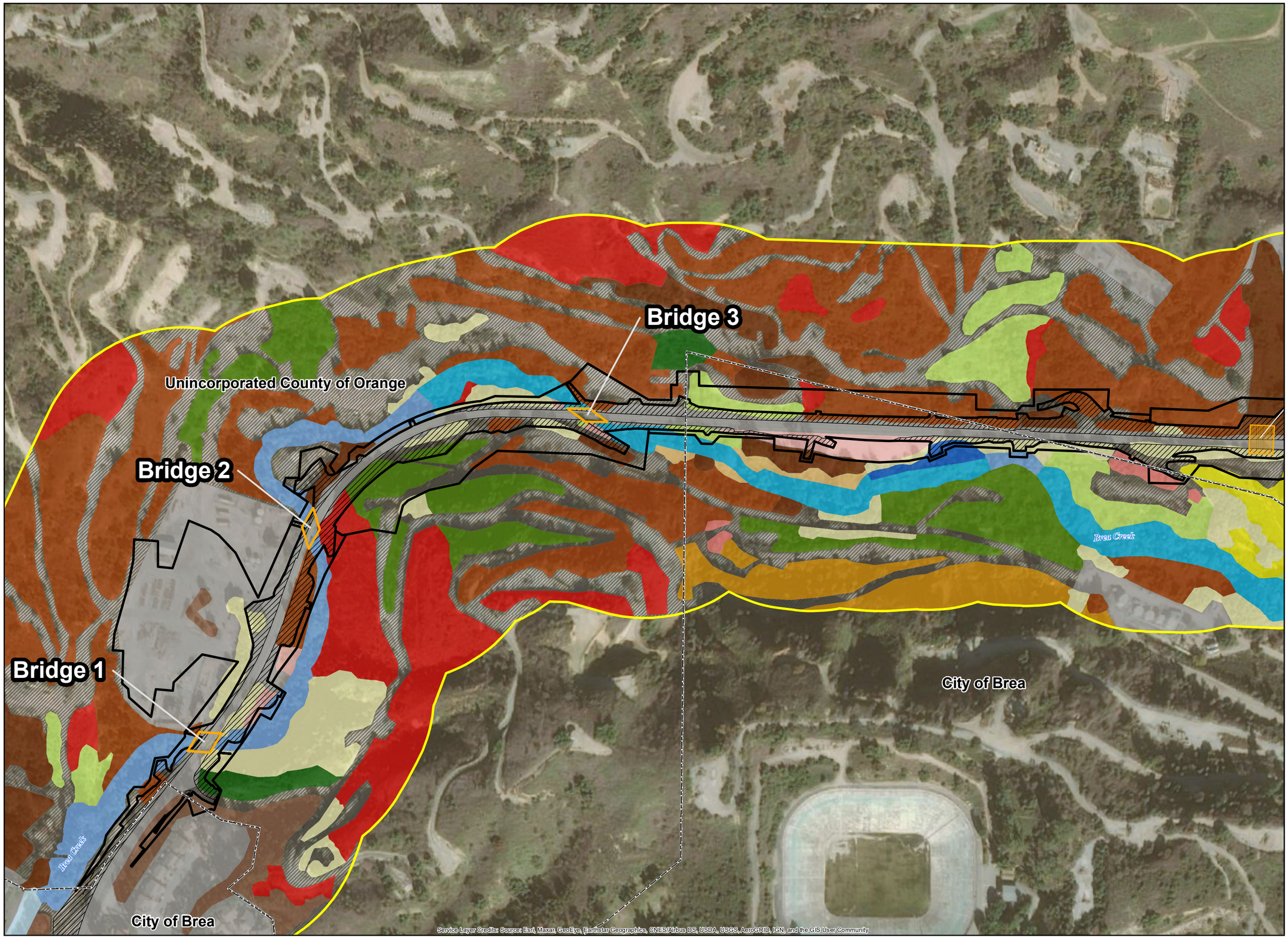
Brea Boulevard Corridor Improvement Project

Vegetation Communities (Proposed Project)

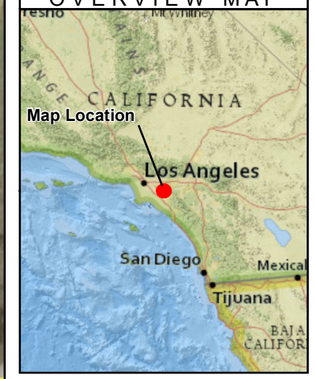
Date: 9/26/2022 Project: 60492260

AECOM

Figure 7b



OVERVIEW MAP



- Biological Survey Area
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Natural Vegetation Communities
- Blue elderberry stands
- Blue Elderberry - Toyon
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Non-Native Vegetation Communities
- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Aquatic and Riparian Communities
- Arroyo willow thickets
- Black Willow Riparian Forest
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Land Cover Types
- Developed
- Disturbed

0 300
Feet
NORTH

Scale 1:3,600
1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

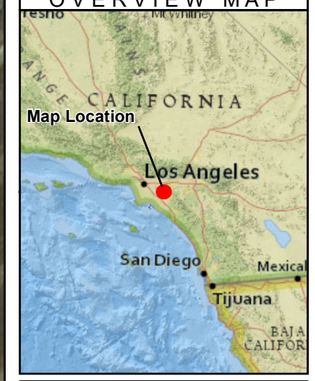
Vegetation Communities (Proposed Project)

Date: 9/26/2022 Project: 60492260

AECOM

Figure 7c

OVERVIEW MAP



- Biological Survey Area
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Natural Vegetation Communities

- Blue Elderberry - Toyon
- California walnut groves
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black Willow Riparian Forest
- Unvegetated Channel

Land Cover Types

- Developed
- Disturbed

0 300
Feet
NORTH

Scale 1:3,600
1 inch = 300 feet

Brea Boulevard Corridor
Improvement Project

Vegetation Communities (Proposed Project)

Date: 9/26/2022 Project: 60492260

AECOM

Figure 7d

Impacts to non-native vegetation communities (including ornamental-landscape plants) and developed and disturbed land cover types resulting from construction of the Project are not considered significant under CEQA; however, direct impacts to sensitive natural vegetation communities designated by CDFW (2021a, 2020d) may be considered a potential significant impact under CEQA. These communities usually require mitigation for any acreage impacted. The requirements for mitigation are finalized in conjunction with a LSAA that would be issued for the Project from CDFW for impacts to aquatic and riparian habitats during installation of the new bridges. Permitting and mitigation for impacts to these communities is discussed further in Section 5.1.4.1.

Indirect impacts to vegetation communities adjacent to the project limits could include the accumulation of fugitive dust, and the colonization of nonnative, invasive plant species. Other indirect impacts could include an increase in the amount of compacted or modified surfaces within the project limits that, if not controlled, could increase the potential for surface runoff, increased erosion, and sediment deposition within vegetation beyond the project limits. With implementation of typical construction BMPs related to biological resources as outlined in Chapter 6, indirect impacts to vegetation communities outside the project limits would be avoided and minimized, and not be considered significant.

5.1.2 Special-Status Plant Species

If present, individual special-status plant species could be directly damaged or destroyed from crushing or trampling during construction activities. Species adjacent to the project limits could also be indirectly affected, including by the accumulation of fugitive dust, the colonization of nonnative, invasive plant species, and an increase in the amount of surface runoff, increased erosion, and sediment deposition beyond the project limits. While such impacts would be short-term during the time of construction, they do exhibit a potential to harm native species and if they occurred, such impacts would be significant.

No federal or State-listed plant species have previously been documented within the BSA and none were observed during field surveys. Habitat conditions within the project limits are generally disturbed and dominated by non-native species and are not suitable for listed special-status plants. One non-listed special-status species, California black walnut (CRPR 4.2), is present in the BSA but outside the project limits, and other non-listed special-status species have potential to occur in the BSA (see Table 2) but are not expected within the project limits due to unsuitable conditions. As a result, direct impacts to special-status plant species are not anticipated. Further, with implementation of typical biological resource construction BMPs outlined in Chapter 6, and implementation of a Fugitive Dust Plan (FDP) to control dust, and a Stormwater Pollution Prevention Plan (SWPPP) to control erosion, runoff, and hazardous spills, indirect impacts to special-status plant species would be avoided and minimized, and not be considered significant.

5.1.3 Special-Status Wildlife Species

Two federally and/or State-listed wildlife species were identified during the field surveys, including coastal California gnatcatcher and least Bell's vireo. Additionally, four non-listed species, including Cooper's hawk, yellow-breasted chat, yellow warbler, and western pond turtle were detected in the BSA. A number of other special-status wildlife have some potential to occur within the BSA (see Table 3). In addition, birds protected by the MBTA and CFGC have the potential to nest within the BSA. Potential direct and indirect

impacts to special-status wildlife species and appropriate measures to reduce impacts to a level below significance are presented below.

5.1.3.1 Birds

Significant direct impacts to special-status bird species would occur if a bird or eggs were injured or killed during construction, or if vegetation suitable for nesting by special-status birds is removed. Indirect impacts to nesting birds within the vicinity of the project limits could occur as a result of dust, noise, vibrations, and increased human presence. Disturbances related to construction could result in changes in breeding behaviors which could decrease nesting attempts and/or increase nestling mortality due to nest abandonment or decreased feeding frequency. If such impacts were to occur, they would be considered significant.

Passerine and Non-Passerine Land Birds

Listed and non-listed special-status passerine and non-passerine land birds were detected in the BSA or have some potential to occur within the BSA. (see Table 3). Mature trees, shrubs, and other vegetation present in the BSA is suitable for nesting by these species and provide nearby foraging opportunities. Direct and indirect impacts to these species could occur during Project implementation as described above. With implementation of typical biological resource construction BMPs and an FDP, and by implementing mitigation measures BIO-1 through BIO-3 outlined in Chapter 6, direct and indirect impacts to listed and non-listed passerine and non-passerine land birds, and nesting by common bird species protected under the MBTA and CDFW would be less than significant.

Raptors

One non-listed special-status raptor, Cooper's hawk, was detected within the BSA. Common raptor species have also been detected within the BSA and an active red-tailed hawk nest was observed during field surveys. Although other regional special-status raptor species are not expected within the BSA or would likely occur only as a transient forager or migrant (see Table 3), non-listed raptors and nesting by common raptor species protected under the MBTA and CFGC, is expected to occur in the BSA. With implementation of typical biological construction BMPs and an FDP, and by implementing mitigation measure BIO-1 outlined in Chapter 6, direct and indirect impacts to listed and non-listed raptor species and nesting by common raptors protected under the MBTA and CDFW would be less than significant.

5.1.3.2 Reptiles

If present, individual special-status reptile species could be directly injured or killed from crushing or trampling during construction activities. Indirect impacts to reptiles occurring outside the project limits could occur during construction from increased noise, vibrations, accidental release of pollutants, excess sedimentation and erosion, and human intrusions into habitat outside the project limits that may affect habitat suitable for such species. If such impacts occur, they would be considered significant.

No federal or State-listed reptile species were observed during field surveys and only green turtle, an ocean species, was identified from the database reviews as having a recorded occurrence within the region. One

non-listed special-status reptile, western pond turtle, was detected in the BSA and four additional species have some potential to occur in the BSA (see Table 3). With implementation of typical biological resource construction BMPs and a SWPPP to control erosion, runoff, and hazardous spills, and implementation of mitigation measure BIO-4 outlined in Chapter 6, impacts to western pond turtle and other reptile species would be less than significant.

5.1.3.3 Invertebrates, Fish, and Amphibians

Special-status invertebrate and fish species are not anticipated to occur within the BSA and as a result, no impacts to such species would occur. However, if present, individual special-status amphibian species could be directly injured or killed from crushing or trampling during construction activities. Indirect impacts to amphibians occurring outside the project limits could occur during construction from increased noise, vibrations, accidental release of pollutants, excess sedimentation and erosion, and human intrusions into habitat outside the project limits that may affect habitat suitable for such species. If such impacts occur, they would be considered significant.

No federal or State-listed amphibian species were observed during field surveys and no regional records of listed amphibian species in the BSA were identified during the database reviews. Only western spadefoot (CDFW SSC) was identified and was determined to have Low potential to occur in the BSA (see Table 3). With implementation of typical biological resource construction BMPs and a SWPPP to control erosion, runoff, and hazardous spills, and implementation of mitigation measure BIO-4 outlined in Chapter 6, impacts to western spadefoot would be less than significant.

5.1.3.4 Mammals

If present, individual special-status terrestrial mammal species (non-bats) could be directly injured or killed from crushing or trampling during construction activities, or the collapse of burrows of fossorial mammals (i.e. American badger). Indirect impacts to terrestrial mammals occurring outside the project limits could occur during construction from increased noise, vibrations, accidental release of pollutants, excess sedimentation and erosion, and human intrusions into habitat outside the project limits that may affect habitat suitable for terrestrial mammals. If such impacts occur, they would be considered significant.

Bats

Bats could also be directly injured or killed during construction, including during tree removal. Indirect impacts to bats could occur as a result of increased noise, vibrations, and human presence during construction. Such disturbances could result in displacement from daytime roosts. Night roosts are susceptible to indirect impacts from construction as well, particularly to construction lighting during night-work. With implementation of typical biological resource construction BMPs and mitigation measure BIO-5 outlined in Chapter 6, indirect impacts from night-time construction lighting to night-time roosts would be less than significant.

No federal or State-listed mammal species were identified during the database reviews; however, a number of non-listed species are known from the region. No special-status mammal species were observed during field surveys and due to a lack of potentially suitable habitat, they are either not expected to occur within

the BSA, or have a Low potential to occur (see Appendix D, Table B). Five bat species and one terrestrial mammal (American badger) could potentially occur in the BSA (see Table 3). Suitable habitat for special-status terrestrial mammals is of marginal quality; however, mature trees and large structures may provide suitable crevice, cavity, and tree bark and foliage habitats that roosting bats utilize. Suitable habitat for maternity colonies generally includes caves, cliff/rock crevices, and large suitable structures such as bridges or buildings, which are limited in the BSA. Onsite bridges and structures in the BSA are generally small; however, bat panels in place on the SR-57 bridge over Tonner Canyon Road may provide a suitable colonial roosting site, although colonial roosting was not observed beneath the bridge during field surveys. As a result, there is some potential for special-status and common bat species protected under CFGC Section 4150 to occur within the BSA. With implementation of typical biological resource construction BMPs and mitigation measure BIO-5 outlined in Chapter 6, impacts to terrestrial mammals and bats would be less than significant.

5.1.4 Sensitive Natural Communities

Sensitive natural communities in the form of sensitive natural vegetation communities, USFWS- designated Critical Habitat for coastal California gnatcatcher, and aquatic resources under CWA and CFGC Section 1600 et seq. regulation occur within the BSA and are discussed below.

5.1.4.1 Sensitive Natural Vegetation Communities

Table 7 summarizes permanent direct impacts and temporary direct impacts to California Walnut Grove, California Walnut-Laurel Sumac, Coast Live Oak Woodland, Arroyo Willow Thickets, Black Willow Riparian Forest, and Coast Live Oak Riparian Forest.

Table 7
Permanent and Temporary Impacts to
Sensitive Natural Vegetation Communities

Sensitive Natural Vegetation Community	Permanent Direct Impacts (Acres and [Percent of total Sensitive Vegetation Community within the BSA])	Temporary Direct Impacts (Acres and [Percent of Total Sensitive Vegetation within the BSA)
California Walnut Grove	0	0
California Walnut-Laurel Sumac	0.27 (4%)	0.49 (7%)
Coast Live Oak Woodland	1.19 (15%)	1.17 (15%)
Arroyo Willow Thickets	0.24 (5%)	0.50 (10%)
Black Willow Riparian Forest	0.13 (2%)	0.30 (3%)
Coast Live Oak Riparian Forest	0.07 (15%)	0.05 (13%)

Arroyo willow thickets, black willow riparian forest, and coast live oak riparian forest habitats occurring within the project limits coincide with jurisdictional waters and riparian habitats subject to USACE and CDFW jurisdiction. Direct impacts to these communities would be addressed during coordination with regulatory agencies regarding CWA and CFGC Section 1600 et seq. permitting for impacts to WoUS and WoST, as described below in Section 5.1.4.3. The other two sensitive natural vegetation communities (i.e., California Walnut-Laurel Sumac and Coast Live Oak Woodland) occur adjacent to the riparian

corridor along Brea Creek (particularly the Coast Live Oak Woodland) and in upland areas (particularly the California Walnut-Laurel Sumac that occurs on hillsides along the north side of Brea Boulevard). Direct temporary and permanent impacts to these two communities would be linear in nature, occurring along the fringe of the widened roadway (Figures 7c and 7d). Individual California black walnut trees were detected as part of surveys within the BSA but are outside the project limits and therefore not expected to occur due to unsuitable conditions. However, individual coast live oak trees may be present within the temporary and/or permanent project limits for the widened roadway, the removal of which would be considered a potentially significant impact. With implementation of mitigation measure BIO-6 outlined in Chapter 6, impacts to coast live oak trees would be less than significant.

Indirect impacts to sensitive natural vegetation communities during construction could include the accumulation of fugitive dust, increase of surface runoff, increase of erosion, and increase of sediment deposition within vegetation beyond the project limits. With implementation of typical biological resource construction BMPs, an FDP and a SWPPP, indirect impacts to sensitive natural communities would be reduced to a level below significance.

5.1.4.2 USFWS-Designated Critical Habitat

As presented in Chapter 3.2.2, approximately 20.87 acres of disturbed coastal sage scrub habitat in the BSA potentially suitable for CAGN coincides with Critical Habitat for the species. Of this, an approximate 5-acre area at the southwest corner of the intersection of Brea Boulevard and Tonner Canyon Road was identified during protocol surveys as being utilized by CAGN and represents the most suitable area of coastal sage scrub habitat within the BSA, although it includes a significant amount of non-native herbaceous cover. Project construction would result in approximately 0.06 acre of direct permanent impacts and approximately 0.81 acre of direct temporary impacts to CAGN Critical Habitat associated with widening of Brea Boulevard at that location. These impacts would occur along the periphery of the disturbed coastal sage scrub habitat that occurs adjacent to the south side of Brea Boulevard (see Figure 7d); however, they would occur to habitat where coastal CAGN was detected during protocol surveys in 2016. For impacts to habitat that was documented as occupied in 2016 OC Public Works would be required to consult with USFWS regarding potential impacts of the Project on Critical Habitat. Despite their disturbed nature and relatively small sizes of temporary and permanent impact, OC Public Works' consultation with USFWS would determine the appropriate mitigation actions regarding the coastal sage scrub habitat, which could involve compensatory mitigation in the form of a Project-specific Habitat Mitigation and Monitoring Plan (HMMP) or a Habitat Conservation Plan (HCP). The applicable plan would be prepared and approved by the regulatory agencies (consistent with any requirements of applicable regulatory permits) and include information such as: identification of responsible parties, implementation timeframe and methods, procedures for soil and plant salvage (as applicable), proposed seed mixes/plant palette, duration and methods for monitoring and maintaining the site, performance standards used for judging implementation success, remedial measures that would be implemented (should restoration performance standards not be met), and specification of (through either a qualitative or quantitative assessment method) how the functions and values of habitat would be/have been replaced.

Indirect impacts to Critical Habitat during construction would be similar to those described above. Similarly, with implementation of typical biological resource construction BMPs, an FDP, a SWPPP, and implementation of mitigation measure BIO-7 outlined in Chapter 6, direct and indirect impacts to Critical Habitat, as well wildlife utilizing this Critical Habitat, would be reduced to a level below significance.

5.1.4.3 Jurisdictional Waters

As included below in Table 8 and presented in the Project's Aquatic Resource Delineation Report (AECOM 2022), the Project will temporarily impact approximately 0.31 acre of WoUS and permanently impact approximately 0.15 acre of WoUS falling under USACE and RWQCB (i.e. CWA) jurisdiction.

The Project will temporarily impact approximately 0.90 acre and permanently impact approximately 0.50 acre of streambed/banks that would be subject to CFGC Sections 1600–1616 and under CDFW jurisdiction. Table 9 included below presents the proposed impacts by water type (AECOM 2022). Figures 8a-8e depicts the project limits over the jurisdictional delineation.

Table 8
Potential Impacts to Waters of the U.S.

	BSA		Potential Temporary Impact[1]		Potential Permanent Impact[2]	
USACE/RWQCB	**(acres)**	**(linear feet)**	**(acres)**	**(linear feet)**	**(acres)**	**(linear feet)**
UNVEGETATED						
Non-Wetland WoUS (Open Water Channel) – Brea Creek	2.14	10,798	0.22	489	0.14	221
Tonner Canyon Creek	0.14	772	0	0	0	0
Non-Wetland WoUS (Bridge 1)[3]	0.02	n/a	0.02	n/a	0	0
Non-Wetland WoUS (Bridge 2)[3]	0.03	n/a	0.03	n/a	0	0
Non-Wetland WoUS (Bridge 3)[3]	0.02	n/a	0.02	n/a	0	0
Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)	1.52	1,760	0	0	0	0
Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237	0	0	0	0
Non-Wetland WoUS (Unvegetated; Ephemeral Drainages)	0.16	3,398	0.02	531	0.01	133
VEGETATED						
Wetland WoUS	1.89	n/a	0	n/a	0	n/a
USACE/RWQCB Jurisdiction	**6.52**	**17,965**	**0.31**	**1.020**	**0.15**	**354**

[1] Temporary impact acreage values may be considered a worst-case scenario. It is probable that many of the direct but temporary impacts to Brea Creek could be avoided.

[2] Essentially all impacts for this project are temporary, and the bridge covering open water is assumed to not be a permanent impact, especially given that the channel bottom will change from being concrete-lined to soft bottom (for Bridges 2 and 3). A trace acreage of wetlands was located under the new, larger bridges. This could be considered a permanent loss, but due to the soft bottom and large bridge sizes, it is anticipated that any wetlands may persist with the presence of the proposed bridges.

[3] Because the bridges allow for water and wildlife to freely move under the bridges (no culverts), the area of waters under the bridges is part of the overall calculation of surface waters. Culverts are viewed as a disruption in surface water area and linear feet, and thus are not counted as surface waters. A further discussion is provided in the Aquatic Resource Delineation Report [AECOM 2022]).

Note: Totals may not add up due to rounding.

Los Angeles County

Orange County

Unincorporated County of Orange

Bridge 3

Proposed Wildlife Overpass/ Land Bridge

Bridge 2

Bridge 1

Brea Creek

Brea Canyon Channel

Tonner Canyon Creek

Tonner Canyon Road

Brea Boulevard

57

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP

- 500 ft Disturbance Buffer
- City Boundary
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- Erosional Feature
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- USACE/CDFW Non-Wetland WoUS (Open Water)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 500 Feet

NORTH

Scale 1:6,600

1 inch = 550 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project)

Date: 9/26/2022 Project: 60492260

AECOM

Figure 8a

Los Angeles County

Orange County

Brea Creek

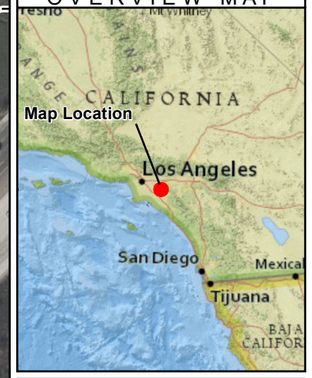
Brea Boulevard

57

bing

Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS

OVERVIEW MAP



- Existing Right of Way
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- City Boundary
- 500 ft Disturbance Buffer
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 200

Feet

NORTH

Scale 1:2,640

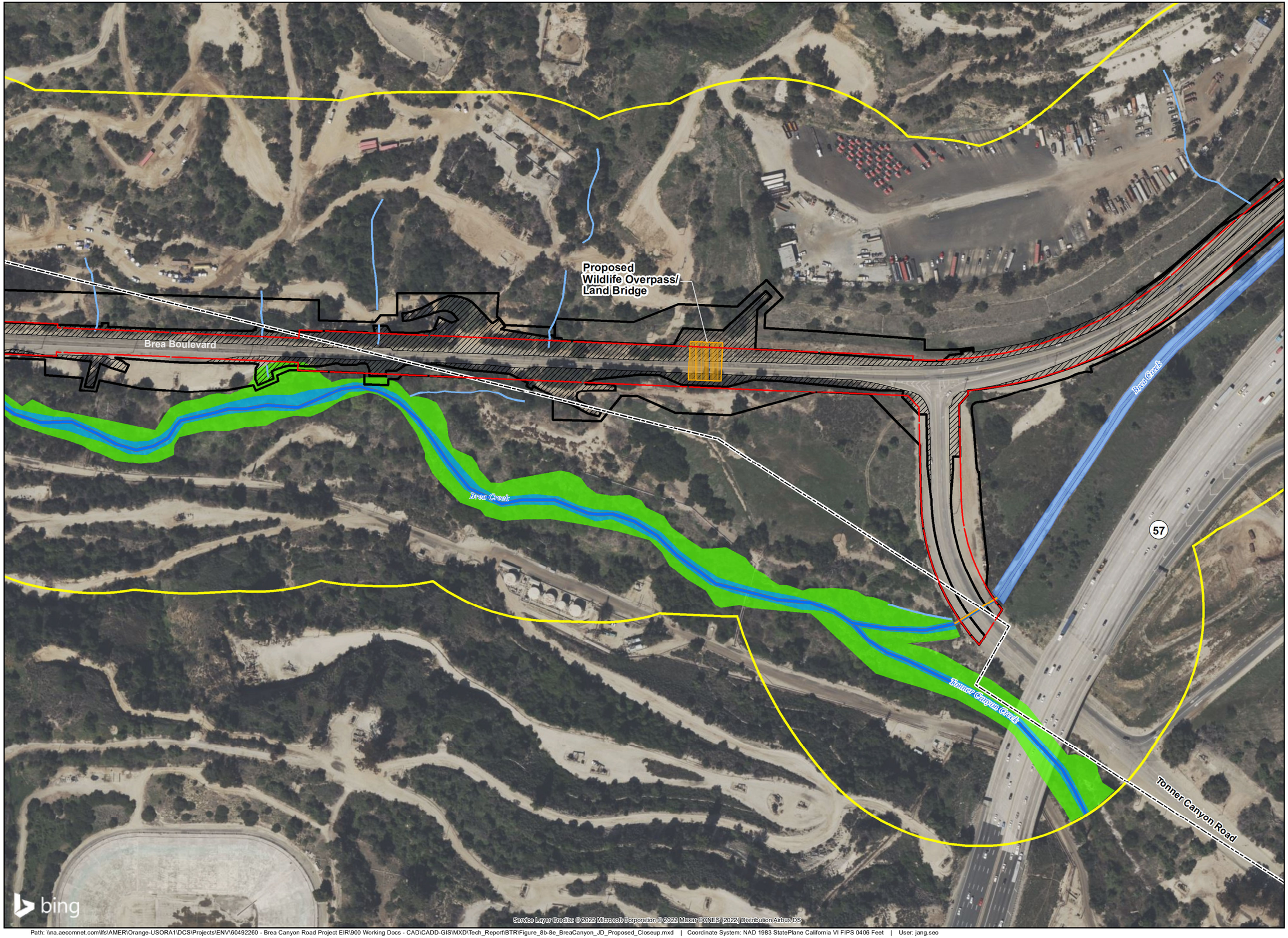
1 inch = 220 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/26/2022 Project: 60492260

AECOM **Figure 8b**



OVERVIEW MAP

- Existing Right of Way
- Streambed / Ephemeral Drainage
- Underground Culvert
- City Boundary
- 500 ft Disturbance Buffer
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:2,640
1 inch = 220 feet

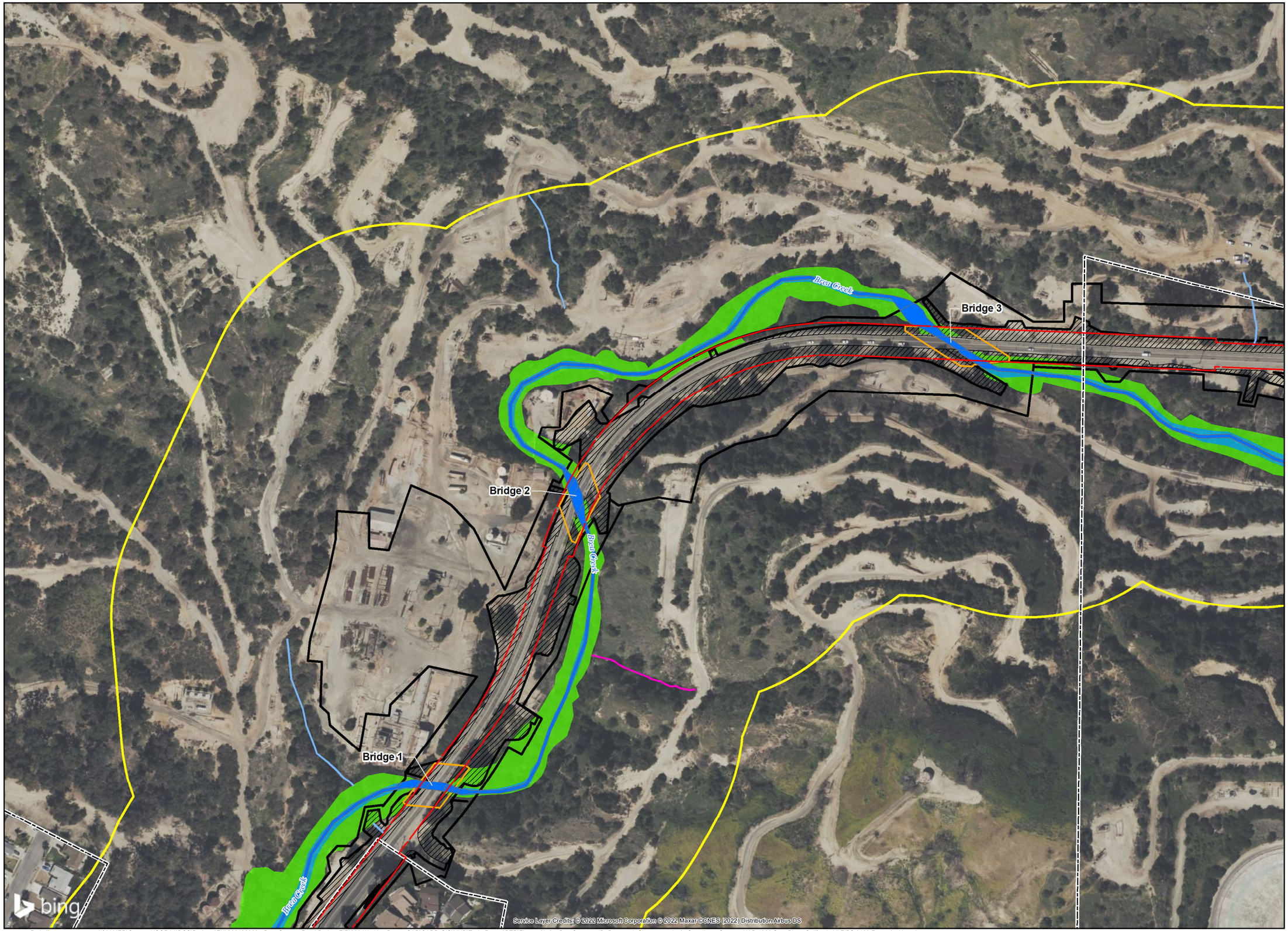
Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/26/2022 Project: 60492260

AECOM

Figure 8c



OVERVIEW MAP

- Existing Right of Way
- Erosional Feature
- Streambed / Ephemeral Drainage
- City Boundary
- 500 ft Disturbance Buffer
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:2,640
1 inch = 220 feet

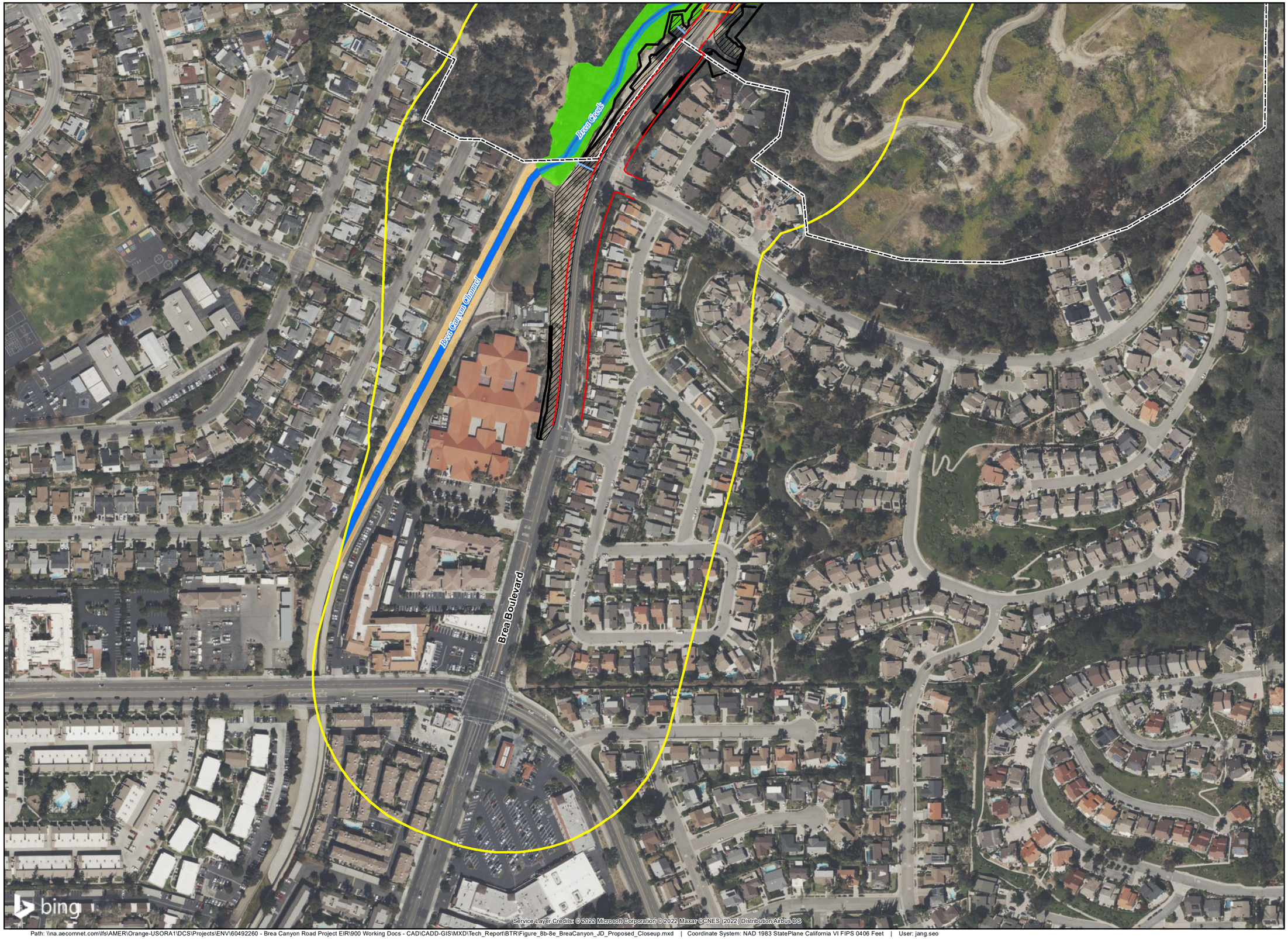
Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/26/2022 Project: 60492260

AECOM

Figure 8d



OVERVIEW MAP

- Existing Right of Way
- Streambed / Ephemeral Drainage
- City Boundary
- 500 ft Disturbance Buffer
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:3,160
1 inch = 263 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/26/2022 Project: 60492260

AECOM

Figure 8e

This page intentionally left blank.

Table 9
Potential Impacts to Waters of the State and CDFW Streambed and Riparian Habitat

RWQCB (Water of the State) / CDFW (Streambed & Riparian Habitat)	Study Area (Buffer)		Potential Temporary Impact[1]		Potential Permanent Impact[2]	
	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)
UNVEGETATED						
Streambed / Open Water Channel (Brea Creek)	2.14	10,798	0.22	489	0.14	221
Tonner Canyon Creek	0.14	772	0	0	0	0
CDFW Streambed (Bridge 1)[3]	0.02	n/a	0.02	n/a	0	0
CDFW Streambed (Bridge 2)[3]	0.03	n/a	0.03	n/a	0	0
CDFW Streambed (Bridge 3)[3]	0.02	n/a	0.02	n/a	0	0
CDFW Streambed (Unvegetated; Concrete-lined Box Channel)	1.52	1,760	0	0	0	0
CDFW Streambed (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237	0	0	0	0
CDFW Streambed (Unvegetated; Rip rap-lined Trapezoidal Banks)	1.09	n/a	0	0	0	0
RWQCB (WoST) / CDFW Streambed (Ephemeral Tributary Drainages)	0.16	3,398	0.02	531	0.01	133
VEGETATED						
CDFW Streambed Wetlands	1.89	n/a	0	n/a	0	n/a
CDFW-Only Riparian Habitat (adjacent to "Streambed Wetlands")	10.12	n/a	0.61	n/a	0.35	n/a
CDFW Jurisdiction	**17.73**	**17,965**	**0.90**	**1,176**	**0.50**	**354**

[1] Temporary impact acreage values may be considered a worst-case scenario. It is probable that many of the direct but temporary impacts to Brea Creek could be avoided.

[2] Essentially all impacts for this project are temporary, and the bridge covering open water is assumed to not be a permanent impact, especially given that the channel bottom will change from being concrete-lined to soft bottom (for Bridges 2 and 3). A trace acreage of wetlands was located under the new, larger bridges. This could be considered a permanent loss, but due to the soft bottom and large bridge sizes, it is anticipated that any wetlands may persist with the presence of the proposed bridges.

[3] Because the bridges allow for water and wildlife to freely move under the bridges (no culverts), the area of waters under the bridges is part of the overall calculation of surface waters. Culverts are viewed as a disruption in surface water area and linear feet, and thus are not counted as surface waters. A further discussion is provided in the Aquatic Resource Delineation Report [AECOM 2022]).

Note: Totals may not add up due to rounding.

As presented above, the Project will result in mostly temporary impacts, although some permanent impacts to CDFW-Only riparian habitat may occur. As described in the Aquatic Resource Delineation Report (AECOM 2022), regulatory permits and adherence to mitigation measures included in the permits would be required to offset direct impacts of the Project to jurisdictional waters. Mitigation measures related to permitting and mitigation presented in the Aquatic Resource Delineation Report are included in Section 6 as JD-1 and JD-2. Adherence to these measures would reduce direct impacts to jurisdictional waters to a level less than significant.

Additionally, the Project is adjacent to portions of Brea Creek and, as such, remaining jurisdictional areas may be indirectly impacted by run-off from the road and increased trash and litter. In addition, edge effects during construction may include dust and soil erosion. With implementation of typical biological resource

construction BMPs, a FDP to control dust and a SWPPP to control erosion, runoff, and hazardous spills, and implementation of any additional mitigation measures provided in waters permits obtained for the Project from the regulatory agencies, indirect impacts to jurisdictional waters would be less than significant.

5.1.5 Wildlife Movement Corridor

As described previously in this report, the BSA occurs along the southern perimeter of the Puente-Chino Hills wildlife corridor. A Wildlife Movement Study conducted in 2020 and 2021 concluded that the existing Brea Boulevard corridor currently functions as either a semi-permeable or highly permeable filter for wildlife, allowing them to pass over the road at grade, or below grade using existing undercrossings (bridges/culverts) (AECOM 2021). A significant impact would occur if wildlife movement across/over/under Brea Boulevard is substantially impaired during construction of the Project. It is anticipated that wildlife may avoid the area during construction due to increased human presence, noise, vibrations, etc.; however, this would be temporary in nature and restricted to the construction period. Further, it is anticipated that wildlife will continue to move across Brea Boulevard during periods when construction is not occurring, such as at night time, when many wildlife were detected moving across the corridor. A minimization measure to prevent entrapment and/or injury to wildlife related to open excavation/trenches from Project construction is included in Section 6 as BIO-9.

5.1.6 Invasive Shot Hole Borers

Polyphagous and Kuroshio shot hole borers (PSHB and KSHB, respectively) are invasive ambrosia beetles that introduce fungi and other pathogens into host trees, collectively referred to as invasive shot hole borers (ISHBs). The adult female tunnels galleries into the cambium of a wide variety of host trees, where it lays its eggs and propagates the Fusarium fungi species for the express purpose of feeding its young. These fungi cause Fusarium dieback disease, which interrupts the transport of water and nutrients and other impacts (e.g., branch dieback, canopy loss, tree mortality) in a number of tree species in Southern California, including commercial avocado groves, common landscape trees, and native species in urban and wildland environments (including palms, cottonwoods, maples, oaks, sycamores, and willows).

Documented ISHB occurrences in the Orange County/Los Angeles County area include Fullerton, the West Coyote Hills (along Brea Creek), La Habra, Hacienda Heights, throughout Puente Hills/Powder Canyon Open Space, Yorba Regional Park, Carbon Canyon Regional Park, and Craig Regional Park (UCANR 2021). The CNPS has identified (CNPS 2018) the following species (documented within this report) as reproductive hosts capable of supporting beetle reproduction and growth of Fusarium fungi: mulefat, western sycamore, Fremont cottonwood, coast live oak, and black, red, and arroyo willow, all of which occur within the project limits. Improper removal of an ISHB-infested/infected tree as part of the Project could result in the spread of ISHBs in the area, resulting in potentially significant impacts to other nearby trees. With implementation of mitigation measure BIO-8 (requiring survey of trees to be removed or trimmed and a control plan if infested/infected by ISHBs) outlined in Chapter 6, potential impacts related to spread of ISHBs would be less than significant.

5.2 OPERATION IMPACTS

5.2.1 Special-Status Plant Species

Operations and routine maintenance of the widened Brea Boulevard roadway and new bridges would be conducted within the R/W, consisting of paved surfaces and areas of ruderal roadside vegetation or areas of bare ground. It is not anticipated that roadside areas within the R/W would provide suitable habitat for special-status plant species that may be affected by operation and maintenance of the new roadway. No special-status plant species are anticipated to occur within the ROW, and as a result, impacts to special-status plant species are not anticipated to occur during Project operation.

5.2.2 Special-Status Wildlife Species

No special-status wildlife species were identified during the Wildlife Movement Study's camera and roadkill surveys and the R/W would not provide habitat suitable for special-status wildlife upon operation of the Project. Additionally, maintenance activities would generally be conducted from within paved surfaces, ruderal roadside vegetation or bare ground within the R/W and would not encroach into adjacent habitats potentially suitable for special-status wildlife. Significant direct impacts would occur if special-status species are killed or injured by vehicles during Project operation, however, special-status species are not expected to occur within the R/W and as a result no significant direct impacts to such species are anticipated during operation.

5.2.3 Sensitive Natural Communities

Operations and routine maintenance of the widened Brea Boulevard roadway and new bridges would be conducted within the ROW, consisting of paved surfaces and areas of ruderal roadside vegetation or areas of bare ground. Except at bridge locations where aquatic and/or riparian habitats may occur in the R/W (discussed below), no sensitive natural vegetation communities occur within the R/W or would be impacted by operations or maintenance of the Project. As a result, impacts to a sensitive natural vegetation community is not anticipated to occur during Project operation.

Operation of the Project is not anticipated to impact jurisdictional waters and/or riparian areas under USACE, RWQCB, or CDFW jurisdiction. However, in the event that bridge maintenance or any other maintenance activity within the R/W encroaches into jurisdictional waters and/or riparian areas, OC Public Works would obtain the required regulatory permits pursuant to the CWA and CFGC. By obtaining permits and satisfying mitigation requirements, direct and indirect impacts to jurisdictional waters during maintenance of the Project would be less than significant.

5.2.4 Wildlife Movement Corridor

OC Public Works retained AZTEC Engineering Group (AZTEC) to provide Project design and construction recommendations in support of maintaining and enhancing wildlife movement across the Project (AZTEC 2020). One major feature of design is the proposed land bridge located at the eastern end of the Brea Boulevard Corridor. At approximately 75-feet wide and 85-feet long, the land bridge would span all four

lanes of the expanded roadway to facilitate wildlife movement. The AZTEC report recommended directional wildlife fencing, jump-out/egress locations, escape ramps and a proposed land bridge. The report provides detail regarding the benefits of directional wildlife fencing with regularly-spaced jump-out locations. This design provides at least two escape points (one on each side of the road) spaced along each 0.5 mile of Brea Boulevard where directional fencing and retaining walls are proposed. The AZTEC report also contains details of lateral access driveway gates or grates to prevent wildlife ingress onto the road. AECOM provided further recommendations for the proposed land bridge at the conclusion of collecting wildlife movement data and their review of the AZTEC report, including: 1) planting native vegetation on the land bridge, 2) excluding regular human use on the land bridge, and 3) minimizing the potential for noise and light to deter wildlife from using the land bridge.

Overall, implementation of the Project would negatively affect existing at grade wildlife movement by widening the roadway (increasing vehicle capacity) and adding new physical barriers (concrete median barriers and retaining walls, fencing, etc.), which could increase the rate of vehicle-wildlife strikes or discourage wildlife from approaching the road. However, the inclusion of directional fencing along the extent of the roadway corridor should instead funnel wildlife towards the safer undercrossings (bridges and culverts) or to the proposed land bridge. Moreover, the addition of jump out/egress locations and escape ramps along the Brea Boulevard Corridor should provide wildlife a safe way to exit the road, should they enter it. The proposed reconstruction of bridges would improve their openness ratios (i.e., improve the likelihood to be used by a variety of species) and the new land bridge at the eastern end of the corridor near the confluence of Brea and Tonner Canyon creeks would offer a new, safe location for crossing Brea Boulevard. As such, the impacts of the components of the Project that would impede wildlife movement (i.e., traffic and physical barriers) are expected to be offset by the Project components designed to mitigate those impacts. The installment of wildlife fencing, in conjunction with proposed improvements to undercrossings and the addition of the land bridge, may provide a net benefit to wildlife movement in the vicinity of the Brea Boulevard Corridor. Maintaining the permeability of the Brea Boulevard Corridor is necessary to ensure continued wildlife movement along the southern portion of the Puente-Chino Hills Wildlife Corridor. It is anticipated that with implementation of the design and construction recommendations provided by AZTEC (2020) and AECOM (2021a), the potential for the Project to significantly impact wildlife movement across Brea Boulevard would be reduced to a level that is less than significant.

It should be noted the expansion of all three existing bridges may potentially influence the level and amount of water in Brea Creek flowing under the bridges. Bobcats prefer to pass through an undercrossing/bridge on dry ground and will avoid areas inundated with water. During the wildlife movement study, bobcats were rarely detected under Bridges 2 and 3, which contained flowing water in Brea Creek throughout most of the year. Because the Project will include wildlife fencing to prevent bobcats from crossing at grade and directing them towards the bridges, a minimization measure to provide a dry place that bobcats can use to pass under Bridges 2 and 3 is included in Section 6 as BIO-10.

CHAPTER 6.0
RECOMMENDED MITIGATION MEASURES, MINIMIZATION MEASURES, AND BMPS

These recommendations are based on background research and the current assessment. If conditions within the corridor change or further information about biological resources are generated, additional surveys may become necessary.

6.1 MITIGATION MEASURES

BIO-1 *Avoid and minimize Project related impacts to nesting birds.*

The clearance or disturbance of any vegetation during construction shall occur outside of the nesting bird season (February 1 through September 15). If vegetation removal/disturbance and other Project construction outside this time period are not feasible, the following additional measures shall be employed to avoid and minimize impacts to special-status bird species and nesting birds protected under the MBTA and CFGC:

1. A pre-construction nesting bird survey shall be conducted by a qualified biologist (i.e., is familiar and experienced with the identification and life histories of wildlife and plant species in southern California) within 3 days (72 hours) prior to the start of construction activities to determine whether active nests are present within or directly adjacent to the construction zone. All nests found shall be recorded.

2. If construction activities must occur within 150 feet of an active nest of any passerine bird or within 300 feet of an active nest of any raptor, a qualified biologist shall monitor the nest on a weekly basis and the construction activity shall be postponed until the biologist determines that the nest is no longer active.

3. If the recommended nest avoidance zone is not feasible, the qualified biologist shall provide justification on a case-by-case basis if a buffer reduction is possible, taking into consideration the location of work and type of activity, distance of nest from work area, surrounding vegetation and line-of-sight between the nest and work areas, tolerance of species to disturbance and observations of the nesting bird's reaction to Project activities. If the biologist determines nesting activities may fail as a result of work activities, all Project work shall cease (except access along established roadways) within the recommended no-disturbance buffer until the biologist determines the adults and young are no longer reliant on the nest site.

4. Buffers shall be delineated (by or under the supervision of the qualified biologist) on-site with bright flagging, for easy identification by Project staff. The on-site construction supervisor and operator staff shall be notified of any nest(s) and the applicable buffer limits to ensure they are maintained.

5. The indirect impacts of night-time construction lighting on nesting birds outside the project limits shall be reduced by shielding or directing construction lighting to avoid light encroachment in to adjacent habitats.

6. A summary of preconstruction surveys, monitoring efforts, and any no-disturbance buffers that were installed shall be documented in a report by the qualified biologist at the conclusion of each nesting season.

BIO-2 *Avoid and minimize Project related impacts to coastal California gnatcatcher*

1. Beginning 30 or more days prior to the removal or disturbance of any coastal sage scrub habitat or any habitats within 300 feet of coastal sage scrub habitat that will occur during the nesting bird season of February 1 through September 15, OC Public Works shall arrange for weekly bird surveys to detect the presence of coastal California gnatcatcher and other special-status upland bird species in the habitats to be removed or disturbed, and any other such habitat within 300 feet of the project limits. The surveys shall be conducted by a biologist with the necessary permits to survey for coastal California gnatcatcher. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of construction work.

2. In the event that a coastal California gnatcatcher is observed in the habitats to be removed or disturbed or in other habitats within 300 feet of the project limits, OC Public Works has the option of delaying all construction work in the suitable habitat or within 300 feet of the suitable habitat until after September 15 or continuing the surveys in order to locate any nests. If an active nest is found, clearing and construction within 300 feet of a nest shall be postponed until the nest is vacated and juveniles have fledged, and when there is no evidence of a second attempt at nesting. No-disturbance buffers around suitable habitat or a nest site shall be established in the field with bright flagging by the qualified biologist and construction personnel shall be instructed on the ecological sensitivity of the area.

3. A qualified biologist shall conduct weekly surveys of the suitable habitat or nest site to determine status of coastal California gnatcatcher and check that flagging placed to delineate the no-disturbance buffer is maintained and visible.

4. Locating and determining the status of a nest shall be performed in accordance with approved procedures by the USFWS and CDFW. Results of the surveys, including surveys to locate nests, shall be provided to the agencies no later than 5 days prior to construction. The results shall include a description of any nests located and measures to be implemented to avoid nest sites. Surveys for coastal California gnatcatcher shall be required even if work is completed outside of the nesting bird season (i.e., from September 16 through January 31) because this species overwinters in southern California.

5. If coastal California gnatcatcher are present and the avoidance measures identified above cannot be implemented, take may result. In such an instance, OC Public Works shall immediately discontinue construction at the location where coastal California gnatcatcher are found, maintain a

300-foot no-disturbance buffer around the suitable habitat, and immediately coordinate with USFWS regarding the need for take authorization for the species.

BIO-3 *Avoid and minimize Project related impacts to least Bells' vireo*

1. Beginning 30 or more days prior to the removal or disturbance of any riparian habitat or any habitats within 300 feet of riparian habitat that will occur during the nesting bird season of February 1 through September 15, OC Public Works shall arrange for weekly bird surveys to detect the presence of least Bell's vireo in the habitats to be removed or disturbed, and any other such habitat within 300 feet of the project limits. The surveys shall be conducted by a qualified biologist familiar with the identification and life history of least Bell's vireo. The surveys shall continue on a weekly basis, with the last survey being conducted no more than 3 days prior to the initiation of construction work.

2. In the event that a least Bell's vireo or other special-status bird species is observed in the habitats to be removed or disturbed or in other habitats within 300 feet of the project limits, OC Public Works has the option of delaying all construction work in the suitable habitat or within 300 feet of the suitable habitat until after September 15 or continuing the surveys in order to locate any nests. If an active nest is found, clearing and construction within 300 feet of a nest shall be postponed until the nest is vacated and juveniles have fledged, and when there is no evidence of a second attempt at nesting. No-disturbance buffers around suitable habitat or a nest site shall be established in the field with bright flagging by the qualified biologist and construction personnel shall be instructed on the ecological sensitivity of the area.

3. A qualified biologist shall conduct weekly surveys of the suitable habitat or nest site to determine status of least Bell's vireo and check that flagging placed to delineate the no-disturbance buffer is maintained and visible.

4. Locating and determining the status of a nest shall be performed in accordance with approved procedures by the USFWS and CDFW. Results of the surveys, including surveys to locate nests, shall be provided to the agencies no later than 5 days prior to construction. The results shall include a description of any nests located and measures to be implemented to avoid nest sites. No surveys shall be necessary if the work is completed outside of the nesting bird season, i.e., from September 16 through January 31.

5. If least Bell's vireo are present and the avoidance measures identified above cannot be implemented, take may result. In such an instance, OC Public Works shall immediately discontinue construction at the location where least Bell's vireo are found, maintain a 300-foot no-disturbance buffer around the suitable habitat, and immediately coordinate with USFWS and CDFW regarding the need for take authorization for the species.

BIO-4 *Avoid and minimize Project related impacts to western pond turtle.*

Break Creek and riparian habitats shall be cleared of western pond turtle and any additional special-status reptile or amphibian species which may occur (including western spadefoot), immediately before

construction activities that would coincide with the creek and its riparian habitats is initiated, immediately before any equipment is moved into or through Brea Creek or riparian areas, and immediately before diverting any stream water, should diversions be required. The removal of western pond turtle, or any other reptile or amphibian species shall be conducted by a qualified biologist using procedures approved by CDFW, and with the appropriate collection and handling permits. Species shall be relocated to nearby suitable habitat areas that will not be disturbed by the Project. A Species Protection, Relocation, and Monitoring Plan including avoidance and minimization measures and relocation methods for western pond turtle shall be submitted to CDFW for review and approval prior to construction.

BIO-5 *Avoid and minimize Project related impacts to special-status and/or roosting bat species.*

Prior to removal of any tree, and prior to construction during the bat maternity season (April 15 through August 31), a survey of trees to be removed and of the SR-57 bridge shall be conducted by a qualified bat biologist to determine the potential presence of colonial bat roosts. The surveys (as detailed below) shall consist of a visual inspection and/or one-night emergence survey utilizing acoustic recognition technology to determine if any maternity roosts are present.

To avoid any impacts on roosting bats resulting from construction activities, the following shall be implemented:

<u>At the SR-57 Bridge</u>

Prior to construction during the bat maternity season a visual inspection and/or one night emergence survey of the SR-57 bridge shall be completed utilizing acoustic recognition technology to determine if any maternity roosts are present. Should an active maternity roost be found, a determination (in coordination with the qualified bat biologist) shall be made whether indirect effects of construction-related activities (i.e., noise, vibration, construction lighting) could substantially disturb roosting bats and if exclusionary devices should be used to remove bats. This determination shall be based on baseline noise/vibration levels, anticipated noise levels associated with construction in the vicinity, and the sensitivity to noise-disturbances of the bat species present. If it is determined that noise could result in the temporary abandonment of a maternity roost, construction-related activities shall be scheduled to avoid the maternity season (April 15 through August 31), or as determined by the qualified bat biologist.

<u>Trees To Be Removed</u>

All trees to be removed as part of the Project shall be evaluated for their potential to support bat roosts. In particular, any eucalyptus and palm trees which bats are known to utilize, shall be evaluated by a qualified bat biologist by conducting a one-night emergence survey during acceptable weather conditions, or if conditions permit, physically examine the trees for presence or absence of bats (such as with lift equipment) before the start of construction/tree removal. The following measures shall apply to trees to be removed that are determined to provide potential bat roost habitat by the qualified bat biologist.

- If roosting bats are determined present during the maternity season (April 15 through August 31), the tree shall be avoided until after the maternity season when young are self-sufficient.

  If roosting bats are determined present during the winter months when bats are in torpor, a state in which the bats have significantly lowered their physiological state, such as body temperature and metabolic rate, due to lowered food availability (October 31 through February 15, but is dependent on specific weather conditions), the tree shall be avoided until after the winter season when bats are once again active.

- Trees with potential colonial bat habitat can be removed outside of the maternity season and winter season (February 16 through April 14 and September 1 through October 30, or as determined by the qualified bat biologist) using a two-step tree trimming process that occurs over 2 consecutive days.

  - Day 1, Step 1: Under the supervision of the qualified bat biologist, tree branches and limbs with no cavities shall be removed by hand (e.g., using chainsaws). This will create a disturbance (noise and vibration) and physically alter the tree. Bats roosting in the tree will either abandon the roost immediately or, after emergence, will avoid returning to the roost.

  - Day 2, Step 2: Removal of the remainder of the tree under the supervision of the qualified bat biologist may occur on the following day. Trees that are only to be trimmed and not removed shall be processed in the same manner; if a branch with a potential roost must be removed, all surrounding branches shall be trimmed on Day 1 under supervision of the qualified bat biologist and then the limb with the potential roost shall be removed on Day 2.

- Trees with foliage (and without colonial bat roost potential) that can support lasiurine bats shall have the two-step tree trimming process occur over one day under the supervision of the qualified bat biologist. Step 1 shall be to remove adjacent, smaller, or non-habitat trees to create noise and vibration disturbance that will cause abandonment. Step 2 shall be to remove the remainder of tree on that same day. For palm trees that can support western yellow bat (a special-status bat species with Low potential to occur in the BSA), the two-step tree process shall be used over two days. Western yellow bats may move deeper within the dead fronds during disturbance. The two-day process will allow the bats to vacate the tree before removal.

The results of bat surveys, evaluations, and monitoring efforts that are undertaken shall be documented in a report by the qualified bat biologist at the conclusion of all bat-related activities.

BIO-6 *Minimize Project related impacts to coast live oak trees.*

The removal of any individual coast live oak tree associated with the coast live oak woodland sensitive natural vegetation community shall be replaced at a minimum of 1:1 ratio. OC Public Works shall have the option to incorporate this mitigation requirement in conjunction with the regulatory permit coordination for wetland/riparian vegetation impacts (and their associated example mitigation options identified in JD-2). For example, tree replacement could be implemented on site within suitable locations in the temporary disturbance limits, or as an adjacent component in connection with the wetland/riparian revegetation, as

appropriate; or could be implemented off site at the upstream Soquel Mitigation Bank (in coordination and compliance with the mitigation bank owner's requirements).

BIO-7 *Avoid and minimize Project related impacts to Critical Habitat.*

OC Public Works shall consult with USFWS regarding potential impacts of the Project on USFWS-designated critical habitat for coastal California gnatcatcher. Informal consultation pursuant to Section 7 or Section 10 of FESA, where USFWS would determine the appropriate mitigation actions regarding critical coastal sage scrub habitat, could involve compensatory mitigation in the form of a Project-specific Habitat Mitigation and Monitoring Plan (HMMP) or development of a Habitat Conservation Plan (HCP), consistent with any requirements of applicable regulatory permits.

BIO-8 *Avoid and minimize Project related impacts related to ISHBs.*

A qualified biologist familiar with the signs of ISHBs shall survey trees within the project limits that are designated for removal or trimming. Surveys shall be conducted no more than 30 days prior to removal or trimming activities. If any tree is determined to be infested/infected by ISHBs, a control plan shall be prepared and submitted to CDFW for review and approval prior to tree disturbance. At a minimum, the control plan shall include methods of control, removal, and appropriate disposal techniques to prevent the spread of ISHBs (e.g., equipment disinfection, chipping potential host materials to less than 1 inch and solarization treatment prior to delivery to landfill or use as compost on site, solarization of cut logs and/or burning of potential host tree materials, etc.).

JD-1 Regulatory Permits for impacts to jurisdictional waters.

Prior to approval of the Project plans and specifications, OC Public Works shall obtain all applicable regulatory permits, including coverage under NWP 14 for Transportation projects from the USACE, a Water Quality Certification from RWQCB, and an LSAA from CDFW.

JD-2 Examples of Mitigation Options for Temporary and Permanent Impacts

Regulatory permits obtained in coordination with the applicable regulatory agencies, as identified in JD-1, would include measures to mitigate all temporary and permanent impacts. Examples of the options to mitigate for impacts associated with the Project may include some combination of the following:

(1) Treatment of non-native, invasive plant species (castor bean, tree tobacco, etc.)

(2) On-site revegetation for temporary impacts to wetland/riparian vegetation

(3) Obtaining credits from the Soquel Mitigation Bank, located upstream of the Project within the headwaters of Tonner Creek for permanent impacts to wetland/riparian vegetation

6.2 MINIMIZATION MEASURES

The following minimization measure is included to further reduce impacts to wildlife and wildlife movement during construction:

BIO-9 Excavation and trenching activities shall include measures to prevent entrapment and injury to wildlife. For instance, steep-sided trenches may either be backfilled at the end of each work day, fenced, or include "escape ramps" for wildlife.

The following minimization measure is included to further facilitate wildlife movement during operations:

BIO-10 To ensure there is a dry place for bobcats to pass under Bridges 2 and 3, it is recommended that a wildlife ledge be installed under both bridges. The wildlife ledge should be placed approximately 3 feet above the ground, above the ordinary high water mark of Brea Creek under both sides of Bridges 2 and 3. The wildlife ledge should be wide enough to accommodate a bobcat, include a non-slip surface, and have a small ramp at both ends to allow wildlife easy access to the ledge. It is recommended that the final design and height above the ground determined by bridge engineers in concert with a wildlife expert and hydrologist.

6.3 STANDARD BIOLOGICAL RESOURCE CONSTRUCTION BMPS

The following BMPs avoid and minimize Project related impacts to special-status species and sensitive natural communities.

1. Prior to the initiation of construction, a qualified biologist (i.e., is familiar and experienced with the identification and life histories of wildlife and plant species in southern California) shall be identified and approved by OC Public Works to conduct biological surveys, monitor construction activities, and advise construction personnel of the potential biological issues associated with Project construction.

    a. The qualified biologist will be responsible for avoiding impacts to sensitive species to the fullest extent possible.

    b. The qualified biologist shall be present on a daily basis to monitor construction activities and support impact avoidance and minimization measures detailed in permits and approvals obtained for the Project.

    c. The qualified biologist shall attend weekly construction meetings and provide on-site direction for addressing habitat- or species-specific issues.

2. The qualified biologist shall present a Worker Environmental Awareness Program to all Project personnel discussing the biology of the habitats and species in the project area. Information about the distribution and habitat needs of any protected species that may be present, legal protections for those species, penalties for violations, and Project-specific protective measures will be included in

the education program. Cards or fact sheets containing this information will be provided to all personnel and they will be required to sign a form stating they attended the program and understand the protective measures.

3. The qualified biologist shall ensure the project limits (including staging areas) are clearly delineated with fencing or other boundary markers prior to the start of construction. During construction, construction workers shall strictly limit their activities, vehicles, equipment, and construction materials to the designated project limits and staging areas.

4. The project limits shall be clearly marked on Project maps provided to the construction contractor(s) and areas outside of the project limits shall be designated as "environmentally sensitive areas." A construction manager shall be present during all construction activities to ensure that work is limited to designated project limits.

5. During construction, the project limits shall be kept as clean of debris as possible to avoid attracting predators of sensitive wildlife. All food-related trash items shall be enclosed in sealed containers and removed daily from the construction work zone.

CHAPTER 7.0
CONCLUSIONS

With implementation of standard biological resource construction BMPs provided in Chapter 6 above, the Project would not result in a significant impact upon any federally listed or state-listed threatened, endangered, or candidate plant species, or other species tracked by the CNDDB and occurring or potentially occurring within the project limits. No direct impacts to special-status plant species are anticipated, as none were observed during the field survey and the project limits are primarily disturbed and comprised of non-native species, making habitat within the project limits unsuitable for such species. Upon implementation of standard biological resource construction BMPs, indirect impacts on special-status plants would also be less than significant.

Two federally-listed species, coastal California gnatcatcher and least Bell's vireo, were observed during field surveys. In addition, birds protected by the MBTA have the potential to occur and nest in the project limits or in proximity. Potential direct impacts to these species or their nests could occur during project construction. Potential indirect impacts are associated with noise, dust, vibration, and increased human activity, which could cause individuals to change their behavior and move out of the area. Implementation of the standard biological resource construction BMPs and Mitigation Measures BIO-1 through BIO-3 in Chapter 6 would avoid disturbance to these species, resulting in less than significant impacts to special-status wildlife species and nesting birds. If it is determined that impacts to coastal California gnatcatcher and least Bell's vireo are unavoidable and take could occur, consultation with USFWS pursuant to FESA would be required to provide incidental take.

One State-listed species, least Bell's vireo, and four non-listed special-status species including, Cooper's hawk, yellow-breasted chat, yellow warbler, and western pond turtle were detected during field surveys. In addition, birds protected by CFGC have the potential to occur and nest in the project footprint or in proximity. Potential direct impacts to these species or their nests could occur during Project construction. Potential indirect impacts are associated with noise, dust, vibration, and increased human activity, which could cause individuals to change their behavior and move out of the area. Implementation of the standard biological resource construction BMPs and Mitigation Measures BIO-1 through BIO-5 in Chapter 6 would avoid disturbance of these species, resulting in less than significant impacts to special-status wildlife species and nesting birds.

Implementation of Mitigation Measure BIO-6 outlined in Chapter 6 would ensure impacts related to removal of coast live oak trees would be reduced to below a level of significance.

For impacts to critical habitat that was documented as occupied in 2016, OC Public Works would be required to informally consult with USFWS pursuant to Section 7 or Section 10 of FESA. OC Public Works' consultation with USFWS would determine the appropriate mitigation actions regarding the coastal sage scrub habitat, which could involve compensatory mitigation in the form of a Project-specific HMMP or a HCP. Implementation of typical biological resource construction BMPs, a FDP, SWPPP, and

implementation of Mitigation Measure BIO-7 outlined in Chapter 6, would reduce impacts to critical habitat to a level below significance.

Implementation of Mitigation Measure BIO-8 outlined in Chapter 6 would ensure impacts related to improper removal of an ISHB-infested/infected tree that could result in the spread of ISHBs in the area would be reduced to below a level of significance.

Construction of the Project would result in impacts to sensitive natural vegetation communities, including communities occurring within jurisdictional areas under regulation of the USACE, RWQCB, and CDFW. However, by adhering to the standard biological resource construction BMPs and mitigation measures in Chapter 6 related to obtaining permits pursuant to CWA and CFGC regulations and providing mitigation for direct impacts to sensitive natural vegetation communities occurring within jurisdictional waters, impacts to such communities would be less than significant.

Construction of the Project would result in impacts to WoUS and WoST under the jurisdiction of USACE, RWQCB, and CDFW. However, by adhering to the standard biological resource construction BMPs and Mitigation Measures JD-1 and JD-2 in Chapter 6 related to obtaining permits pursuant to CWA and CFGC regulations and providing mitigation for direct impacts to jurisdictional waters, impacts to such features would be less than significant.

With implementation of design and Project construction recommendations provided by AZTEC (2020) and AECOM (2021a), and implementation of Mitigation Measures BIO-9 and BIO-10, operation of the Project is not anticipated to have a significant impact on wildlife movement.

Operation and routine maintenance of the widened Brea Boulevard roadway and new bridges would be conducted within the road ROW, consisting of paved surfaces and areas of ruderal roadside vegetation or areas of bare ground. Except at bridge locations where aquatic and/or riparian habitats may occur in the ROW, biological resources would not be impacted by operations or routine maintenance of the Project. In the event that bridge maintenance or any other maintenance activity within the R/W encroaches into jurisdictional waters and/or riparian areas, OC Public Works would be required to obtain regulatory permits pursuant to the CWA and CFGC. By obtaining permits and satisfying mitigation requirements, direct and indirect impacts to jurisdictional waters during maintenance of the Project would be less than significant.

CHAPTER 8.0
REFERENCES

AECOM

2021 Brea Boulevard Corridor Improvement Project Wildlife Movement Study. Draft. February.

2017a Brea Canyon Road Widening Project Coastal California Gnatcatcher 45-Day Summary Report, Orange County, California. February.

2017b Brea Canyon Road Widening Project Least Bell's Vireo 45-Day Summary Report, Orange County, California. January.

2017c Brea Canyon Road Widening Project Southwestern Willow Flycatcher 45-Day Summary Report, Orange County, California. January.

2022 Aquatic Resource Delineation Report. Brea Boulevard Corridor Improvement Project. Draft. September

Asay, C. E.

1987 Habitat and Productivity of Cooper's Hawks Nesting in California. California Department of Fish and Game 73:80–87.

AZTEC Engineering Group, Inc. (AZTEC)

2020 Wildlife Connectivity Strategy Scoping Report for the Brea Boulevard Corridor Improvements Project, Orange County, California. October 12.

California Department of Fish and Game (CDFG)

2010 *List of California Terrestrial Natural Communities Recognized by the Natural Diversity Data Base.* Natural Heritage Division. The Resources Agency. September.

1991 Endangered and Threatened Animals of California. State of California, The Resources Agency, Department of Fish and Game. Sacramento, California. 5 pp.

California Department of Fish and Wildlife (CDFW)

2021a *California Natural Diversity Data Base (CNDDB).* Full report for La Habra, El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange quadrangles. Generated February 11, 2021.

2021b *State and Federally Listed Endangered, Threatened, and Rare Plants of California*. California Natural Diversity Data Base, January. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109390&inline.

2021c *Special Vascular Plants, Bryophytes, and Lichens List*. California Natural Diversity Data Base. January. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109383.

2020a *State and Federally Listed Endangered and Threatened Animals of California*. November. Natural Heritage Division, California Natural Diversity Data Base. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline

2020b *Special Animals*. California Natural Diversity Data Base. November. Available at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406

2020c Natural Communities. Available at: https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities#cnddb. Accessed on January 4, 2020.

2020d. California Sensitive Natural Communities. September 9. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609&inline. Accessed January 5, 2020.

California Native Plant Society (CNPS)

2018 *Racing to Stop the Destructive Shot Hole Borer*. California Native Plant Society. Sacramento, CA. Available at https://www.cnps.org/flora-magazine/racing-to-stop-the-destructive-shot-hole-borer-11489. Accessed June 15, 2021.

2021 *Inventory of Rare and Endangered Plants* (online edition, v8-02). California Native Plant Society. Sacramento, CA. Available at http://www.rareplants.cnps.org/. Accessed February 11, 2021.

Chiang, S. N., P. H. Bloom, A. M. Bartuszevige, and S. E. Thomas (Chiang et al.)

2012 Home Range and Habitat Use of Cooper's Hawks in Urban and Natural Areas. In Urban Bird Ecology and Conservation, edited by C. A. Lepczyx and P. S. Warren. Studies in Avian Biology No. 45. University of California Press.

Environmental Laboratory (EL)

1987 *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). September.

Holland, R.

1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, The Resources Agency. 156 pp.

Puente Hills Landfill Native Habitat Preservation Authority and Wildlife Corridor Conservation Authority (PHLNHPA and WCCA)

2012 The Puente-Chino Hills Wildlife Corridor. Available at: https://habitatauthority.org/newsite/wp-content/uploads/2012/04/pg1-12v2b.pdf. Accessed November 3, 2020.

Remsen, H. V.

1978 *Bird Species of Special Concern in California: an Annotated List of Declining or Vulnerable Bird Species*. California Department of Fish and Game, The Resources Agency.

Rourke, J.W., T.D. McCarthey, R.F. Davidson, and A. M. Santaniello (Rourke et al)

1999 Southwestern Willow Flycatcher Nest Monitoring Protocol. Nongame and Endangered Wildlife Program Technical Report 144. Arizona Game and Fish Department, Phoenix, Arizona.

Salata, L. R.

1984 Status of the Least Bell's Vireo on Camp Pendleton, California: Report on Research Done in 1984. Unpublished Report. U.S. Fish and Wildlife Service, Laguna Niguel, California.

Sawyer, J.O., T. Keeler-Wolf, and Evans, J. (Sawyer et al.)

2009 A Manual of California Vegetation. Second Ed. Sacramento, CA: California Native Plant Society.

Sogge, M.K., D. Ahlers, and S.J. Sferra (Sogge et al)

2010 A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 pp.

Spencer, W.D.

2005 Maintaining Ecological Connectivity Across the "Missing Middle" of the Puene-Chino Hills Wildlife Corridor. Final Report. Prepared for Resources Legacy Fund Foundation. Sacramento, California. July 2005.

University of California Agriculture and Natural Resources (UCANR)

2021 ISHB-FD Distribution in California. Available at https://ucanr.edu/sites/pshb/pest-overview/ishb-fd-distribution-in-california/. Accessed June 15, 2021.

U.S. Fish and Wildlife Service (USFWS)

2021 Information for Planning and Conservation. Available at https://ecos.fws.gov/ipac/. Accessed February 22, 2021.

2017 Critical Habitat Under the Endangered Species Act. June 13. Available at: https://www.fws.gov/southeast/endangered-species-act/critical-habitat/. Accessed: February 2, 2021)

2007 Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*); 72010 *Federal Register* / Vol. 72, No. 243 / Wednesday, December 19, 2007 / Rules and Regulations.

2005 Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. Federal Register 50 CFR Part 17.

2001 U.S. Fish and Wildlife Service (USFWS). 2001. Least Bell's Vireo Survey Guidelines. Carlsbad Fish and Wildlife Office. January 19.

1998 Draft Recovery Plan for the Least Bell's Vireo. Fish and Wildlife Service, Portland, Oregon. 139 pp.

1995 Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. February 17, 1995. Federal Register 60(38): 10694–10715.

1994 Designation of Critical Habitat for Least Bell's Vireo. U.S. Fish and Wildlife Service, February 2, 1994 (59 FR 4845).

1984 Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Least Bell's Vireo. Final Rule. *Federal Register* 59:4845–4867.

1993 Endangered and Threatened Wildlife and Plants: Special Rule Concerning Take of the Threatened Coastal California Gnatcatcher. Final Rule. *Federal Register* 58: 65088–65096.

1986 Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for the Least Bell's Vireo. Final Rule. *Federal Register* 51:16474–16482.

United States Geological Survey (USGS)

2006 USGS Western Pond Turtle (Emys marmorata) Visual Survey Protocol for the Southcoast Ecoregion. 60 pp.

Unitt, Phillip

2004 San Diego County Bird Atlas. San Diego Natural History Museum, P.O. Box 121390, San Diego, California 92112-1390. Ibis Publishing Company.

Western Bat Working Group (WBWG)

2017 Species Matrix. Available at http://wbwg.org/matrices/species-matrix/. Accessed January 10, 2021.

Williams, D. F.

1986 *Mammalian Species of Special Concern in California*. California Department of Fish and Game. Wildlife Management Division Administrative Report 86-1. 112 pp.

Yosef, Reuven

1996 *Loggerhead Shrike* (Lanius ludovicianus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology. Available at: http://bna.birds.cornell.edu/bna/species/231

Zeiner, D.C., W.F. Laudenslyaer, Jr., K.E. Mayer, and M. White, eds (Zeiner et al.)

1990 *California's Wildlife*. Vol. I-III. California Department of Fish and Game, Sacramento, California. Available at: https://www.wildlife.ca.gov/Data/CWHR/Life-History-and-Range

This page intentionally left blank.

APPENDIX A

Field Surveys

Appendix A
Field Surveys

Survey Date	Time	Weather Conditions	Personnel	Purpose of Survey
05/10/2016	0730 - 1430	Start: 59°F, 100% cloud cover, wind 1-2 mph End: 72°F, clear skies, wind 6 mph	Arthur Popp John Parent	general bio survey[1]
05/10/2016	0730 – 1100	Start: 59°F, 100% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
05/19/2016	0830-1100	Start: 63°F, 100% cloud cover, wind 2-3 mph	Kelly Rios	protocol LBV survey
05/30/2016	0830-1100	Start: 64°F, 100% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
05/31/2016	0800 - 1400	n/a	Erik Larsen John Parent	jurisdictional delineation and rare plant survey
06/01/2016	0630 – 1020	Start: 61°F, 100% cloud cover, wind 1 mph End: 66°F, 100% clouds, wind 3 mph	Brennan Mulrooney John Parent	protocol SWFL survey
06/02/2016	0800 - 1430	n/a	Erik Larsen John Parent	jurisdictional delineation; rare plant survey
06/08/2016	0610 – 0958	Start: 64°F,100% cloud cover, wind 0 mph End: 68°F, 100% clouds, wind 2 mph	Brennan Mulrooney	protocol SWFL survey
06/09/2016	0700 – 1030	Start: 65°F, 100% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
06/16/2016	0700-1100	n/a	John Parent Vanessa Tucker	survey focused on southwestern pond turtle
06/20/2016	0830 - 1100	Start: 95°F,0% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
06/29/2016	0618 – 0956	Start: 67°F, 20% clouds, wind 0 mph End: 72°F, 0% clouds, wind 3 mph	Brennan Mulrooney	protocol SWFL survey
06/30/2016	0815 – 1100	Start: 73°F, 0% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
07/06/2016	0607 – 0940	Start: 65°F, 100% clouds, wind 0 mph End: 69°F, 1000% cloud cover, wind 3 mph	Brennan Mulrooney	protocol SWFL survey
07/10/2016	0700 – 0930	Start: 66°F, 20% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
07/14/2016	0602 – 0934	Start: 66°F, 90% cloud cover, wind 3 mph End: 73°F, 0% cloud cover, wind 5 mph	Brennan Mulrooney	protocol SWFL survey
07/15/2016	0710 – 1000	Start: 69°F, 100% cloud cover, wind 1-2 mph	Kelly Rios	protocol LBV survey
09/27/2016	0900 - 1030	Start: 89°F, Mostly Cloudy, wind 4-6 mph End: 93°F, clear skies, calm winds	John Parent Arthur Popp	general bio survey[2]
12/29/2016	1200 – 1500	Start: 77°F, clear skies, calm winds End: 80°F, clear skies, wind 3.5 mph	Erik Larsen Arthur Popp Vanessa Tucker	general bio survey[3]

Survey Date	Time	Weather Conditions	Personnel	Purpose of Survey
05/29/2018	1000 - 1630	n/a	Erik Larsen Chris Hargreaves	jurisdictional delineation; rare plant survey
05/31/2018	1200 - 1530	n/a	Erik Larsen Chris Hargreaves	jurisdictional delineation; rare plant Survey
06/27/2018	1000-1200	Start: 77°F, clear skies, no wind End: 80°F, clear skies, calm winds	Vanessa Tucker	general bio survey survey focused on southwestern pond turtle

[1] Field survey covered project limits, all of survey buffer east of intersection of Brea Boulevard and Tonner Canyon Road, and survey buffer on the south side of Brea Boulevard west of the intersection with Tonner Canyon Road.
[2] Field survey covered Area Energy property within the survey buffer north of Brea Boulevard.
[3] Field survey covered Brea Hills LLC property within the survey buffer north of Brea Boulevard.

APPENDIX B

Species Observed

Table A: Plants

Table B: Wildlife

Table A. Plants

Table A. List of Plant Species Observed During Field Surveys	
Scientific Name	**Common Name**
DICOTS (Woody and Herbaceous Plant Species)	
AMARANTHACEAE	**CARROT FAMILY**
Chenopodium album	Lamb's quarters
Salsola tragus	Russian thistle
APOCYNACEAE	**DOGBANE FAMILY**
Asclepias fascicularis	narrow leaf milkweed
ASTERACEAE	**SUNFLOWER FAMILY**
Ambrosia psilostachya	western ragweed
Baccharis salicifolia	mulefat
Corethrogyne filaginifolia	common sandaster
Encelia californica	California encelia
Ericameria nauseosus	rubber rabbitbrush
Glebionis coronaria	crown daisy
Helianthus annuus	common sunflower
Sonchus oleraceus	sow thistle
BORAGINACEAE	**FORGET-ME-NOT FAMILY**
Phacelia imbricata	imbricate phacelia
Amsinckia tessellata	fiddleneck
BRASSICACEAE	**MUSTARD FAMILY**
Brassica sp.	mustard
Sisymbrium irio	London rocket
EUPHORBIACEAE	**SPRUGE FAMILY**
Croton setigerus	dove weed
GERANIACEAE	**GERANIUM FAMILY**
Erodium cicutarium	red-stemmed filaree
LAMIACEAE	**MINT FAMILY**
Marrubium vulgare	horehound
Salvia columbariae	Chia sage

Table A. List of Plant Species Observed During Field Surveys	
Scientific Name	**Common Name**
PAPAVERACEAE	**POPPY FAMILY**
Eschscholzia californica	California poppy
PINACEAE	**PINE FAMILY**
Pinus sp.	pine tree
POLYGONACEAE	**KNOTWEED FAMILY**
Chorizanthe staticoides	Turkish rugging
Erigonum fasciculatum	California buckwheat
SALICACEAE	**WILLOW FAMILY**
Populus fremontii	Fremont cottonwood
Salix spp.	willow trees
SOLANACEAE	**NIGHTSHADE FAMILY**
Datura wrightii	Jimsonweed
MONOCOTS (Grasses and Grass-like Plant Species)	
POACEAE	**GRASS FAMILY**
Avena fatua	wild oat
Bromus diandrus	ripgut brome
Bromus madritensis ssp. rubens	red brome
Elymus elymoides	squirreltail
Hordeum vulgare	common barley

Table B. Wildlife

Scientific Name	Common Name
Birds	
Accipitridae	**Hawks**
*Accipiter cooperii**	Cooper's hawk
Buteo jamaicensis	Red-tailed hawk
Buteo lineatus	Red-shouldered hawk
Aegithalidae	**Bushtits**
Psaltriparus minimus	Bushtit
Anatidae	**Ducks, Geese, and Swans**
Anas platyrhynchos	Mallard
Apodidae	**Swifts**
Aeronautes saxatalis	White-throated swift
Ardeidae	**Herons, Egrets and Bitterns**
Ardea herodias	Great Blue heron
Butorides virescens	Green heron
Bombycillidae	**Waxwings**
Bombycilla cedrorum	Cedar waxwing
Cardinalidae	**Grosbeaks, Cardinals and Tanagers**
Passerina caerulea	Blue grosbeak
Passerina amoena	Lazuli bunting
Pheucticus melanacephalus	Black-headed grosbeak
Cathartidae	**Vultures**
Cathartes aura	Turkey vulture
Columbidae	**Pigeons and Doves**
Columba livia	Rock dove
Patagioenas fasciata	Band-tailed pigeon
Streptopelia decaocto	Eurasian Collared dove
Zenaida macroura	Mourning dove
Corvidae	**Crows, Jays and allies**
Aphelocoma californica	California scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Emberizidae	**Sparrows**
Carduelis psaltria	Lesser goldfinch
Carpodacus mexicanus	House finch
Melospiza melodia	Song sparrow
Melozone crissalis	California towhee
Pipilo maculatus	Spotted towhee
Estrildidae	**Old world finches**
Lonchura punctulata	Scaly-breasted munia
Falconidae	**Falcons**
Falco sparverius	American kestrel

Scientific Name	Common Name
Fringillidae	**Finches**
Haemorhous mexicanus	House Finch
Spinus psaltria	Lesser Goldfinch
Hirundinidae	**Swallows**
Petrochelidon pyrrhonota	Cliff Swallow
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Icteridae	**Blackbirds, Grackles and Orioles**
Icterus bullockii	Bullock's Oriole
Icterus cucullatus	Hooded Oriole
Molothrus ater	Brown-headed Cowbird
Quiscalus mexicanus	Great-tailed Grackle
Mimidae	**Mockingbirds and Thrashers**
Mimus polyglottos	Northern Mockingbird
Toxostoma redivivum	California Thrasher
Odontophoridae	**Quails**
Callipepla californica	California quail
Parulidae	**Wood warblers**
Cardellina pusilla	Wilson’s warbler
Geothlypis trichas	Common Yellowthroat
*Icteria virens**	Yellow-breasted Chat
Oreothlypis celata	Orange-crowned Warbler
Setophaga coronate	Yellow-rumped warbler
Setophaga petechia brewsteri	Yellow warbler
Passeridae	**Old World Sparrows**
Passer domesticus	House sparrow
Picidae	**Woodpeckers, Sapsuckers and Flickers**
Colaptes auratus	Northern flicker
Melanerpes formicivorus	Acorn woodpecker
Picoides nuttallii	Nuttall’s woodpecker
Polioptilidae	**Gnatcatchers**
*Polioptila californica california**	Coastal California gnatcatcher
Ptilogonatidae	Silky flycatchers
Phainopepla nitens	Phainopepla
Regulidae	**Kinglets**
Regulus calendula	Ruby-crowned kinglet
Sturnidae	**Starlings**
Sturnus vulgaris	European starling

Scientific Name	Common Name
Sylviidae	**Old World Warblers**
Chamaea fasciata	Wrentit
Trochilidae	**Hummingbirds**
Archilochus alexandri	Black-chinned hummingbird
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
Troglodytidae	**Wrens**
Chamaea fasciata	Wrentit
Tryomanes aedon	House wren
Thryomanes bewickii	Bewick's wren
Turdidae	**Mockingbirds**
Turdus migratorius	American robin
Tyrannidae	**Tyrant Flycatchers**
Contopus sordidulus	Western wood-pewee
Empidonax difficilis	Pacific-slope flycatcher
Myiarchus cinerascens	Ash-throated flycatcher
Sayornis nigricans	Black phoebe
Sayornis saya	Say's phoebe
Tyrannus verticalis	Western kingbird
Tyrannus vociferans	Cassin's kingbird
Vireonidae	**Vireos**
*Vireo bellii pusillus**	Least Bell's vireo
Vireo gilvus	Warbling vireo
Vireo huttoni	Hutton's vireo
Mammals	
Sciuridae	**Squirrels**
Otospermophilus beecheyi	California ground squirrel
Reptiles	
Phrynosomatidae	**Lizards**
Sceloporus occidentalis	Western fence lizard
Invertebrates	
Cambaridae	**Freshwater Crayfish**
Procambarus clarkii	Red swamp crayfish

* Indicates a special-status wildlife species.

This page intentionally left blank.

APPENDIX C

Database Review Results

California Natural Diversity Data Base (CNDDB)

California Native Plant Society (CNPS)

Information for Planning and Conservation (IPaC)

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Baldwin Park (3411718) OR El Monte (3411811) OR San Dimas (3411717) OR Whittier (3311881) OR La Habra (3311788) OR Yorba Linda (3311787) OR Los Alamitos (3311871) OR Anaheim (3311778) OR Orange (3311777))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Abronia villosa var. aurita chaparral sand-verbena	PDNYC010P1	None	None	G5T2?	S2	1B.1
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G1G2	S1S2	SSC
Aimophila ruficeps canescens southern California rufous-crowned sparrow	ABPBX91091	None	None	G5T3	S3	WL
Ammodramus savannarum grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
Anniella stebbinsi Southern California legless lizard	ARACC01060	None	None	G3	S3	SSC
Antrozous pallidus pallid bat	AMACC10010	None	None	G4	S3	SSC
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Arizona elegans occidentalis California glossy snake	ARADB01017	None	None	G5T2	S2	SSC
Asio otus long-eared owl	ABNSB13010	None	None	G5	S3?	SSC
Aspidoscelis hyperythra orange-throated whiptail	ARACJ02060	None	None	G5	S2S3	WL
Aspidoscelis tigris stejnegeri coastal whiptail	ARACJ02143	None	None	G5T5	S3	SSC
Astragalus hornii var. hornii Horn's milk-vetch	PDFAB0F421	None	None	GUT1	S1	1B.1
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Atriplex parishii Parish's brittlescale	PDCHE041D0	None	None	G1G2	S1	1B.1
Bombus crotchii Crotch bumble bee	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
California Walnut Woodland California Walnut Woodland	CTT71210CA	None	None	G2	S2.1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Calochortus plummerae Plummer's mariposa-lily	PMLIL0D150	None	None	G4	S4	4.2
Calochortus weedii var. intermedius intermediate mariposa-lily	PMLIL0D1J1	None	None	G3G4T2	S2	1B.2
Calystegia felix lucky morning-glory	PDCON040P0	None	None	G1Q	S1	1B.1
Campylorhynchus brunneicapillus sandiegensis coastal cactus wren	ABPBG02095	None	None	G5T3Q	S3	SSC
Catostomus santaanae Santa Ana sucker	AFCJC02190	Threatened	None	G1	S1	
Centromadia parryi ssp. australis southern tarplant	PDAST4R0P4	None	None	G3T2	S2	1B.1
Chelonia mydas green turtle	ARAAA02010	Threatened	None	G3	S4	
Chloropyron maritimum ssp. maritimum salt marsh bird's-beak	PDSCR0J0C2	Endangered	Endangered	G4?T1	S1	1B.2
Choeronycteris mexicana Mexican long-tongued bat	AMACB02010	None	None	G3G4	S1	SSC
Cicindela hirticollis gravida sandy beach tiger beetle	IICOL02101	None	None	G5T2	S2	
Cicindela latesignata latesignata western beach tiger beetle	IICOL02113	None	None	G2G4T1T2	S1	
Cicindela senilis frosti senile tiger beetle	IICOL02121	None	None	G2G3T1T3	S1	
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Crotalus ruber red-diamond rattlesnake	ARADE02090	None	None	G4	S3	SSC
Cuscuta obtusiflora var. glandulosa Peruvian dodder	PDCUS01111	None	None	G5T4?	SH	2B.2
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Dudleya multicaulis many-stemmed dudleya	PDCRA040H0	None	None	G2	S2	1B.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Empidonax traillii extimus southwestern willow flycatcher	ABPAE33043	Endangered	Endangered	G5T2	S1	
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Eriastrum densifolium ssp. sanctorum Santa Ana River woollystar	PDPLM03035	Endangered	Endangered	G4T1	S1	1B.1
Eumops perotis californicus western mastiff bat	AMACD02011	None	None	G4G5T4	S3S4	SSC
Euphydryas editha quino quino checkerspot butterfly	IILEPK405L	Endangered	None	G5T1T2	S1S2	
Falco columbarius merlin	ABNKD06030	None	None	G5	S3S4	WL
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Gila orcuttii arroyo chub	AFCJB13120	None	None	G2	S2	SSC
Glyptostoma gabrielense San Gabriel chestnut	IMGASB1010	None	None	G2	S2	
Gonidea angulata western ridged mussel	IMBIV19010	None	None	G3	S1S2	
Habroscelimorpha gabbii western tidal-flat tiger beetle	IICOL02080	None	None	G2G4	S1	
Horkelia cuneata var. puberula mesa horkelia	PDROS0W045	None	None	G4T1	S1	1B.1
Icteria virens yellow-breasted chat	ABPBX24010	None	None	G5	S3	SSC
Lasionycteris noctivagans silver-haired bat	AMACC02010	None	None	G3G4	S3S4	
Lasiurus cinereus hoary bat	AMACC05030	None	None	G3G4	S4	
Lasiurus xanthinus western yellow bat	AMACC05070	None	None	G4G5	S3	SSC
Lasthenia glabrata ssp. coulteri Coulter's goldfields	PDAST5L0A1	None	None	G4T2	S2	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lepidium virginicum var. robinsonii Robinson's pepper-grass	PDBRA1M114	None	None	G5T3	S3	4.3
Lepus californicus bennettii San Diego black-tailed jackrabbit	AMAEB03051	None	None	G5T3T4	S3S4	SSC
Microtus californicus stephensi south coast marsh vole	AMAFF11035	None	None	G5T2T3	S1S2	SSC
Myotis yumanensis Yuma myotis	AMACC01020	None	None	G5	S4	
Nama stenocarpa mud nama	PDHYD0A0H0	None	None	G4G5	S1S2	2B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Nasturtium gambelii Gambel's water cress	PDBRA270V0	Endangered	Threatened	G1	S1	1B.1
Navarretia prostrata prostrate vernal pool navarretia	PDPLM0C0Q0	None	None	G2	S2	1B.2
Nemacaulis denudata var. denudata coast woolly-heads	PDPGN0G011	None	None	G3G4T2	S2	1B.2
Nyctinomops femorosaccus pocketed free-tailed bat	AMACD04010	None	None	G5	S3	SSC
Nyctinomops macrotis big free-tailed bat	AMACD04020	None	None	G5	S3	SSC
Oncorhynchus mykiss irideus pop. 10 steelhead - southern California DPS	AFCHA0209J	Endangered	None	G5T1Q	S1	
Orcuttia californica California Orcutt grass	PMPOA4G010	Endangered	Endangered	G1	S1	1B.1
Passerculus sandwichensis beldingi Belding's savannah sparrow	ABPBX99015	None	Endangered	G5T3	S3	
Phacelia stellaris Brand's star phacelia	PDHYD0C510	None	None	G1	S1	1B.1
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Polioptila californica californica coastal California gnatcatcher	ABPBJ08081	Threatened	None	G4G5T3Q	S2	SSC
Pseudognaphalium leucocephalum white rabbit-tobacco	PDAST440C0	None	None	G4	S2	2B.2
Ribes divaricatum var. parishii Parish's gooseberry	PDGRO020F3	None	None	G5TX	SX	1A
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Riversidian Alluvial Fan Sage Scrub Riversidian Alluvial Fan Sage Scrub	CTT32720CA	None	None	G1	S1.1	
Salvadora hexalepis virgultea coast patch-nosed snake	ARADB30033	None	None	G5T4	S2S3	SSC
Scutellaria bolanderi ssp. austromontana southern mountains skullcap	PDLAM1U0A1	None	None	G4T3	S3	1B.2
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Setophaga petechia yellow warbler	ABPBX03010	None	None	G5	S3S4	SSC
Sidalcea neomexicana salt spring checkerbloom	PDMAL110J0	None	None	G4	S2	2B.2
Sorex ornatus salicornicus southern California saltmarsh shrew	AMABA01104	None	None	G5T1?	S1	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Southern California Arroyo Chub/Santa Ana Sucker Stream	CARE2330CA	None	None	GNR	SNR	
Southern California Arroyo Chub/Santa Ana Sucker Stream						
Southern Coast Live Oak Riparian Forest	CTT61310CA	None	None	G4	S4	
Southern Coast Live Oak Riparian Forest						
Southern Coastal Salt Marsh	CTT52120CA	None	None	G2	S2.1	
Southern Coastal Salt Marsh						
Southern Cottonwood Willow Riparian Forest	CTT61330CA	None	None	G3	S3.2	
Southern Cottonwood Willow Riparian Forest						
Southern Willow Scrub	CTT63320CA	None	None	G3	S2.1	
Southern Willow Scrub						
Spea hammondii	AAABF02020	None	None	G3	S3	SSC
western spadefoot						
Sternula antillarum browni	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
California least tern						
Suaeda esteroa	PDCHE0P0D0	None	None	G3	S2	1B.2
estuary seablite						
Symphyotrichum defoliatum	PDASTE80C0	None	None	G2	S2	1B.2
San Bernardino aster						
Taxidea taxus	AMAJF04010	None	None	G5	S3	SSC
American badger						
Vireo bellii pusillus	ABPBW01114	Endangered	Endangered	G5T2	S2	
least Bell's vireo						
Walnut Forest	CTT81600CA	None	None	G1	S1.1	
Walnut Forest						

Record Count: 94

California Native Plant Society

Rare and Endangered Plants of California

Nine quad search of: La Habra, Baldwin Park, El Monte, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim and Orange quads.

Scientific Name	Common Name	California Rare Plant Rank	Listing Under CESA	Listing Under FESA
Abronia villosa var. aurita	chaparral sand-verbena	1B.1	None	None
Androsace elongata ssp. acuta	California androsace	4.2	None	None
Asplenium vespertinum	western spleenwort	4.2	None	None
Atriplex parishii	Parish's brittlescale	1B.1	None	None
Atriplex serenana var. davidsonii	Davidson's saltscale	1B.2	None	None
Calochortus catalinae	Catalina mariposa lily	4.2	None	None
Calochortus plummerae	Plummer's mariposa lily	4.2	None	None
Calochortus weedii var. intermedius	intermediate mariposa lily	1B.2	None	None
Calystegia felix	lucky morning-glory	1B.1	None	None
Camissoniopsis lewisii	Lewis' evening-primrose	3	None	None
Centromadia parryi ssp. australis	southern tarplant	1B.1	None	None
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	1B.2	Endangered	Endangered
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	1B.1	Endangered	Candidate
Convolvulus simulans	small-flowered morning-glory	4.2	None	None
Cuscuta obtusiflora var. glandulosa	Peruvian dodder	2B.2	None	None
Deinandra paniculata	paniculate tarplant	4.2	None	None
Dudleya multicaulis	many-stemmed dudleya	1B.2	None	None
Horkelia cuneata var. puberula	mesa horkelia	1B.1	None	None
Juglans californica	Southern California black walnut	4.2	None	None
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	1B.1	None	None
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	4.3	None	None
Navarretia prostrata	prostrate vernal pool navarretia	1B.1	None	None
Orcuttia californica	California Orcutt grass	1B.1	Endangered	Endangered
Phacelia hubbyi	Hubby's phacelia	4.2	None	None
Phacelia ramosissima var. austrolitoralis	south coast branching phacelia	3.2	None	None
Phacelia stellaris	Brand's star phacelia	1B.1	None	None
Pseudognaphalium leucocephalum	white rabbit-tobacco	2B.2	None	None
Quercus engelmannii	Engelmann oak	4.2	None	None
Ribes divaricatum var. parishii	Parish's gooseberry	1A	None	None
Romneya coulteri	Coulter's matilija poppy	4.2	None	None
Scutellaria bolanderi ssp. austromontana	southern mountains skullcap	1B.2	None	None
Senecio aphanactis	chaparral ragwort	2B.2	None	None
Sidalcea neomexicana	salt spring checkerbloom	2B.2	None	None
Suaeda esteroa	estuary seablite	1B.2	None	None
Symphyotrichum defoliatum	San Bernardino aster	1B.2	None	None

California Native Plant Society, Rare Plant Program. 2021. Inventory of Rare and Endagnered Plants of California (online edition, v8-03, 0.39). Website http://www.rareplants.cnps.org [accessed 11 February 2021].

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Los Angeles and Orange counties, California

Local office

Carlsbad Fish And Wildlife Office

(760) 431-9440
(760) 431-5901

2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385

http://www.fws.gov/carlsbad/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

Coastal California Gnatcatcher Polioptila californica californica — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/8178

Least Bell's Vireo Vireo bellii pusillus — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/5945

Fishes

NAME	STATUS
Santa Ana Sucker Catostomus santaanae There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3785	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Coastal California Gnatcatcher Polioptila californica californica https://ecos.fws.gov/ecp/species/8178#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31

Costa's Hummingbird Calypte costae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9470	Breeds Jan 15 to Jun 10
Lawrence's Goldfinch Carduelis lawrencei This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9464	Breeds Mar 20 to Sep 20
Nuttall's Woodpecker Picoides nuttallii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9410	Breeds Apr 1 to Jul 20
Oak Titmouse Baeolophus inornatus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9656	Breeds Mar 15 to Jul 15
Rufous Hummingbird selasphorus rufus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Song Sparrow Melospiza melodia This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Feb 20 to Sep 5
Spotted Towhee Pipilo maculatus clementae This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/4243	Breeds Apr 15 to Jul 20
Wrentit Chamaea fasciata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 10

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER FORESTED/SHRUB WETLAND

- PFOC
- PFOA
- PSSA

RIVERINE

- R4SBA

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX D

Table A. Regional Special-Status Plant Species and Sensitive Natural Communities

Table B. Regional Special-Status Wildlife Species

Table A. Regional Special-Status Plant Species and Sensitive Natural Communities[1]

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Plants				
chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: None State: None CRPR: 1B.1	Found in sandy habitats, including chaparral, coastal scrub, and desert dunes. Occurs between 250-5,250 feet (75-1,500 meters). Blooms (January) March to September	Present	**Not Expected.** Although potentially suitable habitat for this species is present, the nearest CNDDB record is from 1929 and occurs approximately 7 miles southeast of the BSA. Additionally, all historic populations within the BSA and surrounding quadrangles are thought to be extirpated.
California androsace *Androsace elongata* ssp. *acuta*	Federal: None State: None CRPR: 4.2	Found in chaparral, cismontane woodland, coastal scrub, meadow and seep, pinyon and juniper woodland, and valley and foothill grassland habitats. Occurs between 165 and 4280 feet (50 to 1,305 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
western spleenwort *Asplenium vespertinum*	Federal: None State: None CRPR: 4.2	Found in rocky habitats, including chaparral, cismontane woodland, and coastal scrub. Occurs between 590 and 3,280 feet (180 to 1,000 meters). Blooms February to June.	Present	**Not Expected.** Although marginally suitable habitat for this species is present, the BSA falls outside the elevation range known for this species. Additionally, there are no CNDDB records of the species from the project vicinity and from surrounding quadrangles.
Horn's milk-vetch *Astragalus hornii* var. *hornii*	Federal: None State: None CRPR: 1B.1	Prefers lake margins and alkaline areas in meadow and seep and playa habitats. Occurs between 195 and 2,780 feet (60 to 850 meters). Blooms May to October.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Parish's brittlescale *Atriplex parishii*	Federal: None State: None CRPR: 1B.1	Found in alkaline habitats, including chenopod scrub, playas, and vernal pools. Occurs between 80 and 6,230 feet (25 to 1,900 meters). Blooms June to October.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	Federal: None State: None CRPR: 1B.2	Found in alkaline habitats, including coastal scrub and coastal bluff scrub. Occurs between 30 and 650 feet (10 to 200 meters). Blooms April to October.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Catalina mariposa-lily *Calochortus catalinae*	Federal: None State: None CRPR: 4.2 Other: NCCP	Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Occurs between 50 and 2,300 feet (15 to 700 meters). Blooms February to June.	Present	**Low.** Although potentially suitable habitat for this species is present, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Plummer's mariposa-lily *Calochortus plummerae*	Federal: None State: None CRPR: 4.2	Granitic or rocky habitats. Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and valley and foothill grassland. Occurs between 330 and 5,580 feet (100 to 1,700 meters). Blooms May to July.	Present	**Moderate.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2005 and occurs approximately 6 miles northwest of the BSA.
intermediate mariposa-lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CRPR: 1B.2	Found in chaparral, chenopod scrub, cismontane woodland, coastal scrub, lower montane coniferous forest and valley and foothill grassland. Occurs between 100 to 4,920 feet (30 to 1,500 meters). Blooms April to June.	Present	**High.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2017 and occurs approximately 3 miles east of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
lucky morning-glory *Calystegia felix*	Federal: None State: None CRPR: 1B.1 Other: None	Usually found in wetland and marsh habitats, occasionally in drier habitats, including meadows and seeps and riparian scrub. May inhabit areas with silty loam and alkaline soils. Occurs between 98 and 700 feet (30 to 215 meters). Blooms March to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1905 and occurs approximately 13 miles west of the BSA.
Lewis' evening-primrose *Camissoniopsis lewisii*	Federal: None State: None CRPR: 3	Inhabits sandy or clay soils in coastal bluff-scrub, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland. Occurs between 0 and 985 feet (0 to 300 meters). Blooms March to May (June).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CRPR: 1B.1	Found in vernal pools, vernally mesic valley and foothill grasslands, and around margins of marshes and swamps. Occurs between 0 and 1,575 feet (0 to 480 meters). Blooms May to November.	Absent	**Low.** Potentially suitable habitat for this species is absent from the BSA. No historic CNDDB records occur within the BSA or surrounding quadrangles. The nearest CNPS record is from 2003 and occurs approximately 4 miles southeast of the BSA within the Orange quad.
salt marsh bird's-beak *Chloropyron maritimum* ssp. *maritimum*	Federal: FE State: SE Other: 1B.2	Found in coastal dunes and coastal salt marshes and swamps. Occurs between 0 and 98 feet (0 to 30 meters). Blooms May to October (November).	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the BSA falls outside the elevation range known for this species.
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: None State: SE CRPR: 1B.1	Preferred habitat includes sandy coastal scrub, valley and foothill grasslands. Occurs between 495 and 4,000 feet (150 to 1,220 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
small-flowered morning-glory *Convolvulus simulans*	Federal: None State: None CRPR: 4.2	Found in clay, serpentine seeps in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 98 and 2,430 feet (30 to 740 meters). Blooms March to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Peruvian dodder *Cuscuta obtusiflora* var. *glandulosa*	Federal: None State: None CRPR: 1B.2	Found in freshwater marshes and swamps. Occurs between 49 and 920 feet (15 to 280 meters). Blooms July to October.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
paniculate tarplant *Deinandra paniculata*	Federal: None State: None CRPR: 4.2	Usually prefers vernally mesic, sometimes sandy coastal scrub, valley foothill grassland, and vernal pool habitats. Occurs between 80 to 3,085 feet (25 to 940 meters). Blooms (March) April to November.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles. The nearest CNPS record is from 1932 and occurs approximately 7 miles southeast of the BSA within the Orange quad.
many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CRPR: 1B.2	Found in chaparral, coastal scrub, and valley and foothill grassland habitats. Often in clay soils. Occurs between 50 and 2,520 feet (15 to 790 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1991 and occurs approximately 11 miles northeast of the BSA.
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CRPR: 1B.1	Found in sandy or gravelly sites in chaparral and coastal scrub habitats. Occurs between 300 and 2,000 feet (91 to 610 meters). Blooms April to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1927 and occurs approximately 13 miles southeast of the BSA.
mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: None State: None CRPR: 1B.1	Prefers sandy or gravelly sites in chaparral, cismontane woodland, and coastal scrub habitats. Occurs between 230 and 2,660 feet (70 to 810 meters). Blooms February to September.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1921 and occurs approximately 15 miles northeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Southern California black walnut *Juglans californica*	Federal: None State: None CRPR: 4.2	Found in alluvial sites in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. Occurs between 164 and 2,955 feet (50 to 900 meters). Blooms March to August.	Present	**Present.** This species is present in the BSA.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Federal: None State: None CRPR: 1B.1	Found in coastal salt marshes and swamps, playas, and vernal pools. Occurs between 3 and 4,005 feet (1 to 1,220 meters). Blooms February to June.	Absent.	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Robinson's pepper-grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CRPR: 4.3	Chaparral or coastal scrub habitats. Occurs between 5 to 2,905 feet (1 to 885 meters). Blooms January to July.	Present	**High.** Potentially suitable habitat for this species is present in the BSA. The nearest CNDDB record is from 2010 and occurs approximately 5 miles northeast of the BSA. Additional CNPS records occur from native habitats in the Santa Ana Mountain, 10 plus miles to the southeast.
mud nama *Nama stenocarpa*	Federal: None State: None CRPR: 2B.2	Found in marshes, swamps, lake margins, and riverbanks. Occurs between 15 and 1,645 feet (5 to 500 meters). Blooms January to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 25 miles southwest of the BSA.
Gambel's water cress *Nasturtium gambellii*	Federal: FE State: ST CRPR: 1B.1	Found in freshwater or brackish marshes and swamps. Occurs between 15 and 1,085 feet (5 to 330 meters). Blooms April to October.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CRPR: 1B.2	Found in mesic habitats, including coastal scrub, meadows and seeps, valley and foothill grassland, and vernal pools. Occurs between 9 and 3,970 feet (3 to 1,210 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1895 and occurs approximately 15 miles west of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
coast woolly-heads *Nemacaulis denudata* var. *denudata*	Federal: None State: None CRPR: 1B.2	Inhabits coastal dune habitats. Occurs between 0 and 330 feet (0 to 100 meters). Blooms April to September.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the BSA falls outside the elevation range known for this species.
California Orcutt grass *Orcuttia californica*	Federal: FE State: FE CRPR: 1B.1	Found in vernal pools. Occurs between 145 and 7105 feet (45 to 2165 meters). Blooms April to August.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Hubby's phacelia *Phacelia hubbyi*	Federal: None State: None CRPR: 4.2	Prefers gravelly, rocky, or talus sites in chaparral, coastal scrub, and valley and foothill grassland habitats. Occurs between 0 and 3280 feet (0 to 1000 meters). Blooms April to July.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
south coast branching phacelia *Phacelia ramosissima* var. *austrolitoralis*	Federal: None State: None CRPR: 3.2	Prefers sandy or rocky areas in chaparral, coastal dune, coastal scrub, and coastal salt marsh and swamp habitats. Occurs between 15 and 985 feet (5 to 300 meters). Blooms March to August.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Brand's star phacelia *Phacelia stellaris*	Federal: None State: None CRPR: 1B.1	Inhabits coastal dune and coastal scrub habitats. Occurs between 3 and 1315 feet (1 to 400 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 15 miles southwest of the BSA.
white rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CRPR: 2B.2	Prefers sandy, gravelly areas in chaparral, cismontane woodland, coastal scrub, or riparian woodland habitats. Occurs between 0 to 6890 feet (0 to 2100 meters). Blooms (July) August to November (December).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB records are from over 85 years ago and occur approximately 21 miles north of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
Engelmann oak *Quercus engelmannii*	Federal: State: CRPR: 4.2	Found in chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland habitats. Occurs between 164 and 4265 feet (50 to 1300 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
Parish's gooseberry *Ribes divaricatum* var. *parishii*	Federal: None State: None CRPR: 1A	Inhabits riparian woodland habitats. Occurs between 210 and 985 feet (65 to 300 meters). Blooms February to April.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1979 and occurs approximately 16 miles northwest of the BSA.
Coulter's matilija poppy *Romneya coulteri*	Federal: None State: None CRPR: 4.2	Often found in burns in chaparral or coastal scrub habitats. Occurs between 65 to 3940 feet (20 to 1200 meters). Blooms March to July (August).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, no historic CNDDB records occur within the BSA or the surrounding quadrangles.
southern mountains skullcap *Scutellaria bolanderi* ssp. *austromontana*	Federal: None State: None CRPR: 1B.2	Prefers mesic habitats, including chaparral, cismontane woodland, and lower montane coniferous forest. Occurs between 1390 and 6565 feet (425 to 2000 meters). Blooms June to August.	Present	**Not Expected.** Although potentially suitable habitat for this species is present in the BSA, the BSA falls outside the elevation range known for this species.
chaparral ragwort *Senecio aphanactis*	Federal: None State: None CRPR: 2B.2	Sometimes alkaline. Prefers areas of chaparral, cismontane woodland, or coastal scrub habitats. Occurs between 50 to 2625 feet (15 to 800 meters). Blooms January to April (May).	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1932 and occurs approximately 14 miles northeast of the BSA.
salt spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CRPR: 2B.2	Prefers alkaline or mesic areas in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playa habitats. Occurs between 45 and 5020 feet (15 to 1530 meters). Blooms March to June.	Present	**Low.** Although potentially suitable habitat for this species is present in the BSA, the nearest CNDDB record is from 1952 and occurs approximately 10 miles south of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent in BSA	Potential for Occurrence[5,6]
estuary seablite *Suaeda esteroa*	Federal: None State: None CRPR: 1B.1	Found in coastal salt marshes and swamps. Occurs between 0 and 20 feet (0 to 5 meters). Blooms (May) June to October (January).	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA and the BSA falls outside the elevation range known for this species.
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CRPR: 1B.2	Found near ditches, streams, and springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and vernally mesic valley and foothill grassland habitats. Occurs between 6 and 6700 feet (2 to 2040 meters). Blooms July to November (December).	Present	**Low.** Although potentially suitable habitat for this species is present within the BSA, the nearest CNDDB record is from 1896 and occurs approximately 9 miles southwest of the BSA. Additionally, all historic populations within the BSA and surrounding quadrangles are thought to be extirpated or possibly extirpated.
Sensitive Natural Communities Listed in the CNDDB				
California Walnut Woodland				
Riversidian Alluvial Fan Sage Scrub				
Southern California Arroyo Chub/Santa Ana Sucker Stream				
Southern Coast Live Oak Riparian Forest				
Southern Coastal Salt Marsh				
Southern Cottonwood Willow Riparian Forest				
Walnut Forest				

[1] Special-Status plant species known from the CNDDB and CNPS to occur on the La Habra, El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange quadrangles, and from a search of IPaC for the project vicinity.

[2] Nomenclature for special-status plant species conforms to CNPS.

[3] Sensitivity Status Codes

Federal **FT** - Federally Threatened under the Federal Endangered Species Act
FE - Federally Endangered under the Federal Endangered Species Act
FC - A Federal Candidate for listing under the Federal Endangered Species Act

State **ST** - State Threatened under the California Endangered Species Act
SE - State Endangered under the California Endangered Species Act

CRPR CNPS California Rare Plant Rank (CRPR)
1A: Plants presumed extinct in California
1B: Plants rare, threatened, or endangered in California and elsewhere
2: Plants rare, threatened, or endangered in California, but more common elsewhere

3: Plants more information is needed for
4: Plants of limited distribution – a watch list
0.1: Seriously threatened in California
0.2: Fairly endangered in California
0.3: Not very endangered in California

[4] General Habitat Descriptions from CNPS (2021).

[5] Historical CNDDB records from CDFW (2021) and CNPS (2021).

[6] Potential for each species to occur within the BSA is based on the following general guidelines:

- Present: Species was observed in or immediately adjacent to the BSA during the field survey, or survey conducted within the past five years.
- High: Habitat (including soils and elevation factors) and known historical range for the species occurs in the BSA and a known occurrence has been recorded from within five miles within the past 30 years.
- Moderate: Habitat for the species occurs in the BSA and a known occurrence exists from between five and ten miles of the BSA, within the past 30 years.
- Low: Limited habitat for the species occurs in the BSA and a known occurrence is from greater than 10 miles from the BSA or over 30 years old, or habitat to support the species is of marginal quantity or quality. A low potential to occur is also assigned when focused surveys for a species have been conducted numerous times within the past 10 years without positive results.
- Not Expected: Beyond those factors listed for Low Potential, the species is easily identifiable throughout the year and was not observed, or specific habitat requirements are not found within or adjacent to the BSA.

Table B. Regional Special-Status Wildlife Species[1]

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
Invertebrates				
Crotch bumble bee *Bombus crotchii*	Federal: None State: CE	Inhabit open grassland and scrub habitats. Utilize a wide variety of flowering plants.	Present	**Not Expected.** Potentially suitable habitat for this species is limited in the BSA and the nearest CNDDB record is from 1968 and occurs approximately 3 miles west of the BSA.
sandy beach tiger beetle *Cicindela hirticollis gravida*	Federal: None State: None Other: CNDDB	Burrow in moist sand in coastal habitats, including sand dunes and beaches.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
western beach tiger beetle *Cicindela latesignata latesignata*	Federal: None State: None Other: CNDDB	Utilize coastal habitats including wetlands, tidal flats, salt flats, sand dunes, and beaches. Require sandy soils for burrowing.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
senile tiger beetle *Cicindela senilis frosti*	Federal: None State: None Other: CNDDB	Inhabit coastal mud flats, salt flats, salt marshes, and inland alkali mud flats.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
monarch – California overwintering population *Danaus plexippus pop. 1*	Federal: None State: None Other: CNDDB	Roost in eucalyptus (*Eucalyptus* sp.), Monterey cypress (*Hesperocyparis macrocarpa*), and Monterey pines (*Pinus radiata*).	Present	**Not Expected.** Although eucalyptus trees potentially suitable for overwintering populations of this species are present in the BSA, the nearest CNDDB record is from 2013 and occurs approximately 20 miles southwest of the BSA.
quino checkerspot butterfly *Euphydryas editha quino*	Federal: FE State: None	Lives in grasslands, coastal sage scrub, chamise chaparral, red shank chaparral, juniper woodland, and semi-desert scrub where native plantain is found. The butterfly's primary larval host plant is the native plantain.	Present	**Not Expected.** Although potentially suitable habitat for this species is present within the BSA, the nearest CNDDB record is from 1930 and occurs approximately 8 miles southwest of the BSA. Additionally, all historic populations within the BSA and surrounding quadrangles are thought to be extirpated.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
western ridged mussel *Gonidea angulata*	Federal: None State: None Other: CNDDB	Found in streams, rivers, and lakes with substrates ranging from gravel to firm mud. Requires at least some silt, sand, or clay.	Present	**Not Expected.** Although potentially suitable habitat for this species is present in the BSA, this species is not expected in the BSA.
western tidal-flat tiger beetle *Habroscelimorpha gabbii*	Federal: None State: None Other: CNDDB	Utilize coastal habitats including salt marshes, tidal flats, and beaches. Require sandy soils for burrowing.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Fish				
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None	Inhabits permanent streams and rivers, with depths from a few centimeters to over a meter. Water must be cool with variable flows. Substrates of gravel, rubble and boulders are preferred for foraging and required for breeding.	Present	**Not Expected.** Brea Canyon provides habitats potentially suitable for this species; however, this species is not known from Brea Canyon or streams that are tributary to Brea Canyon. The nearest CNDDB record is from 2000 and occurs approximately 9 miles southeast of the BSA.
arroyo chub *Gila orcuttii*	Federal: None State: None Other: SSC	Habitat includes headwaters, creeks, and small to medium rivers, often intermittent streams; permanent, small to moderate-sized, moderate to high gradient streams with more than 50% of the habitat as runs and pools < 10 cm deep and reaches of permanent water more than 2 km long; requires some flow.	Present	**Not Expected.** Brea Canyon provides habitats potentially suitable for this species; however, this species is not known from Brea Canyon or streams that are tributary to Brea Canyon. The nearest CNDDB record is from 2013 and occurs approximately 16 miles north of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
southern California steelhead DPS *Oncorhynchus mykiss irideus*	Federal: FE State: None	Found in Pacific Ocean tributaries from Aleutian Islands in Alaska south to Southern California. Anadromous forms are known as steelhead, freshwater forms as rainbow trout.	Absent	**Not Expected.** Brea Canyon does not provide habitats preferred by this species and the species is not known from the larger San Gabriel River watershed, which the BSA occurs in. The nearest CNDDB record is from 1950 and occurs approximately 13 miles south of the BSA.
Amphibians				
western spadefoot *Spea hammondii*	Federal: None State: None Other: SSC	Inhabits grassland, oak woodland, coastal sage scrub, and chaparral vegetation in washes, floodplains, alluvial fans, playas, and alkali flats.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 1978 and occurs approximately 7 miles southwest of the BSA. The most recent CNDDB record is from 2005 and occurs approximately 10 miles northwest of the BSA.
Reptiles				
southern California legless lizard *Anniella stebbinsi*	Federal: None State: None Other: SSC	Occurs in moist warm loose soils in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Often under leaf litter or other surface objects.	Present	**Low.** Although potentially suitable habitat for this species occurs within the BSA, the nearest CNDDB record is from 1964 and occurs approximately 8 miles south of the BSA. The most recent CNDDB record is from 2018 and occurs approximately 15 miles northeast of the BSA.
California glossy snake *Arizona elegans occidentalis*	Federal: None State: None Other: SSC	Most common in desert habitats but also occur in chaparral, sagebrush, valley-foothill hardwood, pine-juniper, and annual grassland.	Present	**Not Expected.** Habitats in the BSA are marginally suitable for this species; however, the nearest CNDDB record is from 1961 and occurs 13 miles northeast of the BSA.
orange-throated whiptail *Aspidoscelis hyperythra*	Federal: None State: None Other: WL	Inhabits washes, streams, terraces, and other sandy areas often where there are rocks and patches of brush and rocky hillsides. Frequent coastal	Present	**Not Expected.** Although potentially suitable habitat for this species occurs within the BSA, the nearest CNDDB record is from 2000 and occurs 13 miles southeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
		chaparral, thornscrub and streamside growth.		
coastal whiptail *Aspidoscelis tigris stejnegeri*	Federal: None State: None Other: SSC	Occurs in coastal sage scrub, chaparral, riparian areas, woodlands, and rocky areas.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 2017 and occurs approximately 9 miles northwest of the BSA.
green turtle *Chelonia mydas*	Federal: FT State: None	Occurs in shallow waters of lagoons, bays, estuaries, eelgrass and seaweed beds. Prefers areas with abundant algae or aquatic vegetation.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
red-diamond rattlesnake *Crotalus ruber ruber*	Federal: None State: None Other: SSC	Occurs in coastal sage scrub, chamise chaparral, redshank, desert slope scrub, desert washes, grassy fields, orchards, cactus patches, and rocky areas.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB records are from 1995 and occur approximately 7 miles east of the BSA. The most recent CNDDB record is from 2017 and occurs approximately 8 miles northeast of the BSA.
western pond turtle *Emys marmorata*	Federal: None State: None Other: SSC	Occurs in aquatic water bodies including flowing rivers and streams, permanent lakes, ponds, reservoirs, settling ponds, marshes and other wetlands. Semi-permanent water bodies such as stock ponds, vernal pools and seasonal wetlands can also be utilized on a temporary basis.	Present	**Present.** This species was incidentally observed during wildlife crossing surveys in 2019 and 2020. A CNDDB record from 2013 coincides with the BSA, near the confluence of Brea and Tonner Canyons. Further CNDDB records of this species exist from Brea and Tonner Canyons.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
coast horned lizard *Phrynosoma blainvillii*	Federal: None State: None Other: SSC	Inhabits coastal sage scrub and chaparral in arid and semiarid climates. Prefers friable, rocky, or shallow sandy soils.	Present	**Low.** Although potentially suitable habitat for this species occurs within the BSA, the nearest CNDDB record is undated and occurs approximately 13 miles southeast of the BSA. Two additional CNDDB records, one undated and one from 1960, occur 14 miles northwest of the BSA.
coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: None State: None Other: SSC	Inhabits brushy chaparral habitats dominated by chamise and redshank, as well as riparian areas.	Present	**Not Expected.** Although potentially suitable riparian habitat occurs within the BSA, this species is known from locales closer to the coast. The nearest CNDDB record is from 1993 and occurs approximately 8 miles east of the BSA.
Birds				
Cooper's hawk *Accipiter cooperii*	Federal: None State: None Other: WL	Found in woodlands, chiefly of open, interrupted or marginal type. Nest sites are mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains. Also known to nest in live oaks and now nests in many cities.	Present	**Present.** This species was observed during general field surveys conducted in the BSA. The nearest CNDDB record is from 2012 and occurs approximately 12 miles northeast of the BSA.
tricolored blackbird *Agelaius tricolor*	Federal: None State: ST Other: SSC	Inhabits annual grasslands, wet and dry vernal pools, seasonal wetlands. Frequently found in and around agricultural areas.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	Federal: None State: None Other: WL	Resident in southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. Steep, rocky hillsides covered by coastal sage scrub or chaparral preferred by this species are generally absent from the BSA. The nearest CNDDB record is from 2005 and occurs approximately 3 miles east of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
grasshopper sparrow *Ammodramus savannarum*	Federal: None State: None Other: SSC	Associated with dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Prefers native grasslands with a mix of grasses, forbs, and scattered shrubs. This species is loosely colonial when nesting.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
great blue heron *Ardea herodias*	Federal: None State: None Other: CNDDB	Prefers shallow estuaries and fresh and saline emergent wetlands.	Present	**Moderate.** Brea Canyon may provide potentially suitable foraging habitat for this species and eucalyptus groves within the BSA may provide potentially suitable nesting habitat for the species. A CNDDB record from 2004 occurs approximately 5 mile south-southeast of the BSA.
long-eared owl *Asio otus*	Federal: None State: None Other: SSC	Prefers dense foliage, such as willow thickets and evergreen trees. Nests in conifer groves adjacent to open fields and wetlands.	Present	**Low.** Although potentially suitable habitat for this species is present within the BSA, the nearest CNDDB record is from 1925 and occurs approximately 14 miles northeast of the BSA.
burrowing owl *Athene cunicularia*	Federal: None State: None Other: SSC	Occurs in expansive, nearly flat open areas, such as prairies, grasslands, agricultural fields, vacant lots. Small mammal burrows are required for roosting/nesting.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA. The nearest CNDDB record is from 2010 and occurs approximately 11 miles northwest of the BSA.
ferruginous hawk *Buteo regalis*	Federal: None State: None Other: WL	Inhabits arid grasslands and adjacent farmlands. Nests in isolated trees or on rock outcrops.	Absent	**Low.** Although habitats preferred by this species are generally absent from the BSA, this species may cross through the BSA as a migrating transient. One CNDDB record from 1997 exists 10 plus miles southwest of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
Swainson's hawk *Buteo swainsoni*	Federal: None State: Threatened	Nests in stands with few trees in juniper-sage flats and riparian areas. Utilizes adjacent grasslands, grain or alfalfa fields, or livestock pastures for foraging.	Absent	**Not Expected.** Potentially suitable habitat for this species is generally absent from the BSA. The nearest CNDDB record is from 1888 and occurs approximately 7 miles south of the BSA. Historic populations within the project vicinity and surrounding quadrangles are thought to be extirpated.
coastal cactus wren *Campylorhynchus brunneicapillus sandiegensis*	Federal: None State: None Other: SSC	Inhabits cactus scrub complexes that can include *Rhus* sp. Presence of cholla cactus is preferred, as well as large dense stands of cactus.	Absent	**Not Expected.** Habitats with cactus preferred by this species are absent from the BSA.
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	Federal: FT State: SE	Summer resident of valley foothill and desert riparian habitats in California. Found along broad, lower flood bottoms of larger river systems. Colorado River, Sacramento and Owens valleys, South Fork of the Kern River, Santa Ana River, Armargosa River, and possibly San Luis Rey River.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
white-tailed kite *Elanus leucurus*	Federal: None State: None Other: FP	Associated with rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Prefers open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Present	**Low.** Rolling foothill habitat potentially suitable for this species is present in the far northeastern portion of the BSA. The nearest CNDDB record is from 2009 and occurs approximately 10 miles southeast of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
southwestern willow flycatcher *Empidomax traillii extimus*	Federal: FE State: SE	Inhabits riparian woodlands in southern California. Nests in extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters, between 2,000 and 8,000 feet (610 to 2,440 meters). Dense willow thickets are required for nesting and roosting. Low, exposed branches are used for singing posts/hunting perches.	Present	**Not Expected.** Protocol surveys for this species were conducted in 2016 along Brea Canyon with negative results. Specific riparian habitat requirements are not present and the BSA occurs outside the general elevation range known for this species. The nearest CNDDB record is from 1906 and occurs approximately 35 miles northwest of the BSA.
California horned lark *Eremophila alpestris actia*	Federal: None State: None Other: WL	Prefers expansive open areas, with barren or sparsely vegetated ground, such as beaches, plowed fields and occasionally parking lots or runways.	Present	**Moderate.** Barren and sparsely vegetated habitats potentially suitable for this species are present within the BSA. The nearest CNDDB record is from 2008 and occurs approximately 3 miles east-northeast of the BSA.
merlin *Falco columbarius*	Federal: None State: None Other: WL	Inhabits coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stage habitats below 3,900 feet (1,500 meters).	Present	**Low.** Potentially suitable wetland edge habitat for this species is present within the BSA. The nearest CNDDB record is from 1993 and occurs approximately 12 miles northeast of the BSA.
American peregrine falcon *Falco peregrinus anatum*	Federal: Delisted State: Delisted Other: FP	Occurs along coast and western Sierra Nevada in spring and fall. Utilize woodland, forest, and coastal habitats for breeding.	Absent	**Low.** Potentially suitable habitat for this species is generally absent from the BSA; however, the species may occur in the BSA as a transient forager. The nearest CNDDB record is from 2015 and occurs approximately 15 miles south of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
yellow-breasted chat *Icteria virens*	Federal: None State: None Other: SSC	Occurs in dense tangled brushy patches, hedgerows and wood edges, in open sunny areas and along riparian woodland ecotones.	Present	**Present.** This species was detected during protocol bird surveys in 2016, and has been incidentally observed within the BSA since then. The nearest CNDDB record is from 2013 and occurs approximately 5 miles east of the BSA.
California black rail *Laterallus jamaicensis coturniculus*	Federal: None State: Threatened Other: FP	Inhabits saline, brackish, and fresh emergent wetlands.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	Federal: None State: SE Other: None	Inhabits southern coastal wetlands.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: None Other: SSC	Obligate, permanent resident of coastal sage scrub below 2,500 feet (760 meters) in southern California. Inhabits low, coastal sage scrub in arid washes, on mesas and slopes.	Present	**Present.** A family group of this species was detected during protocol bird surveys in 2016 and was incidentally observed in the same locale during subsequent site visits. The BSA occurs within Critical Habitat for the species.
bank swallow *Riparia riparia*	Federal: None State: FT	Found in riparian and other lowland habitats during spring and fall. Occupy riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils during summer, where they dig nesting holes.	Absent	**Not Expected.** Although potentially suitable riparian habitat for this species is present within the BSA, the nearest CNDDB record is from 1994 and occurs approximately 10 miles northwest of the BSA. Additionally, historic populations within the project vicinity and surrounding quads are thought to be extirpated.
yellow warbler *Setophaga petechia*	Federal: None State: None Other: SSC	Occupy riparian vegetation in close proximity to water along streams and in wet meadows. Associated with willow and cottonwoods.	Present	**Present.** This species has been incidentally observed within the BSA. A CNDDB record from 2016 occurs approximately 5 miles east of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
California least tern *Sternula antillarum browni*	Federal: FE State: SE Other: FP	During summer, breed along marine and estuarine shores and feed in nearby shallow, estuarine waters. After breeding, found at lacustrine waters near coast.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE	Occupy willow and cottonwood riparian woodland, usually associated with water or adjacent to a water source.	Present	**Present.** Although not detected during protocol surveys conducted for this species in 2016, a lone male of this species was incidentally detected during general field surveys in 2016 and 2017. The species has also been incidentally detected during surveys associated with the wildlife movement study. A family group was recorded in the CNDDB from 2000, approximately 0.50 mile east-southeast of the BSA along Tonner Canyon in riparian habitat very similar to that occurring within the BSA.
Mammals				
pallid bat *Antrozous pallidus*	Federal: None State: None Other: SSC, WBWG-H	Roosts by day in rock crevices, buildings, mines, and hollow trees. At night, may roost under bridges and/or porches.	Present	**Not Expected.** Although habitat marginally suitable for this species is present in the BSA, the nearest CNDDB record is from 1936 and occurs approximately 18 miles north of the BSA.
Mexican long-tongued bat *Choeronycteris mexicana*	Federal: None State: None Other: SSC, WBWG-H	Roosts in dimly-lit caves, mines, and buildings.	Absent	**Not Expected.** Habitats potentially suitable for this species are absent from the BSA. The nearest CNDDB record is from 1995 and occurs approximately 18 miles south of the BSA.
western mastiff bat *Eumops perotis californicus*	Federal: None State: None Other: SSC, WBWG-H	Roosts in rock crevices, on cliff faces and also uses crevices in buildings and structures. Limited to roosts that allow at least 10 feet of free fall.	Present	**Low.** Habitats in the BSA are marginally suitable for this species. The nearest CNDDB record is from 1990 and occurs approximately 9 miles southwest of the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
silver-haired bat *Lasionycteris noctivagans*	Federal: None State: None Other: CNDDB, WBWG-M	Occurs in coastal and montane coniferous forests, valley foothill woodlands, pinyon-juniper woodlands, and valley foothill and montane riparian habitats. Roosts in hollow trees, snags, buildings, rock crevices, caves, and under bark.	Present	**Not Expected.** Habitats marginally suitable for this species are present in the BSA; however, the nearest CNDDB record is from 1978 and occurs approximately 19 miles southwest of the BSA.
hoary bat *Lasiurus cinereus*	Federal: None State: none Other: CNDDB, WBWG-M	Occurs from sea level to 13,200 feet (4,125 meters). Males generally inhabit foothills, deserts, and mountains, while females inhabit lowlands and coastal valleys. Roosts in dense foliage of medium-large trees, preferring sites hidden from above with few branches below.	Present	**Not Expected.** Habitat marginally suitable for this species is present in the BSA; however, the nearest CNDDB record is from 1925 and occurs approximately 19 miles north of the BSA.
western yellow bat *Lasiurus xanthinus*	Federal: None State: None Other: SSC, WBWG-H	Occurs below 2,000 feet (600 meters) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees and palms.	Present	**Low.** Habitat marginally suitable for this species is present in the BSA. The nearest CNDDB record is from 1985 and occurs approximately 14 miles northeast of the BSA.
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	Federal: None State: None Other: SSC	Occurs in lower elevation herbaceous and desert-shrub areas and open, early-successional stages of forest and chaparral habitats.	Absent	**Not Expected.** Habitat potentially suitable for this species is generally absent from the BSA. The nearest CNDDB record is from 2001 and occurs approximately 22 miles northwest of the BSA.
south coast marsh vole *Microtus californicus stephensi*	Federal: None State: None Other: SSC	Occurs in wetland habitats and associated grasslands along the coast.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.

Common Name *Scientific Name*[2]	Status[3]	General Habitat Description[4]	Habitat Present/ Absent	Potential for Occurrence[5,6]
Yuma myotis *Myotis yumanensis*	Federal: None State: None Other: CNDDB, WBWG-LM	Occurs from sea level to 11,000 feet (3,300 meters), though uncommon above 8,000 feet (2,560 meters). Inhabit open forests and woodlands with water sources. Roosts in buildings, caves, mines, bridges, and abandoned swallow nests during the day. Roost in more open areas at night.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 1998 and occurs approximately 11 miles southeast of the BSA.
pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None Other: SSC, WBWG-M	Occurs in pinyon-juniper woodlands, desert scrub, desert succulent scrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis habitats. Roost in rock crevices, caverns, or buildings.	Present	**Low.** Habitat marginally suitable for this species is present in the BSA. The nearest CNDDB record is from 1989 from an unknown location in the City of Brea.
big free-tailed bat *Nyctinimops macrotis*	Federal: None State: None Other: SSC, WBWG-MH	Often found in urban areas. Roost in buildings, caves, hollow trees, high cliffs, and rocky outcrops.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 1987 and occurs approximately 13 miles northeast of the BSA.
southern California saltmarsh shrew *Sorex ornatus salicornius*	Federal: None State: None Other: SSC	Occurs in coastal salt marshes, preferring those dominated by pickleweed and saltgrass.	Absent	**Not Expected.** Potentially suitable habitat for this species is absent from the BSA.
American badger *Taxidea taxus*	Federal: None State: None Other: SSC	Occurs in dry, open stages of shrub, forest, and herbaceous habitats. Prefers areas with fine-textured or sandy soils for digging burrows.	Present	**Low.** Potentially suitable habitat for this species is present within the BSA. The nearest CNDDB record is from 2006 and occurs approximately 9 miles northwest of the BSA; however, this record is of a dead specimen. A record from 2008 occurs 12 plus miles north of the BSA.

[1] Special-Status wildlife species known from the CNDDB to occur on the La Habra, El Monte, Baldwin Park, San Dimas, Whittier, Yorba Linda, Los Alamitos, Anaheim, and Orange quadrangles and from a search of IPaC for the project vicinity.
[2] Nomenclature for special-status wildlife conforms to CNDDB.
[3] Sensitivity Status Codes

Federal
FT - Federally Threatened under Federal Endangered Species Act (FESA)
FE - Federally Endangered under FESA
BGEPA - Bald and Golden Eagle Protection Act

State
ST - State Threatened under California Endangered Species Act (CESA)
SE - State Endangered under CESA
SC - State Candidate for listing under CESA

Other
SSC - Designated as a Species of Special Concern by CDFW
WL - Designated as a Watch List species by CDFW
CNDDB - Tracked by CDFW in the California Natural Diversity Data Base or considered locally sensitive
WBWG-H - Designated by the Western Bat Working Group (WBWG) (2017) as High Priority - species that are imperiled or are at high risk of imperilment
WBWG-M - Designated by the WBWG (2017) as Medium Priority – a level of concern that should warrant closer evaluation, more research, and conservation actions of both species and possible threats.
WBWG – L - Designated by the WBWG (2017) as Low Priority – while local concerns may exist, data supports stable populations that are unlikely to change in the near future.

[4] General Habitat Descriptions from Zeiner et al. (1990).
[5] Historical records from CDFW 2021.
[6] Potential for each species to occur within the BSA is based on the following general guidelines:

- Present: Species was observed in or immediately adjacent to the BSA during the field survey, or survey conducted within the past five years.
- High: Habitat (including soils and elevation factors) and known historical range for the species occurs in the BSA and a known occurrence has been recorded from within five miles within the past 30 years.
- Moderate: Habitat for the species occurs in the BSA and a known occurrence exists from between five and ten miles of the BSA, within the past 30 years.
- Low: Limited habitat for the species occurs in the BSA and a known occurrence is from greater than 10 miles from the BSA or over 30 years old, or habitat to support the species is of marginal quantity or quality. A low potential to occur is also assigned when focused surveys for a species have been conducted numerous times within the past 10 years without positive results.
- Not Expected: Beyond those factors listed for Low Potential, the species is easily identifiable throughout the year and was not observed, or specific habitat requirements are not found within or adjacent to the BSA.

APPENDIX E

Coastal California Gnatcatcher Survey Report

AECOM
515 South Flower Street
Eighth Floor
Los Angeles, CA 90071
www.aecom.com

213.593.7700 tel
213.593.7715 fax

July 18, 2016

Ms. Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Carlsbad Field Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: *DRAFT* Brea Canyon Road Widening Project Coastal California Gnatcatcher 45-Day Summary Report, Orange County, California

Dear Ms. Love:

In compliance with the Special Terms and Conditions for Endangered and Threatened Wildlife Species Permit TE-018909-4, AECOM submits this letter report summarizing the results of focused surveys conducted during 2016 for the federally listed threatened coastal California gnatcatcher (*Polioptila californica californica*; CAGN) associated with the Brea Canyon Road Widening Project (Project), located in the City of Brea, in Orange County Surveys were conducted on behalf of Orange County Public Works.

Project Description

The proposed Project entails widening Brea Canyon Road from two lanes to a total of four lanes, including associated infrastructure, from West Central Avenue to the intersection of Brea Canyon Road and Tonner Canyon Road. The existing road from Tonner Canyon Road north to the Orange and Los Angeles County line will be resurfaced.

Project Site Location

The Brea Canyon Road Widending Project is generally located north of Lambert Road, south of Orange/Los Angeles County Line, east of North Harbor Boulevard, and west of State Route 57 (SR57) in Orange County California (Figure 1). Specifically, the Project Site is centered on the center line of North Brea Boulevard/Brea Canyon Road from Canyondale Drive northeast to Orange County/Los Angeles County Line (Figure 2). The Project Site is located within the United States Geological Survey (USGS) 7.5' series La Habra quadrangle.

The survey area includes the Project footprint and a 500-foot buffer around the Project's direct limits of disturbance. The survey area includes the Project Site and the shoulder of the adjacent Aera Energy and Linn Energy located along the east and west site of Brea Canyon Road (Figure 2).

Survey Area Descriptions

AECOM conducted reconnaissance-level survey in May 2016 to identify suitable CAGN habitat within the Project footprint. Based on the findings from the reconnaissance-level

survey, the CAGN survey area was further refined based on the vegetation communities found within the survey areas.

Coastal California Gnatcatcher Survey Areas
Coastal California gnatcatchers are known to frequent gentle sloping hillsides adjacent to coastal sage scrub. The CAGN survey areas are located on a hillside adjacent to Brea Canyon Road and contains disturbed coastal sage scrub habitat (Figure 2). During the first survey, the entire project site was surveyed for suitable habitat and CAGN. Survey notes were made on an aerial photograph to depict areas of suitable habitat. Based on the suitable habitat maps, the survey areas were established and served as baseline data for the CAGN surveys. All accessible areas of the Project Site containing coastal sage scrub habitat, regardless of quality, were included as part of the survey areas. One CAGN survey area is located at the southeast corner of Tonner Canyon Road and Brea Canyon road. The other surve area is located on the west side of Brea Canyon Road, south of the Orange/Los Angeles County line.

Topography
The CAGN survey areas occur on gentle rolling hills at approximately 475-495 feet above mean sea level (AMSL).

Vegetation Communities
The survey areas are located within a native vegetation community, disturbed coastal sage. Descriptions of the vegetation communities that define the CAGN survey areas are provided below. They include a discussion of the vegetative constituents and overall structure of the habitats within the survey area, and a statement of the overall quality of the habitat for the CAGN.

Coastal Sage Scrub
The isolated patches of coastal sage scrub are separated by either riparian or developed habitat. The dominant species within the coastal sage scrub was California sagebrush (*Artemisia californica*). A few California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), and coyote brush (*Baccharis pilularis*) were scattered throughout the survey areas. The non-native species include shorpod mustard (*Hirshfeldia incana*), yellow star thistle (*Centaurea solstitialis*), fennel (*Foeniculum vulgare*), and non-native grasses.

Background Information

The CAGN is federally listed as threatened by the U.S. Fish and Wildlife Service (USFWS 1993) and is considered a State Species of Special Concern by the California Department of Fish and Wildlife (CDFW). The CAGN is a local and uncommon year-round resident of Southern California. This species is found in the six southernmost California counties located within the coastal plain (San Bernardino, Ventura, Los Angeles, Orange, San Diego, and Riverside).

The primary cause of this species' decline is the cumulative loss of coastal sage scrub vegetation to urban and agricultural development. Little of this species' habitat is formally protected or managed. Initial studies suggest that the CAGN may be highly sensitive to the

effects of habitat fragmentation and development activity (Atwood 1990; ERCE 1990). USFWS estimated that coastal sage scrub habitat has been reduced by 70 to 90%of its historical extent (USFWS 1991) and little of what remains is in protected natural open space.

The CAGN generally inhabits Diegan coastal sage scrub and Riversidian coastal sage scrub dominated by California sagebrush and California buckwheat generally below 1,500 feet in elevation along the coastal slope. CAGN pairs will attempt several nests each year (average of four), each placed in a different location inside their breeding territory. Clutch size ranges from one to five eggs, with three or four eggs most common. CAGNs will remain paired through the nonbreeding season and will generally expand their home range when not breeding.

The CAGN is particularly vulnerable to habitat destruction and fragmentation because of their low dispersal rate, reliance on a specific habitat type, and poor breeding success. Juvenile CAGNs tend to remain close to their natal territories. On average, juveniles disperse less than 1.2 miles from their natal territories, making colonization of distant habitat patches difficult. The CAGN is described as “an obligate resident of coastal sage scrub” (Atwood and Bontrager 2001), a vegetation community that is vulnerable to urban pressures. Destruction of coastal sage scrub by wildfire also has a detrimental effect on local CAGN populations.

Critical Habitat
In 2007, USFWS published a final rule designating revised Critical Habitat for the CAGN (USFWS 2007). The Project Site survey areas are located within designated Critical Habitat, for the CAGN.

Survey Methodology

Literature Review
Prior to conducting protocol surveys, a literature review was conducted to obtain background information and resources pertinent to the survey effort. The literature review began with a thorough review of aerial imagery of the proposed Project Site and vicinity, as well as electronic copies of the La Habra, California USGS 7.5-minute topographic quadrangle map. Mapping sources used for the effort also included online interactive mapping tools provided by Google Earth.

Data on previous observations of the target species that have been recorded in the vicinity of the Project Site were compiled from the CDFW California Natural Diversity Database (CNDDB), a sensitive species and plant community account database. The CNDDB Geographical Information Systems (GIS) database was also used to confirm and map the locations of all sensitive species recorded by the CNDDB.

The literature review also included research of existing data and documents pertaining to the target species, including federal register listings, protocol survey guidelines, and species data provided by the USFWS and CDFW.

Protocol Survey
Protocol breeding season surveys for the coastal California gnatcatcher were conducted by Kelly Rios under USFWS Section 10(a)(1)(A) Permit Number TE-018909-4. Methods employed were in conformance with USFWS Coastal California Gnatcatcher Presence/Absence Survey Guidelines, issued July 28, 1997 (USFWS 1997). Six surveys were performed at least 1 week apart, between May 10 and June 13, 2016, generally between 0730 hours and 1200 hours.

The biologist slowly traversed the biological survey area, stopping at approximately 100-foot intervals to listen for CAGN. If no CAGN were detected within 5-10 minutes the biologist made pishing sounds, and played an audio recording of CAGN vocalizations. The recording was played for several seconds at each interval, followed by a brief pause to listen for a response. If any CAGN individuals were detected, additional observations including sex, age, breeding status, and behavioral characteristics were documented, consistent with protocol requirements.

Results and Discussion

A summary of survey dates, times, weather conditions and personnel is presented in Table 1. During surveys, temperature ranged from 48 to 85 degrees Fahrenheit, and wind speed ranged from an average of 0 to 5 miles per hour (mph). A list of all avian species detected during protocol CAGN surveys is presented in Appendix A.

Table 1
Protocol Coastal California Gnatcatcher Survey Results
Dates, Time, Weather Conditions, Personnel, and Observations

Survey	Surveyor	Date	Time		Temperature (°F)	Cloud Cover (%)	Wind Speed Average (mph)	Coastal California Gnatcatchers Observed/Detected
			Begin	End				
1	K. Rios	5/9/16	0730	1040	60	100	1-2	Yes
2	K. Rios	5/16/16	1030	1200	67	100	2-3	Yes
3	K. Rios	5/23/16	0800	0930	65	40	2-3	Yes
4	K. Rios	5/30/16	1015	1145	65	100	1-2	Yes
5	K. Rios	6/6/16	1000	1130	64	100	1-2	Yes
6	K. Rios	6/13/16	0900	1030	65	50	1-2	Yes

Discussion

A pair of CAGNs were detected during all six surveys at the southeast corner of Tonner Canyon Road and Brea Canyon Road survey area location. This pair was observed using the entire CSS habitat located with this survey area. During the sixth survey, two juvenilles were observed flying into the survey area from the west side of Brea Canyon Road. This family group of four remained in the CSS habitat throughout the duration of the survey.

No CAGNs were observed in the survey area located on the west side of Brea Canyon Road, south of the County line. This survey area contains poor quality CSS with only a few native plant species observed in the survey area.

No brown-headed cowbirds (*Molothrus ater*), which are known to be a nest parasite to CAGN, were observed or otherwise detected during the surveys.

Certification Statement

The qualified AECOM biologist who conducted protocol CAGN surveys for the Project certifies that the information in this survey report fully and accurately represents the work performed by AECOM. A signature of current AECOM biologist Kelly Rios, who conducted protocol surveys is included below. If you have any questions or require additional information, please contact Kelly Rios at (714) 742-5380.

Sincerely,

Kelly Rios
Wildlife Biologist
Permit Number TE-018909-4

Attachments: Figure 1 – Regional Map
Figure 2 – Vicinity Map and CAGN Survey Areas
Appendix A – Wildlife Species Detected during 2013 Coastal California Gnatcatcher Surveys

Literature Cited

Atwood, J. L.
1990 *Status Review of the California Gnatcatcher (Polioptila californica*). Manomet Bird Observatory, Manomet, Massachusetts. 79 pp.

Atwood, J. L. and D. R. Bontrager
2001 California Gnatcatcher (*Polioptila californica)*. *The Birds of North America*, No. 574, 32 pp.

California Department of Fish and Wildlife (CDFW)
2013 *California Natural Diversity Data Base (CNDDB)*. Data Base Record Search for Information on Threatened, Endangered, Rare, or Otherwise Sensitive Species for USGS Topographic Quadrangles: Newhall, Val Verde.

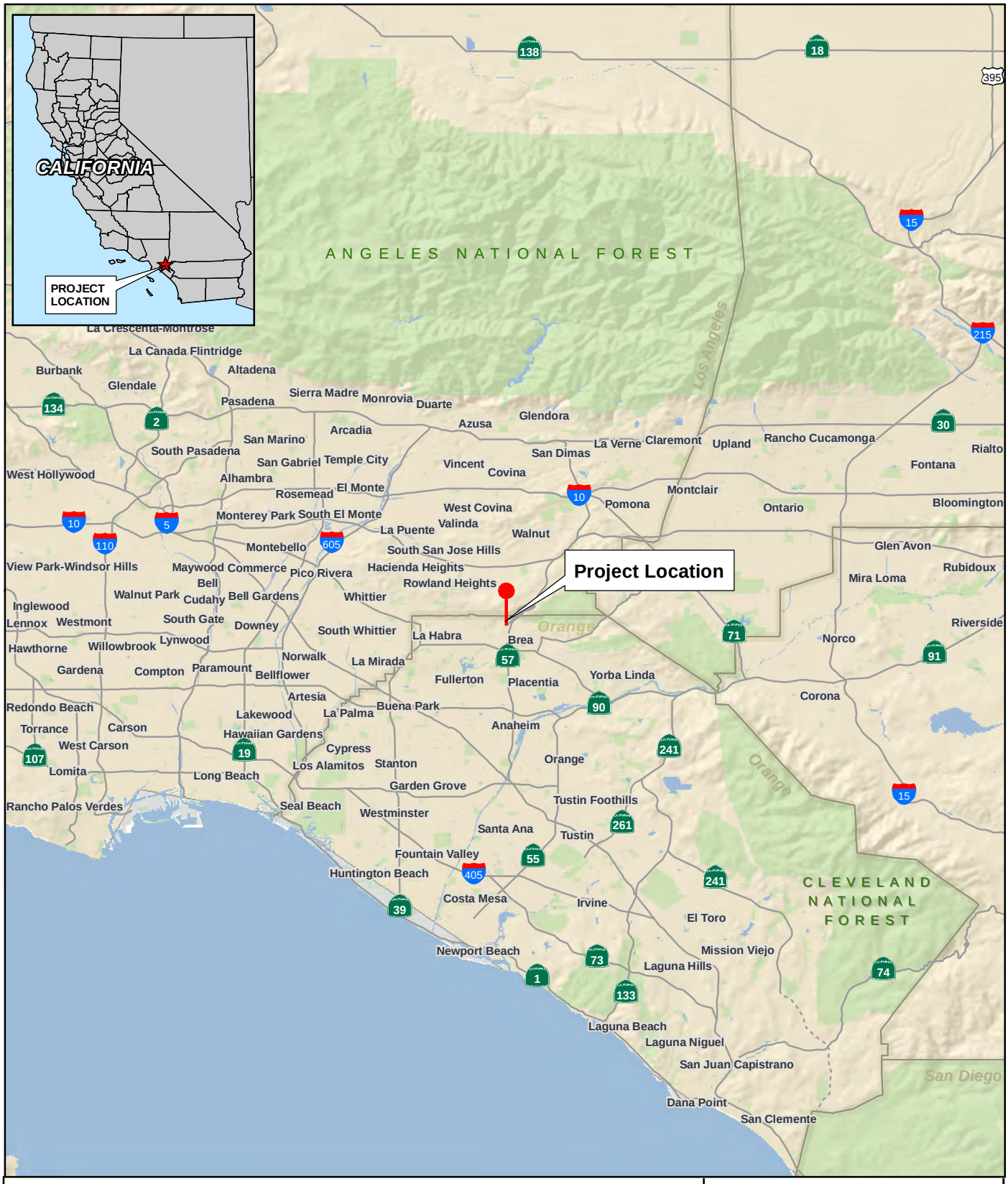
ERC Environmental and Energy Services Company (ERCE)
1990 *Phase 1 Report Amber Ridge California Gnatcatcher Study*. Prepared for Weingarten, Siegel, Fletcher Group, Inc. April. 30 pp.

U.S. Fish and Wildlife Service (USFWS)
1991 *Summary of the Proposed Rule to List the Coastal California Gnatcatcher (Polioptila californica) as Endangered in California and Baja, Mexico*. September. 114 pp.

1993 Endangered and Threatened Wildlife and Plants: Special Rule Concerning Take of the Threatened Coastal California Gnatcatcher. Final Rule. *Federal Register* 58: 65088–65096.

2007 Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*); 72010 *Federal Register* / Vol. 72, No. 243 / Wednesday, December 19, 2007 / Rules and Regulations.

FIGURES



I:\BreaCanyonRd_Widening\MXD\Bio\Figure1_Regional.mxd

Figure 1

Regional Location Map

Brea Canyon Road Widening Project

AECOM

I:\BreaCanyonRd_Widening\MXD\Figure_BreaCanyon.mxd

N

Feet
0 325 650
1 inch = 650 feet

500-ft Buffer
Envrionmental Limits
CAGN Survey Areas

Figure 2
Project Vicinity Map

Brea Canyon Road Widening Project

AECOM

APPENDIX A

AVIAN SPECIES DETECTED DURING 2016 COASTAL CALIFORNIA GNATCATCHER SURVEYS

APPENDIX A

AVIAN SPECIES DETECTED DURING 2016 COASTAL CALIFORNIA GNATCATCHER SURVEYS

BIRDS	
Order Ciconiiformes	**Herons, Ibises, Storks, American Vultures, and Allies**
Family Cathartidae	
Cathartes aura	turkey vulture
Order Falconiformes	**Diurnal Birds of Prey**
Family Accipitridae	
Buteo jamaicensis	red-tailed hawk
Family Falconidae	
Falco sparverius	American kestrel
Order Galliformes	**Magapodes, Curassows, Pheasants, and Allies**
Family Odontophoridae	
Callipepla californica	California quail
Order Columbiformes	**Pigeons and Doves**
Family Columbidae	
Columba livia	rock dove
**Streptopelia decaocto*	Eurasian collared-dove
Zenaida macroura	mourning dove
Order Apodiformes	**Swifts and Hummingbirds**
Family Apodidae	
Aeronautes saxatalis	white-throated swift
Family Trochilidae	
Calypte anna	Anna's hummingbird
Order Piciformes	**Woodpeckers**
Family Picidae	
Melanerpes formicivorus	acorn woodpecker
Dryobates nuttallii	Nuttall's woodpecker
Order Passeriformes	**Song birds**
Family Tyrannidae	
Empidonax difficillis	Pacific-sloped flycatcher
Sayornis saya	Say's Phoebe
Myiarchus cinerascens	ash-throated flycatcher
Tyrannus verticalis	western kingbird
Tyrannus vociferans	Cassin's kingbird
Family Corvidae	
Aphelocoma californica	western scrub jay
Corvus branchyrhynchos	American crow
Corvus corax	common raven
Family Icteridae	
Icterus cucullatus	hooded oriole
Family Sturnidae	
**Sturnus vulgaris*	European starling
Family Hirundinidae	
Petrochelidon pyrrhonota	cliff swallow
Family Aegithalidae	
Psaltriparus minimus	bushtit
Family Troglodytidae	
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
Family Timaliidae	
Chamaea fasciata	wrentit
Family Mimidae	
Mimus polyglottos	northern mockingbird
Family Turdidae	
Turdus migratorius	American robbin
Family Ptilogonatidae	

Phainopepla nitens	phainopepla
Family Vireonidae	
Vireo gilvus	warbling vireo
Family Bombycilla	
Bombycilla cedrorum	cedar waxwing
Family Regulidae	
Regulus calendula	Ruby-crowned kinglet
Family Parulidae	
Setophaga petechial	yellow warbler
Setophaga coronate	yellow-rumped warbler
Cardellina pusilla	Wilson's warbler
Carpodacus mexicanus	house finch
Family Emberizidae	
Pipilo crissalis	California towhee
Melospiza melodia	song sparrow
Pipilo maculates	spotted towhee
Zonotrichia leucophrys	white-crowned sparrow
Family Fringillidae	
Carpodacus mexicanus	house finch
Carduelis psaltria	lesser goldfinch
Passeridae	**Sparrows**
* *Passer domesticus*	house sparrow
Cardinalidae	**Grosbeaks**
Pheucticus melanocephalus	black-headed grosbeak

*Indicates a non-native species

APPENDIX F

Least Bell's Vireo Survey Report

AECOM
999 Town and Country Road
Orange, CA 92868
www.aecom.com

714.567.7501 tel
619.233.0952 fax

January 23, 2017

Mr. Austin Morgan, P.E.
Project Management
OC Public Works - Infrastructure
601 N. Ross Street
Santa Ana, CA 92701

RE: 2016 Brea Canyon Road Widening Project Least Bell's Vireo Focused Survey Report, Orange County, California

Dear Ms. Love:

AECOM submits this letter report summarizing the results of focused surveys conducted during 2016 for the federally listed endangered least Bell's vireo (*Vireo bellii pusillus*; LBV) associated with the Brea Canyon Road Widening Project (project). The project is generally located north of West Central Avenue/North State College Boulevard, south of the Orange and Los Angeles County line, and east and west of Brea Canyon Road in the City of Brea, Orange County. Surveys were conducted on behalf of the County of Orange Department of Public Works (OCPW).

Project Description

The proposed project entails widening Brea Canyon Road from two lanes to a total of four lanes, including associated infrastructure, from West Central Avenue to the intersection of Brea Canyon Road and Tonner Canyon Road. The existing road from Tonner Canyon Road north to the Orange and Los Angeles County line will be resurfaced.

Site Description

AECOM conducted reconnaissance level surveys in May 2016 to identify suitable LBV habitat within the project footprint and a 500-foot buffer around the project's direct limits of disturbance (project area). A regional vicinity figure and figure of the habitgat surveyd are included as Figures 1 and 2, respectively.

The project area is centered on Brea Canyon Road between West Central Avenue/North State College Boulevard approximately 1.75 miles north and east to the Orange and Los Angeles County line. It includes Brea Canyon, Tonner Canyon, and associated riparian habitat. Upland areas consist primarily of active oil leases consisting of oil extraction and piping infrastructure, residential development at the southern end of the project, some commercial development, and undeveloped land at the northern end of the project. Upland vegetation communities are generally disturbed, fragmented by oil field development, residential development, and roadways, and composed of a mix of native and non-native species. Mixed non-native woodlands dominate, interspersed with small patches of disturbed native scrub and non-native grassland habitats.

The LBV survey area includes approximately 22.27 of riparian habitat along Brea Canyon. The area surveyed consists of two subareas, including the primary riparian corridor that

winds along Brea Canyon Road in the middle of the project area (19.75 acres) and a small riparian area further northeast along Brea Canyon Road (2.52 acres). A portion of Brea Canyon between these two riparian areas consists of a concrete box channel with very little vegetation along it or is underground; this reach of Brea Canyon was not surveyed.

Brea Canyon is a relatively narrow, incised channel as it flows from northeast to southwest along Brea Canyon Road. Surface water, although limited, was present in Brea Canyon throughout the entire protocol survey period. The main area of riparian vegetation is dense, generally obstructing views of the stream channel and ranging from approximately 50 to 200 feet in width. Riparian habitat consists of a mix of native and non-native species, dominated by arroyo willow (*Salix lasiolepis*), Peruvian pepper (*Schinus molle*), eucalyptus (*Eucalyptus* spp.), and Mexican fan palm (*Washingtonia robusta*) trees, reflecting a Semi-Natural Riparian Forest alliance. Other species observed in this riparian habitat included southern California walnut (*Juglans californica*), laurel sumac (*Malosma laurina*), mulefat (*Baccharis salicifolia*), toyon (*Heteromeles arbutifolia*), goldenbush (*Isocoma menziesii*), black cottonwood (*Populus trichocarpa*), elderberry (*Sambucus nigra*), tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), California grape (*Vitis girdiana*), and poison oak (*Toxicodendron diversilobum*). Riparian habitat in the northeastern portion of the project area is much narrower, confined in an area lying between Brea Canyon Road and State Route 57 and extending from approximately 30-80 feet across the channel. The riparian corridor in this reach has a similar species composition, although containing noticeably more southern California walnut, black cottonwood, and coast live oak (*Quercus agrifolia*) trees. This stretch also included areas where the banks are riprapped with large stone.

Background Information

LBV was listed as endangered by the U.S. Fish and Wildlife Service (USFWS) on May 2, 1986 (Federal Register 51:16482; USFWS 1986), with a critical habitat listing in 1994 (Federal Register 59:4845; USFWS 1994). This listing status applies to the entire population of LBV. A draft recovery plan was written by USFWS and was recently circulated for review. California listed this subspecies as endangered on October 2, 1980.

Historically, this subspecies was a common summer visitor to riparian habitat throughout much of California. Currently, LBV is found only in riparian woodlands in Southern California, with the majority of breeding pairs in San Diego, Santa Barbara, and Riverside Counties. LBV is restricted to riparian woodland and is most frequent in areas that combine an understory of dense young willows or mulefat with a canopy of tall willows. Since LBV builds its nests in dense shrubbery 3 to 4 feet above the ground (Salata 1984), it requires young successional riparian habitat or older habitat with a dense understory. Therefore, riparian plant succession is an important factor in maintaining LBV habitat. Nests are also often placed along internal or external edges of riparian thickets (Unitt 2004). LBV is migratory arriving in Southern California in late March and early April, and leaves for its wintering ground in September.

LBV's decline is attributed to loss, degradation, and fragmentation of riparian habitat, combined with brood/nest parasitism by the brown-headed cowbird (*Molothrus ater*; BHCB).

Due to concerted programs focused on preserving, enhancing, and creating suitable nesting habitat, the LBV population has steadily increased in population size along several of its breeding drainages in Southern California (USFWS 2006). Trapping to remove brown-headed cowbirds from areas occupied by the LBV has also contributed to the population increase of LBV.

The project area does not coincide with USFWS-designated critical habitat for LBV.

Survey Methodology

AECOM biologist Kelly Rios conducted eight protocol LBV surveys from May 10 through July 15, 2016. The survey area was considered reasonable for one biologist to thoroughly survey in 1 day. Focused surveys followed the current USFWS Presence/Absence Survey Guidelines for the species, dated January 19, 2001 (USFWS 2001). The survey consisted of walking meandering transects through suitable LBV riparian habitat, regardless of quality, and conducting passive surveillance (i.e., listening for LBV vocalizations and looking for the species). Per USFWS protocol, the area was surveyed eight times during 2016 (Table 1). Surveys were conducted at least 10 days apart and typically completed between dawn and 11 a.m.

If any LBV individuals were detected, additional observations and behavioral characteristics would be documented, consistent with protocol requirements.

Results

A summary of the survey effort, field conditions, and LBV observations, if any, are presented in Table 1.

Table 1
Protocol LBV Survey
Dates, Time, Weather Conditions, Personnel, and Observations

Survey #	Date	Time	Weather	Personnel	LBV Observations
1	5/10/2016	0730 – 1100	59°F, 100% clouds, wind 1-2 mph	Kelly Rios	none
2	5/19/2016	0830-1100	Start: 63°F, 100% clouds, wind 2-3 mph	Kelly Rios	none
3	5/30/2016	0830-1100	Start: 64°F, 100% clouds, wind 1-2 mph	Kelly Rios	none
4	6/9/2016	0700 – 1030	Start: 65°F, 100% clouds, wind 1-2 mph	Kelly Rios	none

Survey #	Date	Time	Weather	Personnel	LBV Observations
5	6/20/2016	0830-1100	Start: 95°F,0% clouds, wind 1-2 mph	Kelly Rios	none
6	6/30/2016	0815 – 1100	Start: 73°F, 0% clouds, wind 1-2 mph	Kelly Rios	none
7	7/10/2016	0700 – 0930	Start: 66°F, 20% clouds, wind 1-2 mph	Kelly Rios	none
8	7/15/2016	0710 – 1000	Start: 69°F, 100% clouds, wind 1-2 mph	Kelly Rios	none

During the 2016 LBV survey effort, AECOM's biologist did not detect any LBV within the survey area. Although suitable habitat is present onsite and LBV have been recorded within the survey area, no LBV were detected or observed within the survey area during any of the protocol surveys.

During the 5th survey, June 20, high temperatures greatly reduced avian activity. Avian vocalizations were very low and most avian observations were located at the base of trees and scrubs or within inner trees.

Three additional sensitive wildlife species were detected during focused surveys within the survey area: coastal California gnatcatcher (*Polioptila californica californica*; Federal Endangered Species Act listed Threatened), yellow warbler (*Setophaga petechia brewsteri*; CDFW Species of Special Concern) and yellow-breasted chat (*Icteria virens*; CDFW Species of Special Concern).

During the survey effort, very few BHCBs were detected, with only two BHCB detected during surveys. Wildlife species detected during LBV focused surveys are recorded in Appendix A, Wildlife Species Detected during 2016 Least Bell's Vireo Surveys.

Discussion

Problems and limitations to the LBV survey effort include high traffic noise from Brea Canyon Road that runs parallel to the survey area. The LBV surveys were conducted during the weekdays between the hours of 0600 and 1100, but generally occurred between 0730 and 1100, which coincide with peak traffic hours. The noise from the traffic made it difficult at times to detect avian vocalizations.

Although the habitat within the survey area is suitable to support LBV, with a dense understory of mulefat and an overstory of willows and cottonwoods. Despite the presence of recorded LBV, no LBV were observed or otherwise detected within the survey area.

If you have any questions or comments regarding this letter report, please contact me at (213) 593-8680.

Sincerely,

Kelly Rios
Wildlife Biologist
kelly.rios@aecom.com

Attachments: Figure 1 – Regional Map
Figure 2 – LBV Survey Area
Appendix A – Wildlife Species Detected during 2016 Least Bell's Vireo Surveys

Literature Cited

CDFW. 2016 *RareFind California Natural Diversity Data Base*. Data Base Record Search for Information on Threatened, Endangered, Rare, or Otherwise Sensitive Species for USGS Topographic Quadrangles: Newhall and Val Verde. CDFW, State of California Resources Agency. Sacramento, California.

Compliance Biology. 2010. *2010 Results of Annual Riparian Bird Surveys*. Natural River Management Plan Area, Santa Clara River, Los Angeles County, California. December.

Salata, L. R. 1984. Status of the Least Bell's Vireo on Camp Pendleton, California: Report on Research Done in 1984. Unpublished Report. U.S. Fish and Wildlife Service, Laguna Niguel, California.

State of California. 2016. The Natural Resources Agency. Department of Fish and Game. Biogeographic Data Branch. California Natural Diversity Database. Special Animals List (898 taxa). January.

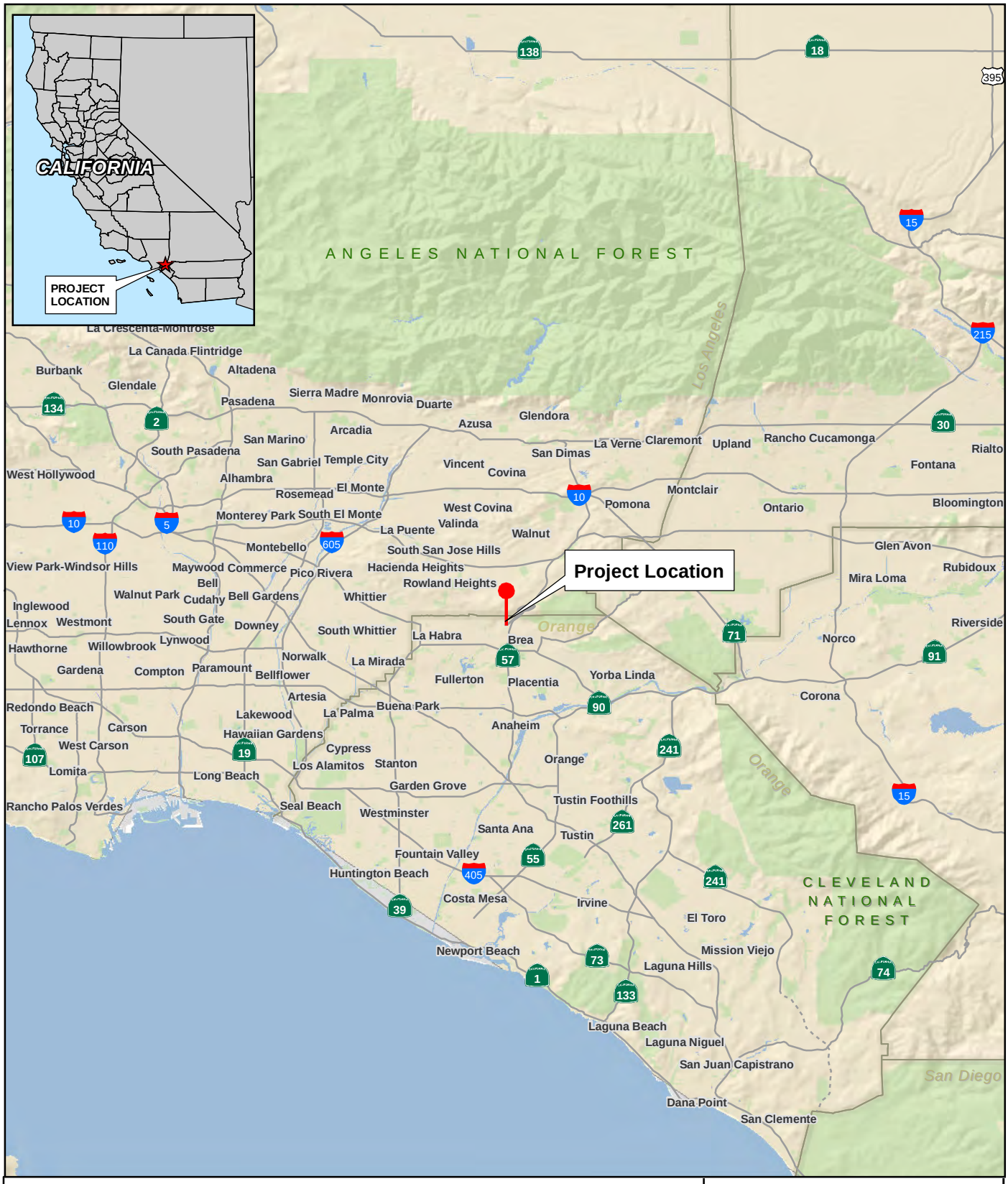
U.S. Fish and Wildlife Service (USFWS). 1986. Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for the Least Bell's Vireo. Final Rule. *Federal Register* 51:16474–16482.

U.S. Fish and Wildlife Service (USFWS). 1994. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the Least Bell's Vireo. Final Rule. *Federal Register* 59:4845–4867.

U.S. Fish and Wildlife Service (USFWS). 2001. *Least Bell's Vireo Survey Guidelines*. Carlsbad Fish and Wildlife Office. January 19.

U.S. Fish and Wildlife Service (USFWS). 2006. *Least Bell's Vireo 5-Year Review Summary and Evaluation*. Carlsbad Fish and Wildlife Service Office, Carlsbad, California. September.

FIGURES



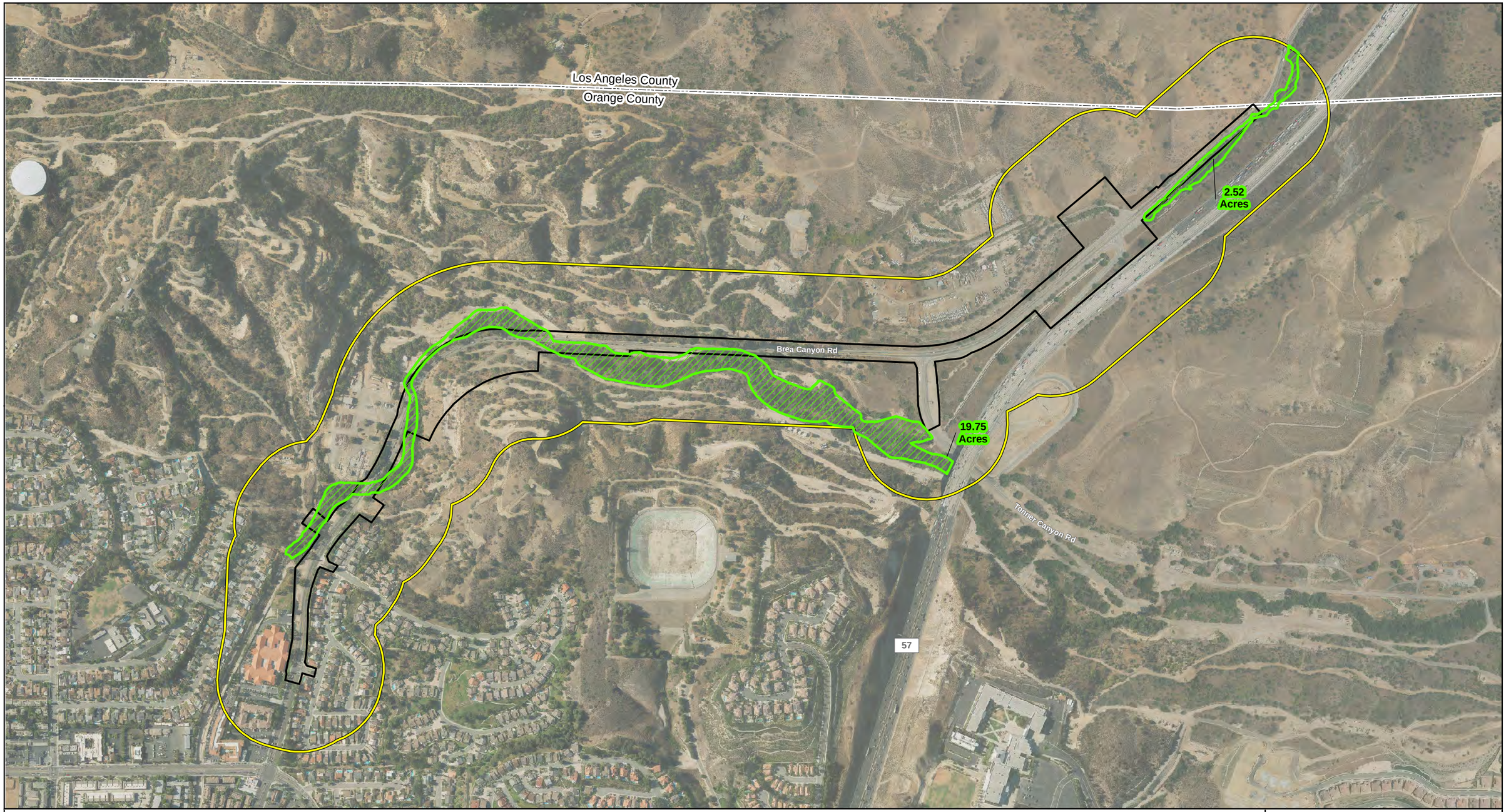
I:\BreaCanyonRd_Widening\MXD\Bio\Figure1_Regional.mxd

Figure 1

Regional Location Map

Brea Canyon Road Widening Project

AECOM



Legend

- Limits of Disturbance
- 500-ft Project Buffer
- Riparian Habitat Surveyed for LBV
- County Boundary

0 700 Feet

1 inch = 700 feet

Base Map Source:
Eagle Aerial Imaging 2015

Figure 2
Least Bell's Vireo
Survey Area

Brea Canyon Road
Widening Project

AECOM

APPENDIX A

WILDLIFE SPECIES DETECTED DURING 2016 LEAST BELL'S VIREO SURVEYS

WILDLIFE COMPENDIA

Birds

Accipitridae	**Hawks, Eagles, and Kites**
Buteo jamaicensis	red-tailed hawk
Apodidae	**Swifts**
Aeronautes saxatalis	white-throated swift
Cathartidae	**New World Vultures**
Cathartes aura	turkey vulture
Columbidae	**Pigeons and Doves**
Zenaida macroura	mourning dove
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
Picidae	**Woodpeckers**
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
Tyrannidae	**Tyrant Flycatchers**
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black phoebe
Tyrannus verticalis	western kingbird
Sayornis saya	say's phoebe
Empidonax difficilis	pacific-slope flycatcher
Corvidae	**Jays and Crows**
Aphelocoma californica	western scrub-jay
Corvus corax	common raven
Cardinalidae	**Cardinals and Grosbeaks**
Pheucticus melanocephalus	black-headed grosbeak
Aegithalidae	**Bushtits**
Psaltriparus minimus	bushtit

Parulidae	**New world warblers**
Geothlypis trichas	common yellowthroat
Icteria virens	yellow-breasted chat
Setophaga coronata	yellow-rumped warbler
Setophaga petechia	yellow warbler
Icteridae	**Blackbirds**
Icterus cucullatus	hooded oriole
Molothrus ater	brown-headed cowbird
Vireonidae	**Vireos**
Vireo gilvus	warbling vireo
Regulidae	**Kinglets**
Regulus calendula	ruby-crowned kinglet
Troglodytidae	**Wrens**
Thryomanes bewickii	Bewick's wren
Thryomanes aedon	house wren
Chamaea fasciata	wrentit
Mimidae	**Mockingbirds and Thrashers**
Mimus polyglottos	northern mockingbird
Emberizidae	**Old World Sparrows**
Melospiza melodia	song sparrow
Pipilo crissalis	California towhee
Pipilo maculatus	spotted towhee
Fringillidae	**Finches**
Carpodacus mexicanus	house finch
Carduelis psaltria	lesser goldfinch
Passeridae	**Sparrows**
Passer domesticus	house sparrow

APPENDIX G

Southwestern Willow Flycatcher Survey Report

AECOM
401 West A Street
Suite 1200
San Diego, CA 92101
www.aecom.com

619.610.7600 tel
619.610.7601 fax

January 20, 2017

Ms. Stacey Love
Recovery Permit Coordinator
U.S. Fish and Wildlife Service
Carlsbad Field Office
2177 Salk Avenue, #250
Carlsbad, CA 92008

RE: 2017 Brea Canyon Road Widening Project Southwestern Willow Flycatcher 45-Day Summary Report, Orange County, California

Dear Ms. Love:

In compliance with the Special Terms and Conditions for Endangered and Threatened Wildlife Species Permit TE-820658, AECOM submits this letter report summarizing the results of focused surveys conducted during 2016 for the federally listed endangered southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL) associated with the Brea Canyon Road Widening Project (project). The project is generally located north of West Central Avenue/North State College Boulevard, south of the Orange and Los Angeles County line, and east and west of Brea Canyon Road in the City of Brea, Orange County. Surveys were conducted on behalf of the County of Orange Department of Public Works (OCPW).

Project Description

The proposed project entails widening Brea Canyon Road from two lanes to a total of four lanes, including associated infrastructure, from West Central Avenue to the intersection of Brea Canyon Road and Tonner Canyon Road. The existing road from Tonner Canyon Road north to the Orange and Los Angeles County line will be resurfaced.

Site Description

AECOM conducted reconnaissance level surveys in May 2016 to identify suitable SWFL habitat within the project footprint and a 500-foot buffer around the project's direct limits of disturbance (project area). A regional vicinity and project area figure are included as Figures 1 and 2, respectively.

The project area is centered on Brea Canyon Road between West Central Avenue/North State College Boulevard approximately 1.75 miles north and east to the Orange and Los Angeles County line. It includes Brea Canyon, Tonner Canyon, and associated riparian habitat. Upland areas consist primarily of active oil leases consisting of oil extraction and piping infrastructure, residential development at the southern end of the project, some commercial development, and undeveloped land at the northern end of the project. Upland vegetation communities are generally disturbed, fragmented by oil field development, residential development, and roadways, and composed of a mix of native and non-native species. Mixed Non-Native Woodlands dominate, interspersed with small patches of disturbed native scrub and non-native grassland habitats.

The SWFL survey area includes approximately 22.27 of riparian habitat along Brea Canyon. The area surveyed consists of two subareas, including the primary riparian corridor that winds along Brea Canyon Road in the middle of the project area (19.75 acres) and a small riparian area further northeast along Brea Canyon Road (2.52 acres). A portion of Brea Canyon between these two riparian areas consists of a concrete box channel with very little vegetation along it, or is underground; this reach of Brea Canyon was not surveyed.

Brea Canyon is a relatively narrow, incised channel as it flows from northeast to southwest along Brea Canyon Road. Surface water, although limited, was present in Brea Canyon throughout the entire protocol survey period. The main area of riparian vegetation is dense, generally obstructing views of the stream channel and ranging from approximately 50 to 200 feet in width. Riparian habitat consists of a mix of native and non-native species, dominated by arroyo willow (*Salix lasiolepis*), Peruvian pepper (*Schinus molle*), eucalyptus (*Eucalyptus* spp.), and Mexican fan palm (*Washingtonia robusta*) trees, reflecting a Semi-Natural Riparian Forest alliance. Other species observed in this riparian habitat included southern California walnut (*Juglans californica*), laurel sumac (*Malosma laurina*), mulefat (*Baccharis salicifolia*), toyon (*Heteromeles arbutifolia*), goldenbush (*Isocoma menziesii*), black cottonwood (*Populus trichocarpa*), elderberry (*Sambucus nigra*), tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), California grape (*Vitis girdiana*), and poison oak (*Toxicodendron diversilobum*). Riparian habitat in the northeastern portion of the project area is much narrower, confined in an area lying between Brea Canyon Road and State Route 57 and extending from approximately 30-80 feet across the channel. The riparian corridor in this reach has a similar species composition, although containing noticeably more southern California walnut, black cottonwood, and coast live oak (*Quercus agrifolia*) trees. This stretch also included areas where the banks are riprapped with large stone.

Background Information

SWFL, a subspecies of willow flycatcher (WIFL), was state-listed by the California Department of Fish and Wildlife (CDFW) as endangered in California in 1991 (CDFG 1991), and federally listed by the U.S. Fish and Wildlife Service (USFWS) as endangered in 1995 (Federal Register 60[38]: 10694–10715; USFWS 1995). This subspecies can only be distinguished from other willow flycatcher subspecies in the field geographically by breeding range. SWFL breeds in New Mexico, Arizona, Southern California, Nevada, Utah, and possibly west Texas (Rourke et al 1999). Critical habitat for SWFL was finalized by USFWS in 2005 (USFWS 2005). The project does not coincide with USFWS-designated critical habitat for the species.

The primary factor responsible for the decline of SWFL is habitat loss, exacerbated by nest predation and brood parasitism by brown-headed cowbirds (*Molothrus ater*; BHCO) (Rourke et al. 1999). SWFL is a neotropical migrant that breeds in riparian forests with a distinct vegetation structure—a dense understory where nests are built, a moderately closed canopy, and an open foraging area at mid-story. SWFL breeding habitat is also characterized by actively changing hydrology, frequently including standing water, but also dry areas that have flooded within the past few years and retain the appropriate vegetation

structure. Less than 5% of appropriate riparian habitat remains in California, compared to when it achieved statehood in 1850 (Kus et al. 2003).
SWFL begin arriving on breeding territories in early May, but the northern subspecies (*E. t. brewsteri*) may migrate through southern breeding areas through mid-June. Since migrant willow flycatchers frequently sing (both males and females), determining whether an individual is a resident SWFL or a migrant cannot be accomplished from a single detection. Therefore, an intensive survey protocol for SWFL has been adopted by USFWS (Sogge et al. 2010).

Survey Methodology

AECOM wildlife biologist Brennan Mulrooney conducted focused surveys for SWFL under Endangered Species Permit TE-820658 from June 1 through July 14, 2016 within the SWFL survey area. The focused surveys followed the current USFWS survey protocol (Sogge et al. 2010) with one exception. Protocol calls for all SWFL habitat within the project site, and a surrounding 500-foot buffer, was surveyed once during the first survey period (May 15 through 31), twice during the second survey period (June 1 through 24), and twice during the third survey period (June 25 through July 17). Because of delays finalizing contracts, the surveys occurred slightly later in the season than called for in the protocol. The first visit occurred one day outside of the first survey window and survey three occurred 4 days out of the second survey window. Surveys were conducted at least 5 days apart and were typically completed between 0.5 hour before sunrise and 10 a.m. On one occasion, when temperatures were moderate and bird activity remained high, the survey was extended into late morning to ensure adequate coverage. The survey area was considered reasonable for one biologist to thoroughly survey in one day. Following the SWFL survey protocol, taped vocalizations were used to elicit a response from any potentially territorial SWFL.

Results

A summary of survey effort and field conditions is presented in Table 1. The table summarizes the number of willow flycatcher observations, as well as BHCO (known nest parasite) observations. Field data collected during protocol surveys are provided in Appendix A.

Table 1
Protocol SWFL Survey
Dates, Time, Weather Conditions, Personnel, and SWFL and BHCB Observations

Survey #	Date	Time	Weather	Personnel	SWFL Observations	BHCB Observations
1	6/1/2016	0630 – 1020	Start: 61°F, 100% clouds, wind 1 mph End: 66°F, 100% clouds, wind 3 mph	Brennan Mulrooney, John Parent[1]	none	2 males, 2 females, 1 unk sex
2	6/8/2016	0610 – 0958	Start: 64°F,100% clouds, wind 0 mph End: 68°F, 100% clouds, wind 2 mph	Brennan Mulrooney	none	3 unk sex
3	6/29/2016	0618 – 0956	Start: 67°F, 20% clouds, wind 0 mph End: 72°F, 0% clouds, wind 3 mph	Brennan Mulrooney	none	none
4	7/6/2016	0607 – 0940	Start: 65°F, 100% clouds, wind 0 mph End: 69°F, 1000% clouds, wind 3 mph	Brennan Mulrooney	none	one male
5	7/14/2016	0602 – 0934	Start: 66°F, 90% clouds, wind 3 mph End: 73°F, 0% clouds, wind 5 mph	Brennan Mulrooney	none	2 unk sex

[1] Non-permitted biologist.

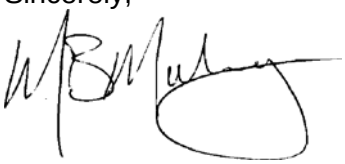
Though no SWFL were observed during any survey, the following four wildlife species with federal (USFWS) or state (CDFW) special status were detected within or adjacent to SWFL survey areas including, least Bell's vireo (*Vireo bellii pusillu*s; USFWS and CDFW endangered), coastal California gnatcatcher (*Polioptila californica californica*; USFWS threatened, CDFW Species of Special Concern), yellow warbler (*Setophaga petechia brewsteri*; CDFW Species of Special Concern), and yellow-breasted chat (*Icteria virens*; CDFW Species of Special Concern) (CDFW 2017). Typically, at least one BHCO was recorded during most surveys. Wildlife species detected during SWFL focused surveys are recorded in Appendix A and depicted in Figure 2.

Discussion

No SWFL were detected during any protocol surveys. The habitat on-site is narrow, highly disturbed, and includes significant non-native species. There is at least one homeless encampment within the riparian corridor and there are two very busy roads and multiple oil extraction operations within the project area. The combination of a narrow riparian corridor with significant disturbances, and with the presence of BHCO, makes it unlikely that SWFL would breed successfully within the project area.

If you have any questions or comments regarding this letter report, please contact me at (619) 610-7600.

Sincerely,



Brennan Mulrooney
Wildlife Biologist
Brennan.Mulrooney@aecom.com

Attachments: Figure 1 – Regional Map
Figure 2 – SWFL Survey Area and Special-Status Species Detections
Appendix A – Wildlife Species Detected during 2016 Southwestern Willow Flycatcher Surveys

Certification Statement

"I certify that the information in this survey report and attached exhibits fully and accurately represents my work."

Brennan Mulrooney
Wildlife Biologist
TE-820658

"I certify that the information in this survey report and attached exhibits fully and accurately represents my work."

John Parent
Biologist

Literature Cited

Kus, B. E. 2003. Population Structure and Demography of the Least Bell's Vireo and Southwestern Willow Flycatcher. Available at https://www.werc.usgs.gov/Project.aspx?ProjectID=59. Accessed January 2017..

Rourke, J. W., T. D. McCarthey, R. F. Davidson, and A. M. Santaniello (Rourke et al.). 1999. *Southwestern Willow Flycatcher Nest Monitoring Protocol*. Nongame and Endangered Wildlife Program Technical Report 144. Arizona Game and Fish Department, Phoenix, Arizona.

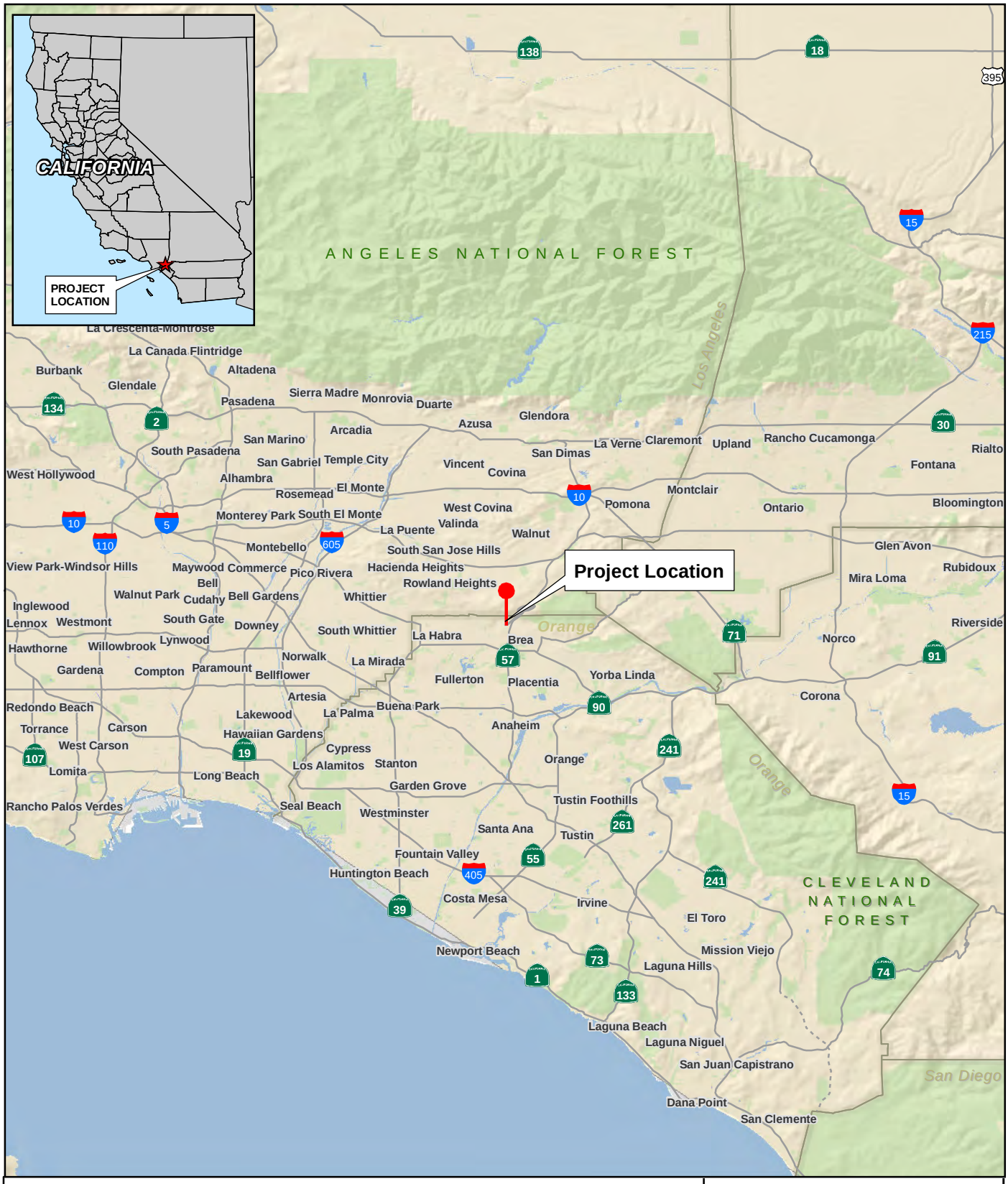
California Department of Fish and Wildlife (CDFW), Natural Diversity Database. 2017. Special Animals List. January. 51 pp.

Sogge, M. K., Darrell Ahlers, and S. J. Sferra (Sogge et al.). 2010. *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher: U.S. Geological Survey Techniques and Methods 2A-10*. 38 p.

U.S. Fish and Wildlife Service (USFWS). 1995. Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher. *Federal Register* 60(38):10694–10715.

U.S. Fish and Wildlife Service (USFWS). 2005. Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. *Federal Register* 50 CFR Part 17.

FIGURES



I:\BreaCanyonRd_Widening\MXD\Bio\Figure1_Regional.mxd

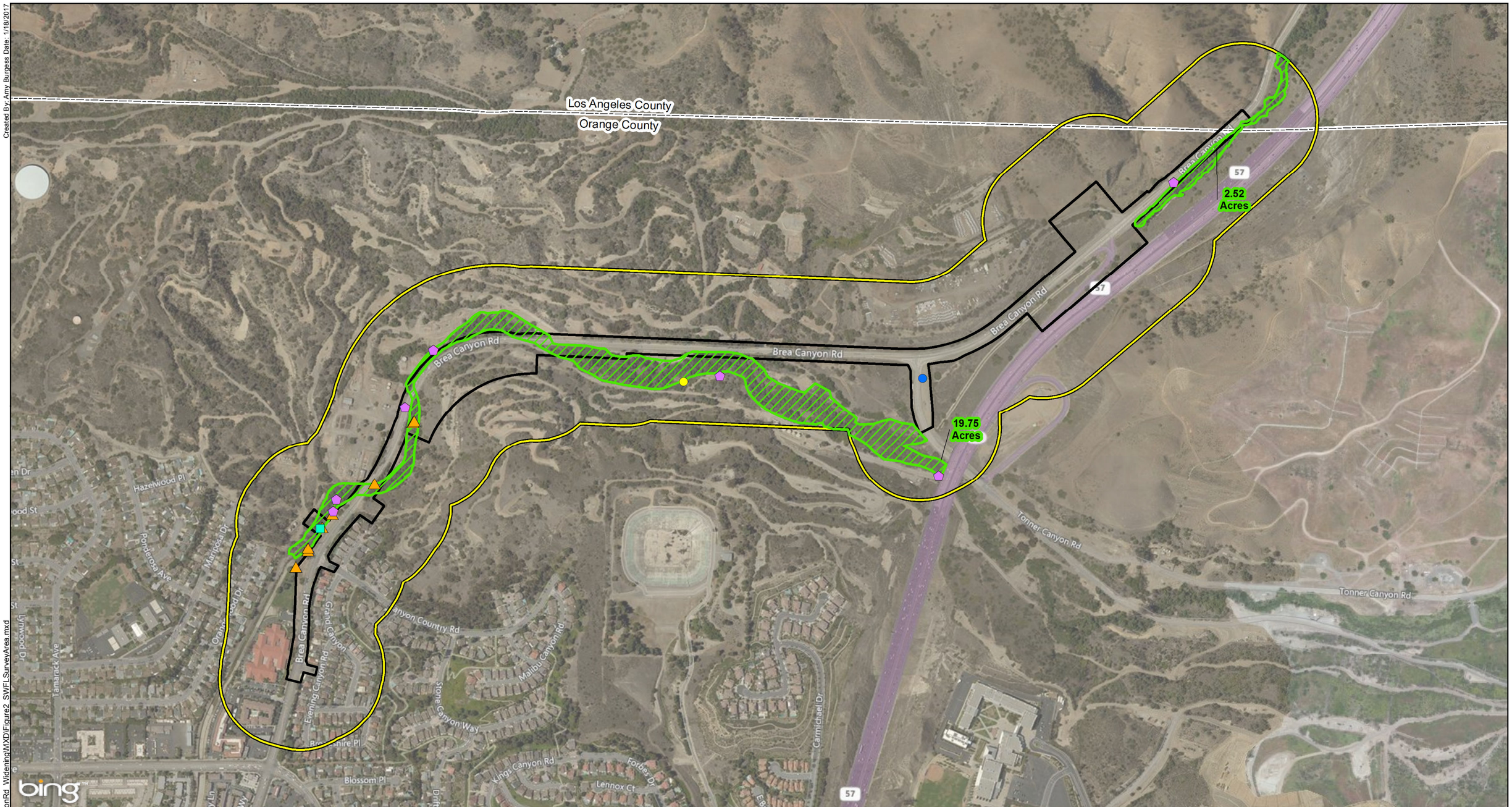
Figure 1

Regional Location Map

Brea Canyon Road Widening Project

AECOM

Created By: Amy Burgess Date: 1/18/2017



Legend

- Limits of Disturbance
- 500-ft Project Buffer
- Riparian Habitat Surveyed for SWFL
- County Boundary
- Least Bell's Vireo
- Coastal California Gnatcatcher
- Yellow Warbler
- Yellow-breasted Chat
- Brown-headed Cowbird

Feet
0 175 350 700
1 inch = 700 feet

Base Map Source:
ArcGIS Online, Bing Map Hybrid

Figure 2
SWFL Survey Area

Brea Canyon Road Widening Project

AECOM

Q:\DCS\Projects_Legacy\GIS\BreaCanyonRd_Widening\MXD\Figure2_SWFLSurveyArea.mxd

APPENDIX A

WILDLIFE SPECIES DETECTED DURING 2016 SOUTHWESTERN WILLOW FLYCATCHER SURVEYS

Appendix A

Wildlife Species Observations

Common Name	Scientific Name	Order	Family
Reptiles & Amphibians			
Baja California Tree Frog	*Pseudacris hypochondriaca*	Anura	Hylidae
Western Fence Lizard	*Sceloporus occidentalis*	Squamata	Phrynosomatidae
Avian			
Red-tailed Hawk	*Buteo jamaicensis*	Accipitriformes	Accipitridae
Red-shouldered Hawk	*Buteo lineatus*	Accipitriformes	Accipitridae
Mallard	*Anas platyrhynchos*	Anseriformes	Anatidae
White-throated Swift	*Aeronautes saxatalis*	Apodiformes	Apodidae
Black-chinned Hummingbird	*Archilochus alexandri*	Apodiformes	Trochilidae
Anna's Hummingbird	*Calypte anna*	Apodiformes	Trochilidae
Allen's Hummingbird	*Selasphorus sasin*	Apodiformes	Trochilidae
Band-tailed Pigeon	*Patagioenas fasciata*	Columbiformes	Columbidae
Eurasian Collared-Dove	*Streptopelia decaocto*	Columbiformes	Columbidae
Mourning Dove	*Zenaida macroura*	Columbiformes	Columbidae
Bushtit	*Psaltriparus minimus*	Passeriformes	Aegithalidae
Black-headed Grosbeak	*Pheucticus melanocephalus*	Passeriformes	Cardinalidae
Blue Grosbeak	*Passerina caerulea*	Passeriformes	Cardinalidae
Lazuli Bunting	*Passerina amoena*	Passeriformes	Cardinalidae
California Scrub-Jay	*Aphelocoma californica*	Passeriformes	Corvidae
Common Raven	*Corvus corax*	Passeriformes	Corvidae

Song Sparrow	*Melospiza melodia*	Passeriformes	Emberizidae
California Towhee	*Melozone crissalis*	Passeriformes	Emberizidae
Spotted Towhee	*Pipilo maculatus*	Passeriformes	Emberizidae
Scaly-breasted Munia	*Lonchura punctulata*	Passeriformes	Estrildidae
House Finch	*Haemorhous mexicanus*	Passeriformes	Fringillidae
Lesser Goldfinch	*Spinus psaltria*	Passeriformes	Fringillidae
Cliff Swallow	*Petrochelidon pyrrhonota*	Passeriformes	Hirundinidae
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	Passeriformes	Hirundinidae
Bullock's Oriole	*Icterus bullockii*	Passeriformes	Icteridae
Hooded Oriole	*Icterus cucullatus*	Passeriformes	Icteridae
Brown-headed Cowbird	*Molothrus ater*	Passeriformes	Icteridae
Great-tailed Grackle	*Quiscalus mexicanus*	Passeriformes	Icteridae
Northern Mockingbird	*Mimus polyglottos*	Passeriformes	Mimidae
California Thrasher	*Toxostoma redivivum*	Passeriformes	Mimidae
Common Yellowthroat	*Geothlypis trichas*	Passeriformes	Parulidae
Yellow-breasted Chat[4]	*Icteria virens*	Passeriformes	Parulidae
Orange-crowned Warbler	*Oreothlypis celata*	Passeriformes	Parulidae
Yellow Warbler[4]	*Setophaga petechia brewsteri*	Passeriformes	Parulidae
House Sparrow	*Passer domesticus*	Passeriformes	Passeridae
Coastal California Gnatcatcher[3]	*Polioptila californica californica*	Passeriformes	Polioptilidae
European Starling	*Sturnus vulgaris*	Passeriformes	Sturnidae
Wrentit	*Chamaea fasciata*	Passeriformes	Sylviidae
Bewick's Wren	*Thryomanes bewickii*	Passeriformes	Troglodytidae
Western Wood-Pewee	*Contopus sordidulus*	Passeriformes	Tyrannidae
Pacific-slope Flycatcher	*Empidonax difficilis*	Passeriformes	Tyrannidae
Ash-throated Flycatcher	*Myiarchus cinerascens*	Passeriformes	Tyrannidae
Black Phoebe	*Sayornis nigricans*	Passeriformes	Tyrannidae

Cassin's Kingbird	*Tyrannus vociferans*	Passeriformes	Tyrannidae
Hutton's Vireo	*Vireo huttoni*	Passeriformes	Vireonidae
Least Bell's Vireo	*Vireo bellii pusillus*[1,2]	Passeriformes	Vireonidae
Great Blue Heron	*Ardea herodias*	Pelecaniformes	Ardeidae
Nuttall's Woodpecker	*Picoides nuttallii*	Piciformes	Picidae
Downy Woodpecker	*Picoides pubescens*	Piciformes	Picidae
Mammals			
Mule Deer	*Odocoileus hemionus*	Artiodactyla	Cervidae
Desert Cottontail	*Sylvilagus audubonii*	Lagomorpha	Leporidae
California Ground Squirrel	*Spermophilus beecheyi*	Mammalia	Rodentia
Eastern Fox Squirrel	*Sciurus niger*	Mammalia	Rodentia

[1]Federally Endangered, [2]State Endangered, [3]Federally Threatened, [4]State Species of Special Concern

APPENDIX G
AQUATIC RESOURCE DELINEATION REPORT

AQUATIC RESOURCE DELINEATION REPORT

BREA BOULEVARD CORRIDOR IMPROVEMENT PROJECT

Prepared for:

Orange County Public Works
601 N. Ross Street
Santa Ana, CA 92701

Contact:

Austin Morgan, P.E.

Prepared by:

AECOM
999 Town & Country Road
Orange, CA 92868

September 2022

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF TABLES

Table **Page**

LIST OF FIGURES
(Located in Appendix A)

This page intentionally left blank.

EXECUTIVE SUMMARY AND PURPOSE

Orange County Public Works (OC Public Works) has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). The Brea Boulevard Corridor Improvement Project (Project) is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route 57 (SR-57) southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor, or "corridor"); refer to Figure 1, Regional Map; Figure 2, Vicinity Map; Figure 3, Proposed Project; and Figure 4, Topographic Map (Figures in Appendix A).

Wetland and non-wetland waters (e.g., streams, rivers, ephemeral drainages) and associated riparian corridors occurring within California may be regulated under federal and state laws. AECOM conducted an aquatic resource delineation for the Project to determine the extent of aquatic resources under the jurisdictional purview of the U.S. Army Corps of Engineers (USACE), the Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW). The purpose of this report is to present the results of this delineation. Table ES-1 provides a summary of the results.

Table ES-1. Summary of Jurisdictional Resources within Study Area

Jurisdictional Features	Study Area (500-foot Buffer) (acres)	Potential Temporary Impact (acres)	Potential Permanent Impact (acres)
Unvegetated Waters			
Brea Creek - Open Water Channel (Non-Wetland WoUS/CDFW Streambed)	2.14	0.22	0.14
Tonner Canyon Creek	0.14	0	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Bridge 1)	0.02	0.02	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Bridge 2)	0.03	0.03	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Bridge 3)	0.02	0.02	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)	1.52	0	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)	0.60	0	0
USACE/RWQCB/CDFW Non-Wetland WoUS (Unvegetated; Ephemeral Drainages)	0.16	0.02	0.01
CDFW-Only Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Banks)	1.09	0	0
Vegetated Waters			
USACE/RWQCB/CDFW Wetland WoUS	1.89	0	0
CDFW-Only Riparian Habitat	10.12	0.61	0.35
Total USACE/RWQCB Jurisdiction (Federal Waters of the U.S.)	6.52	0.31	0.15
Total CDFW Jurisdiction (Streambeds and Riparian Habitat)	17.73	0.90	0.50

PROJECT SETTING/LOCATION

Brea Boulevard is a 30-foot-wide, two-lane, undivided highway (one lane in each direction) with portions of the roadway having no curb or gutter, and unpaved, earthen shoulders. Other portions of the roadway are improved with curb, gutter, and sidewalk. The posted speed limit is 55 miles per hour (MPH) in the unincorporated portion of the corridor, and 45 MPH in the City of Brea at the southern end of the corridor. Brea Boulevard has remained unchanged since the roadway was realigned to its present configuration between 1928 and 1930 with right-of-way (R/W) width that varies between 60 to 100 feet.

There are three bridges crossing Brea Creek within the corridor: a two-span reinforced concrete slab bridge constructed circa 1920 and widened circa 1929 (Bridge 1 [#55C0121]) and a two-span reinforced concrete T-beam bridge constructed circa 1930 (Bridge 2 [#55C0122]) and a three-span reinforced concrete T-beam bridge constructed circa 1939 (Bridge 3 [#55C0123]). In addition to the three bridges there are approximately thirteen existing culvert crossings (for drainage or utilities or both).

The following land uses surround the corridor:

- North of the corridor is an active oil field and natural open space within unincorporated Orange County. Much of this area is property owned by Cal Resources LLC and Brea Hills LLC. North of the eastern end of the corridor on property owned by Cal Resources LLC is a commercial vehicle storage facility for several lessees.
- East of the corridor is State Route (SR) 57 and Tonner Canyon Road.
- South and west of the corridor is the City of Brea and associated residential areas, with general commercial and public facility land uses. Immediately south of the middle stretch of the corridor are steep slopes containing additional oil field activity and the Humble Reservoir.

PART A –
AQUATIC RESOURCE DELINEATION

METHODOLOGY

The aquatic resource delineation included two components: desktop review and field assessment.

Desktop Methods

Prior to the field investigation, a desktop review was conducted to determine the existing conditions and historical uses of the study area and the surrounding area. The following resources and previous studies were utilized:

- Natural Resources Conservation Service Soil Survey Mapping (USDA-NRCS 2016)
- Hydric soils: Hydric Soils – Criteria and 2014 State List for California (USDA-NRCS 2014); Field Indicators of Hydric Soils in the United States, version 8.2 (USDA-NRCS 2018)
- National Wetlands Inventory (NWI) (USFWS 2020)
- Watershed Boundary Dataset accessed via WATERS GeoViewer (USGS 2020)
- National Hydrography Dataset (NHD) accessed via WATERS GeoViewer (USGS 2020)
- Historical Aerial Imagery (1994 – 2019) (Google Earth 2020)
- Wetland (WETS) Climate Tables (USDA/NRCS 2020)

Field Assessment Methods

On various dates over the last few years, Dr. Erik Larsen of AECOM and other staff - such as Chris Hargreaves and John Parent - conducted an aquatic resource delineation for the Project (Table 1, Jurisdictional Delineation Field Dates). The delineation field methods described below were conducted within the temporary and permanent limits of Project construction-related disturbance (project limits) and a surrounding 500-foot buffer (i.e., study area). Areas outside of the project limits were mapped with more of a planning-level approach, and within the R/W and project limits, AECOM mapped with more detail.

Aquatic features can include both wetlands and non-wetland waters. To be considered a wetland, all three parameters (wetland hydrology, hydric soils, and dominance of wetland vegetation) outlined in the 2008 USACE Arid West Supplement must be met (USACE 2008). USACE defines non-wetland waters based on the presence of an ordinary high water mark (OHWM).[1] Aquatic features that exhibit only one of the three

[1] Federal regulations (33 Code of Federal Regulations Part 328.3(e)) define the "ordinary high water mark" (OHWM) as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." On December 2018, the USEPA and

parameters required to qualify as a wetland by USACE may nonetheless be considered wetlands by RWQCB and CDFW. As relevant to the Project, this is discussed further below.

Aquatic features were assessed to determine whether they meet the definition of a Waters of the United States (WoUS) in 33 Code of Federal Regulations [CFR] Part 328. A case-specific significant nexus test[2] was not warranted for the aquatic features within the project limits and is not discussed further in this report. The delineation and vegetation classification were conducted in accordance with the guidance and reference documents listed below:

- A Field Guide to the Identification of the OHWM in the Arid West Region of the Western United States: A Delineation Manual (Lichvar and McColley 2008)
- Updated Datasheet for the Identification of the OHWM in the Arid West Region of the Western United States (Curtis and Lichvar 2010)
- Clean Water Act Jurisdiction Following the Supreme Court Decision in *Rapanos v. U.S.* and *Carabell v. U.S.* (USEPA 2008)
- Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987)
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008)
- National Wetland Plant List (NWPL; USACE 2018)
- Field Indicators of Hydric Soils in the United States, version 8.2 (USDA-NRCS 2018)
- National Wetland Plant List Indicator Rating Definitions (Lichvar et al. 2016)
- Vegetation Community Sources (CNPS 2020)

AECOM recorded all spatial and attribute data using the Environmental Systems Research Institute (ESRI) ArcCollector application running on Android and Apple (iPad, iPhone) devices. Potentially jurisdictional areas were mapped using a Dual XGPS150A receiver connected to the android device through a Bluetooth connection. Global Positioning System (GPS) collected spatial data were imported into ArcMap software for post-field processing. A Trimble GeoXH sub-meter GPS was also brought to the site and used for more detailed data collection as necessary.

The following stream and wetland references were used to define and/or characterize potentially jurisdictional features: Cowardin et al. 1979; Lefebvre et al. 2013; CWMW 2014; Wohl et al. 2016; and California Wetland Portal 2018. Plant species were compiled for the entire site, and scientific names were

USACE issued a prepublication document, signed by both agencies, of a proposed rule revising the definition of "waters of the United States" to clarify federal authority under the Clean Water Act taking a more “common sense” approach. This definition would remove ephemeral features from CWA Section 404 jurisdiction therefore reducing the protections in Southern California. The proposed definition would replace the current one. The implementation date on this new definition was June 22, 2020.

[2] Significant nexus is described in the U.S. Environmental Protection Agency’s 2008 Guidance in Clean Water Act Jurisdiction Following the U.S. Supreme Court’s Decision *in Rapanos v. United States and Carabell v. United States* (USEPA 2008).

consistent with standard references (Baldwin et al. 2012; Calflora 2020; Cal-IPC 2020; CNPS 2020; JFP 2020).

Table 1. Jurisdictional Delineation Field Dates

Survey Date	Time	AECOM Personnel	Purpose of Survey
2016			
05/31/2016	0800 - 1400	Erik Larsen, John Parent	Jurisdictional Delineation; Rare Plant Survey
06/02/2016	0800 - 1430	Erik Larsen, John Parent	Jurisdictional Delineation; Rare Plant Survey
12/29/2016	1200 – 1500	Erik Larsen, Arthur Popp, Vanessa Tucker	Jurisdictional Delineation; General Bio Survey
2018			
05/29/2018	1000 - 1630	Erik Larsen, Chris Hargreaves	Jurisdictional Delineation; Rare Plant Survey
05/31/2018	1200 - 1530	Erik Larsen, Chris Hargreaves	Jurisdictional Delineation; Rare Plant Survey
2019			
10/01/2019	0800 - 1200	Erik Larsen, Chris Hargreaves, John Parent	Jurisdictional Delineation
10/02/2019	0800 - 1200	Erik Larsen, Chris Hargreaves, John Parent	Jurisdictional Delineation

Data sheets specific to the delineation of WoUS, including wetlands, were completed for this report (EL 1987; Lichvar and McColley 2008; USACE 2008; Curtis and Lichvar 2010). The following stream and wetland references were used to define and/or characterize potentially jurisdictional features: Cowardin et al. 1979; Lefebvre et al. 2013; CWMW 2014; Wohl et al. 2016; and California Wetland Portal 2020. Plant species were compiled for the entire site, and scientific names were consistent with standard references (Baldwin et al. 2012; Calflora 2020; Cal-IPC 2020; CNPS 2020; JFP 2020).

Communities were described using A Manual of California Vegetation Online (http://vegetation.cnps.org/). Vegetation communities were categorized using established systematic classification criteria described in Sawyer et al.'s A Manual of California Vegetation, Second Edition (Sawyer et al. 2009, CNPS 2020; CDFW 2018a,b,c; Holland 1986). Alternatively, vegetation communities or land cover types that are not described in A Manual of California Vegetation were classified using conventional naming practices (i.e., developed) or were defined by the dominant species. During the field survey, vegetation communities were identified and mapped within the study area using field observations and a high-quality aerial photograph. After the field investigation, the hand-mapped boundaries were digitized in conjunction with a high-quality aerial photograph using geographic information system (GIS) software from ArcGIS. A list of plant species was compiled by vegetation community; plant species observed incidentally during other surveys were also included. Plant nomenclature follows The Jepson Manual-Vascular Plants of California, Second Edition (Baldwin et al. 2012, JFP 2020). Photographs of the various vegetation communities and rare plant species were taken, and the location of each photograph was recorded using a GPS unit.

RESULTS

The results of the desktop analyses and the aquatic resource delineation are presented below.

Watershed Context, Hydrology and Rainfall

The project area is located within the Northeastern extent of the Coyote Creek watershed (connected to Lower San Gabriel River and Pacific Ocean). The following figures illustrate per both Hydrologic Unit Code (HUC) and CalWater classifications:

Figure 6 - Sub-watershed Map
Figure 7 - CalWaters Area Map
Figure 8 - CalWaters SubArea Map
Figure 9 - National Wetland Inventory Map

The National Wetland Inventory shows various riverine aquatic features within the study area (Figure 9; USFWS 2020).

Based on weather data collected at Imperial Weather Station between 2000 and 2020, the average temperature within the study area is 64.2 degrees Fahrenheit (°F) with a mean low of 52.4°F and a mean high of 75.9°F. Average precipitation within the study area over the past 20 years is 13.23 inches [mid 40% range 9.03 to 15.23 inches] (USDA/NRCS 2020). The majority of rain occurs between October through May. The Wetlands (WETS) Climate Table for the Santa Ana Fire Station Weather Station (nearest weather station to the Project) is presented below as Table 2.

The amount of rainfall recorded in the study area between January 2000 and June 2020 is presented in Table 3. During the winter and spring months of 2019, approximately 19.55 inches fell, well above the average rainfall for that period in the average year (9.82 inches). The high precipitation received during this year provided a favorable setting for the field investigations of the study area. In addition, the precipitation during 2016 to present has, in general, been above average (year – inches):

- 2016 - 10.53
- 2017 - 10.87
- 2018 - 7.10
- 2019 - 19.55
- 2020 – 7.76

Table 4 shows data for monthly mean streamflow for a location further downstream. See also Appendix C for graphics showing flooding frequency (2016 – 2019). Appendix C also contains the Antecedent Precipitation Tool (APT) graphs as required by USACE (Deters 2020). Results indicate the jurisdictional delineation was conducted during “normal conditions.”

Table 2. WETS Station Data for Santa Ana Fire Station, Orange County, CA (1906 – 2021)

Month	Avg. Max Temp (°F)	Avg. Min Temp (°F)	Avg. Mean Temp (°F)	Avg. Precip. (in)	30% Chance Precip. Less Than	30% Chance Precip. More Than	Avg No. Days Precip. 0.10 in or More (days)
Jan	68.5	44	56.2	2.66	1.01	3.1	4
Feb	69.1	45.6	57.3	2.91	1.05	3.42	5
Mar	70.9	47.1	59	2.11	0.7	2.43	4
Apr	73.3	50.3	61.8	1.01	0.3	1.04	2
May	75.2	54.2	64.7	0.26	0	0.2	1
Jun	78.6	57.7	68.2	0.06	0	0.03	0
Jul	83.7	61.3	72.5	0.02	0	0	0
Aug	84.9	62	73.4	0.05	0	0	0
Sep	84.1	59.7	71.9	0.22	0	0.11	0
Oct	79.7	55.1	67.4	0.46	0.1	0.39	1
Nov	74.4	48.1	61.2	1.22	0.39	1.27	2
Dec	68.9	44	56.4	2.26	0.87	2.57	4
Annual Data					9.03	15.23	
Average of Monthly Data	75.9	52.4	64.2	-	-	-	-
Total	**-**	**-**	**-**	**13.23**	**-**	**-**	**23**

Source: AgACIS for Orange County; http://agacis.rcc-acis.org/?fips=06059

Table 3. Average Monthly Precipitation Values (Santa Ana Fire Station, Orange County, CA; 1906 – 2021)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2000	0.74	4.65	1.7	0.82	0.03	0	0	0.01	0.06	1.36	0	T	9.37
2001	4.5	7.33	0.65	0.95	0.05	0.03	0	0	0	0	0.63	1.19	15.33
2002	0.67	0.23	0.5	0.23	0.01	0	0	0	0	0.1	1.8	2.49	6.03
2003	0.11	3.95	3.21	1.82	0.82	T	0.26	0	0	0.02	0.66	0.75	11.6
2004	0.33	4.33	0.52	0.56	0	0	0	0	0	4.85	0.49	3.46	14.54
2005	6.98	8.41	0.59	M	0.27	0	0	0	0.35	M	0.3	0.56	M
2006	0.64	1.68	M	2.88	0.7	0.02	0	0.01	T	0.02	0.11	0.79	M
2007	0.03	0.98	0.05	2.59	0	0	0	0	0.52	0.4	0.95	1.02	M
2008	3.76	1.95	0.06	0.02	0.17	0	0	0	0	0	1.85	3.5	11.31
2009	0.75	3.27	0.04	0.17	0	0.1	0	0	0	0.67	0	3.39	8.39
2010	6.01	4.21	0.26	1.22	0.05	0	0.02	0	0	M	1.3	M	M
2011	M	1.91	2.3	M	0.45	M	M	0	M	0.85	1.67	0.63	M
2012	1.3	M	1.51	3.09	0	0	0.12	0	0	0.32	0.54	1.62	M
2013	0.84	0.32	0.38	0.06	0.54	0	0.06	0	0	0.22	0.46	0.37	3.25
2014	0	1.42	0.68	0.37	0	0	0	0.03	0	0	0.42	3.41	6.33
2015	0.88	0.41	0.42	0.16	0.89	0.01	0.41	0	1.28	0.06	0.04	0.85	5.41
2016	**2.26**	0.25	**0.97**	0.15	**0.58**	0.03	0	0	0.02	**0.66**	**1.22**	**4.39**	**10.53**
2017	**7.34**	**3.2**	0.05	0.08	0.09	0	0	0	0.07	0	0.04	0	**10.87**
2018	**1.08**	0.02	**1.39**	0.02	0.11	0	0	0	0	**0.8**	**1.11**	**2.57**	**7.1**
2019	**6**	**5.61**	**1.42**	0.06	**0.65**	0.05	0	0	0.01	0	**1.95**	**3.8**	**19.55**
2020	0.15	**0.54**	**2.92**	**2.38**	0.06	0	0	0	0	0.05	0.35	**1.31**	**7.76**
2021	**1.95**	-	-	-	-	-	-	-	-	-	-	-	-
Mean	**2.21**	**2.73**	**0.98**	**0.93**	**0.26**	**0.01**	**0.04**	**0**	**0.12**	**0.55**	**0.76**	**1.81**	**9.82**

*M = Missing data; T = Trace levels of precipitation. Table includes data through January 2021. Cells in gray highlight represent the rainy season, here defined as having a month with value greater than 0.5" during the last five years (2016 through 2021; bold values are those greater than 0.5" within this timeframe).
Source: AgACIS for Orange County; http://agacis.rcc-acis.org/?fips=06059.

Table 4. Monthly Mean Streamflow for Brea Creek (USGS 11088500 near Brea Dam, Fullerton, CA)

YEAR	Monthly Mean Flow for 2016 – 2020 (ft3/s)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2016	6.95	1.32	2.63	0.28	0.20	0	0	0	<0.01	0.41	1.48	14.2
2017	38.20	12.80	0.74	0.17	0.52	0.02	<0.01	0	0.02	0	<0.01	0.10
2018	4.23	0.36	3.60	0.01	0.05	0	0	<0.01	0	1.02	2.19	4.94
2019	11.80	23.90	8.42	1.71	1.62	0.31	0.12	0.01	0.02	0.06	2.85	7.97
2020	0.914	0.633	7.16	5.9	0.725	0.248	0.095	0.007	0.121	0.213	0.777	3.38
Mean of Monthly Discharge (1942-2020)	11	16	9.2	3.4	1.4	0.79	0.58	0.6	0.85	1.6	3	5.9

Notes: https://waterdata.usgs.gov/nwis/inventory/?site_no=11088500&agency_cd=USGS ; Hydrologic Unit Code 18070106; Latitude 33°53'16", Longitude 117°55'32" (NAD27); NE 1/4 NE 1/4 sec.28, T.3 S., R.10 W., Orange County, CA, Location: on right bank, 0.2 mi downstream from Brea Dam, and 1 mi north of Fullerton; Drainage area 21.6 sq mi; Calculation Period: 1942-01-01 -> 2020-12-31.

Soils

Soil survey mapping shows Riverwash to be a major soil type within the project area (Table 5; Figure 10). This soil type is classified as a hydric soil on the National Hydric Soils List (USDA-NRCS 2014). Historical Google Earth aerial photography shows continual disturbance throughout the entire study area since it is surrounded by oil infrastructure. Existing roads throughout the study area have been present and visually have not changed much throughout the historical imagery dating back many years.

Vegetation Communities

Essentially all vegetation communities throughout the study area are either disturbed or dominated by non-native plants. Table 6, below, and Figure 11 shows the vegetation communities.

Table 5. Soils within Study Area

Soil Map Symbol	Soil Name	Acreage in Study Area (500-foot Buffer)[1]
101	Alo clay, 15 to 30 percent slopes	2.42
110	Anaheim clay loam, 50 to 75 percent slopes	18.09
1141LA	Zaca-Apollo, warm complex, 20 to 55 percent slopes	15.24
134	Calleguas clay loam, 50 to 75 percent slopes, eroded	16.74
167	Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	69.34
174	Myford sandy loam, 2 to 9 percent slopes, eroded	2.08
175	Myford sandy loam, 9 to 15 percent slopes	9.29
176	Myford sandy loam, 15 to 30 percent slopes	9.83
177	Myford sandy loam, 9 to 30 percent slopes, eroded	1.65
180	Nacimiento clay loam, 15 to 30 percent slopes, MLRA 20, warm MAAT	4.58
181	Nacimiento clay loam, 30 to 50 percent slopes, MLRA 20, warm MAAT	24.45
191	Riverwash (Hydric Soil)	27.81
195	San Emigdio fine sandy loam, 2 to 9 percent slopes	19.39
206	Sorrento loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	2.28
209	Sorrento clay loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	0.11
220	Xerorthents loamy, cut and fill areas, 15 to 30 percent slopes	45.26
	TOTAL	**268.56**

[1] Note: Total may not add up due to rounding.

Table 6. Vegetation Communities within Study Area

Vegetation Communities/ Land Cover Types	Acres within Study Area (500-foot Buffer)
Natural Vegetation Communities	
Blue Elderberry Stands	1.27
Blue Elderberry - Toyon	8.34
California Walnut Groves	0.88
California Walnut - Laurel Sumac	6.58
Coast Live Oak Woodland	8.09
Disturbed Coastal Sage Scrub	20.87
Poison Oak Scrub	1.35
Toyon - Laurel Sumac	6.09
Subtotal	*53.47*
Non-Native Vegetation Communities	
Eucalyptus Groves	9.18
Ornamental–Landscape Plants	9.68
Pepper Tree Groves	33.67
Ruderal	3.73
Tree of Heaven Groves	0.50
Upland Mustards and Ruderal Forbs	28.56
Subtotal	*85.32*
Aquatic and Riparian Communities	
Arroyo Willow Thickets	4.84
Black willow thickets	8.70
Coast Live Oak Riparian Forest	0.43
Unvegetated Channel	3.46
Subtotal	*17.43*
Land Cover Types	
Developed	76.54
Disturbed	35.61
Subtotal	*112.15*
TOTAL	**268.38**

Aquatic Resource Delineation Field Results

AECOM delineated approximately 6.52 acres of wetlands and other waters within the study area, including approximately 1.89 acres of wetland waters. As previously noted, in accordance with the Arid West Supplement (USACE 2008), a feature must meet three parameters—wetland hydrology, hydric soils, and dominance of wetland vegetation—to qualify as a wetland. Table 7 below presents the jurisdictional

resources present within the study area by feature type. Aquatic resources delineated within the study area are also shown in Figure 12. Additional waters-related data is shown in Figure 13, Wetland Delineation Data Points. Table 8 provides classification of waters within the study area and includes various vegetation types found within these features. Site photos were taken within the study area and a photolog with map are included in Appendix B.

Each of the aquatic resource types delineated are discussed further below.

Table 7. Clean Water Act Waters within Study Area

USACE/RWQCB	Study Area (500-foot Buffer)	
	(acres)	(linear feet)
UNVEGETATED		
Non-Wetland WoUS/Open Water Channel (Brea Creek)	2.14	10,798
Tonner Canyon Creek	0.14	772
Non-Wetland WoUS (Under Bridge 1)	0.02	n/a
Non-Wetland WoUS (Under Bridge 2)	0.03	n/a
Non-Wetland WoUS (Under Bridge 3)	0.02	n/a
Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)	1.52	1,760
Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237
Non-Wetland WoUS[1] (Unvegetated; Ephemeral Drainages)	0.16	3,398
VEGETATED		
Wetland WoUS	1.89	n/a
USACE/RWQCB Jurisdiction	**6.52**	**17,965**

[1] The ephemeral drainages are jurisdictional to the USACE/RWQCB per Section 404/401, and these features would remain jurisdictional to RWQCB as WoST.

Table 8. JD Results – Cowardin/Vegetation Classification of JD Resources in Study Area.

Jurisdictional Feature	Cowardin Classification for Wetland/Riparian Areas[1]	Generalized Vegetation Classification[2,3] with Dominant Plant Species
Wetland WoUS/ CDFW Riparian – Main Channel (Brea Creek)	PFO	Arroyo Willow Riparian Forest or Mixed Riparian Forest (Disturbed)[4] *Salix lasiolepis, Salix gooddingii, Salix laevigata, Platanus racemosa, Juglans californica, Fraxinus* sp.*, Washingtonia robusta**
	PSS	Southern Willow Scrub *Salix lasiolepis* Mulefat Scrub *Baccharis salicifolia, Isocoma menziesii* Elderberry Savannah *Sambucus nigra*
	PEM	Coastal Freshwater Marsh *Schoenoplectus californica, Schoenoplectus americanus, Typha* spp., *Juncus xiphioides, Cyperus spp.*
Wetland WoUS/ CDFW Riparian - Upstream Reach (Brea Creek)	PFO	Black Cottonwood Riparian Forest (Disturbed)[4] *Populus trichorcarpa, Salix lasiolepis*
	PFO	Non-Native/Ornamental *Schinus molle**
Non-Wetland WoUS/Streambed – Open Water	R3UB	Unvegetated
Non-Wetland WoUS/Streambed -Bridges 1 – 3, Concrete Box Channel	R3	Unvegetated
Non-Wetland WoUS/Streambed - Ephemeral Drainages	R6	Unvegetated
Adjacent Uplands	Forest/Woodland	Coast Like Oak Riparian Forest *Quercus agrifolia* California Walnut Woodland *Juglans californica* Non-Native/Ornamental *Eucalyptus* spp.*, *Schinus molle**
	Scrub-Shrub	Coastal Sage Scrub *Artemesia californica* Chaparral *Toxicodendron diversilobum, Malosma laurina, Heteromeles arbutifolia*

Jurisdictional Feature	Cowardin Classification for Wetland/Riparian Areas[1]	Generalized Vegetation Classification[2,3] with Dominant Plant Species
		Elderberry Savannah *Sambucus nigra* Non-Native/Ornamental *Nicotiana glauca**
	Herbaceous	Ruderal *Conium maculatum**, *Foeniculum vulgare**, *Brassica* spp.* Non-Native Grassland *Bromus* spp.*

[1] Cowardin et al. (1979); PFO – Palustrine Forested; PSS – Palustrine Scrub-Shrub; PEM – Palustrine, Emergent; R3 – Upper Perennial, Riverine; UB – Unconsolidated Bottom; R6 – Ephemeral, Riverine.
[2] CNPS (2018). Species refer to Alliances and Associations; for example, *Salix lasiolepis = Salix lasioepis* Shrubland Alliance (Arroyo Willow Thickets). * = non-native species or community type.
[3] Holland (1986; CNPS 2020).
[4] Disturbed refers to the prevalence of non-native, invasive plants found within the community.

Table 9. CDFW Streambeds and Riparian Habitat within Study Area

CDFW Jurisdiction	Study Area (Buffer)	
	(acres)	(linear feet)
UNVEGETATED		
Streambed/Open Water Channel - Brea Creek	2.14	10,798
Tonner Canyon Creek	0.14	772
Streambed (Under Bridge 1)	0.02	n/a
Streambed (Under Bridge 2)	0.03	n/a
Streambed (Under Bridge 3)	0.02	n/a
Streambed (Unvegetated; Concrete-lined Box Channel)	1.52	1,760
Streambed (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237
Streambed (Unvegetated; Rip rap-lined Trapezoidal Banks)	1.09	n/a
Streambed (Ephemeral Tributary Drainages)[1]	0.16	3,398
VEGETATED		
Streambed Wetlands (equivalent to USACE/RWQCB wetlands)	1.89	n/a
CDFW-Only Riparian Habitat (adjacent to "Streambed Wetlands")	10.12	n/a
CDFW Jurisdiction	**17.73**	**17,965**

[1] The ephemeral drainages are also jurisdictional to the USACE/RWQCB per Section 404/401, and these features would also be considered jurisdictional to RWQCB as WoST.

JURISDICTIONAL DETERMINATION – BREA CREEK

A jurisdictional determination provides evidence that a given aquatic resource may be isolated (or not) from a known jurisdictional water, especially if such water is a "navigable water." The intent in the section below is to provide a summary overview of the jurisdictional status of the features mapped within the Study Area.

WATERS OF THE U.S. - PRE-2015 REGULATIONS

Regulatory Setting

Due to a recent U.S. District Court ruling in August 2021, the U.S. Environmental Protection Agency (USEPA) and USACE have halted implementation of the Navigable Waters Protection Rule and are interpreting WoUS consistent with the pre-2015 regulatory regime until further notice.[3] In December 2021, USEPA and USACE published a proposed rule in the Federal Register that proposed a change to the definition of WoUS.[4] A final rule (with new definition) is expected later in 2022. Table 10 below includes the applicable regulatory citations and text for the definition of WoUS, as applied to Brea Creek.

Water of the U.S. Jurisdictional Evaluation

Table 10 presents an evaluation of the aquatic resources in the Study Area regarding their potential jurisdiction under the current Clean Water Act (CWA) regulations (33 CFR Part 328(a)1-7). The delineation and analysis presented herein indicate that WoUS are present within the Study Area (Table 10); however, only USACE can make the official determination.

Table 10. Jurisdiction per the Clean Water Act (pre-2015 Regulations)

	Specific Types of Jurisdictional Waters (or Non-Jurisdictional Waters)[1]	Analysis / Comments
1.0 Clean Water Act §404 (per 33 CFR Part 328 (a) Definitions of Waters of the U.S., including Wetlands		
1.1	Jurisdictional Waters of the U.S. The term waters of the United States means:	
33 CFR Part 328 (a) 1	**All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide**;	Do the waters have a connection to commerce? >NO Are tidal waters present? >NO
Guidance for TNWs	The agencies will assert jurisdiction over the following waters: Traditional Navigable Waters (TNWs)	Is the aquatic feature a TNW? >NO

[3] Web References: https://www.epa.gov/wotus/current-implementation-waters-united-states#Pre-2015; https://www.govinfo.gov/content/pkg/CFR-2011-title33-vol3/pdf/CFR-2011-title33-vol3-part328.pdf https://www.usace.army.mil/Media/Announcements/Article/2888988/5-january-2022-navigable-waters-protection-rule-vacatur; https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll11/id/5466 (Memo 4Jan2022).
[4] Federal Register / Vol. 86, No. 232, p.69372-69450; December 7, 2021; Proposed Rules; https://www.epa.gov/system/files/documents/2021-12/revised-definition-of-wotus_nprm_december2021.pdf

	Specific Types of Jurisdictional Waters (or Non-Jurisdictional Waters)[1]	Analysis / Comments
33 CFR Part 328 (a) 2	**All interstate waters including interstate wetlands**;	Does the aquatic feature cross state lines? >NO
33 CFR Part 328 (a) 3	All **other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce** including any such waters: a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or c. Which are used or could be used for industrial purposes by industries in interstate commerce;	(a)3 waters that are jurisdictional. Is the aquatic feature fully within the borders of a state? >YES; Intrastate Water Is the aquatic feature a TNW and/or have a connection to commerce? >NO Is the aquatic feature likely jurisdictional? >YES *(See (a)5 Tributaries, below)*
33 CFR Part 328 (a) 4	**All impoundments of waters** otherwise defined as waters of the United States under the definition;	Is the aquatic feature an impounded water? >NO
33 CFR Part 328 (a) 5	**Tributaries** of waters identified in paragraphs (a)(1) through (a)(4) of this section	Is the aquatic feature a tributary of one of the following categories: tidal, interstate, intrastate, impoundment? >YES; Tidal -> Lower San Gabriel River & Pacific Ocean
Guidance for Jurisdictional Tributaries	The agencies will assert jurisdiction over the following waters: Non-navigable tributaries of TNWs that are relatively permanent (i.e., the tributaries typically flow year-round or have continuous flow at least seasonally).	Is the aquatic feature a non-navigable tributary to a TNW that is also a Relatively Permanent Water (RPW)? >YES (TNW – Coyote Creek, Lower San Gabriel River, Pacific Ocean) Relatively Permanent Water _Perennial (year-round flow)? >YES _Continuous flow on a seasonal basis? >N/A Does the wetland directly abut a non-navigable tributary to a TNW that is a RPW? >YES
Guidance for Ephemeral Waters	Certain ephemeral waters in the arid west are distinguishable from the geographic features described below where such ephemeral waters are tributaries and may have a significant nexus to TNWs.	Is the aquatic feature considered an ephemeral tributary? >YES (some minor drainages are ephemeral) Is it distinguishable from the following: canal, swale, ditch, pipe? >YES *If yes, it may have a significant nexus to a TNW.*
Guidance for Swales, Erosional Features, Ditches, and Uplands	Certain geographic features generally are not jurisdictional waters: • swales, erosional features (e.g., gullies) and small washes characterized by low volume, infrequent, and short duration flow; • ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water; • uplands transporting over land flow generated from precipitation (i.e., rain events and snowmelt).	Is the aquatic feature a swale, erosional feature, ditch, or upland? >NO
Guidance for Other Potentially	Certain geographical features (e.g., ditches, canals) that transport relatively permanent (continuous at least seasonally) flow directly or indirectly into TNWs or between two (or more)	Do any of the following transport RPW directly or indirectly into a TNW? > Canals, swales, ditches, pipes

	Specific Types of Jurisdictional Waters (or Non-Jurisdictional Waters)[1]	Analysis / Comments
Jurisdictional Waters	waters of the U.S., including wetlands, are jurisdictional waters regulated under the Clean Water Act (CWA). Certain geographic features (e.g., swales, ditches, pipes) may contribute to a surface hydrologic connection where the features: • replace or relocate a water of the U.S., or • connect a water of the U.S. to another water of the U.S., or • provide relatively permanent flow to a water of the U.S.	>NO Any of the following provide hydrologic connection between two jurisdictional waters? > Canals, swales, ditches, pipes >NO If yes to either, then feature may be jurisdictional, or the feature may keep an isolated aquatic resource connected (and thus jurisdictional) to downstream waters.
33 CFR Part 328 (a) 6	The **territorial seas**; [Assume TNW status]	Is the aquatic feature considered a sea/ocean? >NO
33 CFR Part 328 (a) 7	**Wetlands** adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1) through (6) of this section.	Are adjacent wetlands present? >YES (some adjacent)
Guidance for Wetlands	The agencies will assert jurisdiction over the following waters: > Wetlands adjacent to TNWs; > Wetlands that directly abut tributaries of TNWs that are RPW (perennial or seasonal).	Are the wetlands adjacent to a TNW? >N/A Do the wetlands directly abut a RPW tributary to a TNW? >YES (some abutting)
1.2	**Non-Jurisdictional Waters** **Waters of the United States do not include:**	
33 CFR Part 328 (a) 3	**Intrastate waters**	(a)3 waters that may not be jurisdictional.
Guidance for Isolated waters (SWANCC)	**Isolated depressional wetlands, ponds, prairie potholes, wet meadows, playas.**	Are these aquatic features isolated per SWANCC? >NO Are migratory birds the only criteria suggesting the features are potentially jurisdictional? >NO
33 CFR Part 328 (a) 8	**Prior converted cropland**. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA. **Waste treatment systems**, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.	Prior converted cropland or waste treatment systems? >NO
2.0 Need for Significant Nexus Evaluation		
2.1	**Potential Jurisdictional Waters of the U.S. Based on Fact-Specific Analysis of Significant Nexus with a TNW**	
Guidance for Non-RPW Tributaries	Tributaries • Non-navigable tributaries that are not relatively permanent	Non-Navigable tributary considered Non-RPW? >NO
Guidance for Adjacent Wetlands	Wetlands • Wetlands adjacent to non-navigable tributaries that are not relatively permanent • Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary	Wetland adjacent to tributary (Non-Navigable, Non-RPW?) >NO Wetland adjacent (but not abut) tributary (Non-Navigable, RPW)? >NO

	Specific Types of Jurisdictional Waters (or Non-Jurisdictional Waters)[1]	Analysis / Comments
Guidance Regarding Need for Significant Nexus Analysis	Is a Significant Nexus Evaluation Required for Tributaries and/or Wetlands?	Significant nexus evaluation is not required.

[1] CWA = Clean Water Act; TNW = Traditional Navigable Water; RPW = Relatively Permanent Water; Non-RPW = Non-Relatively Permanent Water.

Regulatory Setting

Under the CWA Section 404, USACE regulates the discharge of dredged or fill material into any aquatic feature that meets the definition of WoUS as defined in 33 CFR328. Per the USACE Regulatory Guidance Letter (RGL) No. 16-01 *Jurisdictional Determinations*, an official determination that there are, or are not, jurisdictional aquatic resources on a parcel can be made by USACE upon request. An Approved Jurisdictional Determination (AJD) prepared by USACE may remove or add portions of the delineated waters summarized herein from being considered jurisdictional and/or may include additional waters that were not considered as jurisdictional during the field delineation. In lieu of an AJD, OCPW could elect to treat the aquatic resources in the study area as jurisdictional and request a Preliminary Jurisdictional Determination (PJD) from USACE. Without an AJD or PJD, the aquatic resources that were delineated within the study area are considered potential WoUS. The information required for a PJD is included in Appendix D.

Jurisdictional Determination

The delineation and analysis presented herein indicate that WoUS are present within the study area.

RWQCB

Regulatory Setting

Under Section 401 of the CWA and in accordance with the 1969 Porter-Cologne Water Quality Control Act, RWQCB regulates the discharges of wastes, which include discharges of dredged or fill material, which may affect the quality of waters of the State (WoST). These waters include all natural wetlands and some, but not all, artificial wetlands, as well as other non-wetland features, including the oceans, lakes, and rivers. The "State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (new procedures) defines what constitutes a wetland and how wetlands should be delineated and protected in the state (SWRCB 2020). The new procedures became effective on May 28, 2020. The extent of WoST subject to the authority of RWQCB (per the CWA) was also considered to include all WoUS, as discussed above. WoST would also include ephemeral drainages.

Jurisdictional Determination

The delineation and analysis presented herein indicate that WoST are present within the study area; however, only RWQCB can make the official determination.

CDFW

Regulatory Setting

Under California Fish and Game Code (CFGC) Sections 1600–1616, CDFW regulates activities that would result in (1) any potential detrimental impacts associated with the substantial diversion or the obstruction of the natural flow of a stream or lake; (2) substantial changes to the bed, channel, or banks of a stream or lake, or the use of any material from the bed, channel, or banks; and (3) the disposal of debris or waste materials that may pass into a stream or lake.

Jurisdictional Determination

The delineation and analysis presented herein indicate that streambeds and associated riparian habitat are present within the study area; however, only CDFW can make the official determination.

This page intentionally left blank.

PART B –
PROPOSED PROJECT AND IMPACT ANALYSIS

PROJECT PURPOSE, NEED, AND OBJECTIVES

Brea Boulevard presently meets the classification for a Collector Arterial Highway in the Orange County General Plan Transportation Element (2020), which should accommodate between 7,500 to 10,000 Average Daily Traffic (ADT, is the number of vehicles two-way passing a specific point in a 24-hour period). With traffic volumes for Brea Boulevard between 17,000 to 22,000 ADT as of November 4, 2019, the roadway should match the OCTA MPAH designation for a Primary Arterial Highway which can accommodate 20,000 to 30,000 ADT.

The three bridges within the corridor are functionally obsolete, meaning they have exceeded their design lives, do not have the adequate geometry to accommodate the proposed corridor improvements, and should be replaced. Replacing the bridges will present an opportunity to increase the flood conveyance under the bridges to current design standards and avoid emergency response delays during larger storm events.

The Project is located along the southern perimeter of a regional wildlife corridor, Puente Hills-Chino Hills Wildlife Corridor, that connects the Santa Ana Mountains in the southeast to the Whittier Hills area to the northwest. Enhancing wildlife movement will conserve and provide greater connectivity for wildlife while potentially reducing the risk for wildlife collisions with traffic.

Throughout the corridor, sight distance (the distance a driver can see unobstructed) does not meet current design standards and the Project provides an opportunity to enhance driver sight distance.

Currently, there are multiple driveways throughout the corridor that serve as access for the adjacent active oil field. There is an opportunity with the Project to improve and enhance the ingress and egress to limit potential traffic delays from large, specialized equipment accessing the field.

The intersection of Brea Boulevard and Tonner Canyon Road is an unsignalized, three-way t-intersection with stop control on Tonner Canyon Road. Motorists on Tonner Canyon Road suffer undue delay at Brea Boulevard, and traffic control features will be added to improve traffic flow at this intersection as part of the Project.

Project objectives include the following:

- Improve Brea Boulevard to be consistent with the designated Primary Arterial Highway classification per the MPAH;
- Replace three functionally obsolete bridges over Brea Creek with bridges that meet current design standards;
- Increase flood conveyance of Brea Creek under the three bridges;

- Enhance safe wildlife movement across the roadway within the corridor;
- Improve roadway to meet current design standards;
- Redesign the Brea Boulevard/Tonner Canyon Road intersection;
- Minimize impacts to the surrounding habitat and wildlife; and
- Minimize impacts to above/underground utilities.

PROJECT DESCRIPTION

The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the corridor (approximately 1.5-miles), replacing and widening three functionally obsolete bridges, installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge, adding open graded asphalt concrete (OGAC) paving at the southern end of the corridor, and providing striping and installing new signage. Construction of these improvements would be conducted within permanent and temporary limits of disturbance (project limits). The Project's main elements that would affect waters and wetlands are described below.

Roadway Widening

Brea Boulevard will be widened from two to four lanes (two lanes each direction) with 12-foot width lanes, shoulders that will vary from 6-feet to 10-feet wide, and a median that is either 12-foot wide raised with limited landscaping, 6-foot wide with a concrete barrier, or striped of varying widths. Widening would occur between Canyondale Drive and the SR- 57 southbound on-ramp, a total length of approximately 8,100 linear feet or 1.5 miles. In an effort to limit the footprint of the Project the design will utilize a modified Primary Arterial Highway per OC Public Works' Standard Plan 1103 for Standard Street Sections which includes: R/W width less than 100 feet; reducing the median width to less than 14-foot; and no sidewalk throughout the limits within unincorporated County. Within the City of Brea, the roadway section will be a modified Primary Arterial Highway Section per City of Brea's Standard Plan 109-0 to match the existing roadway configuration south of the corridor by reducing the shoulder width.

Bridge Replacement and Culvert Crossing Modifications

Road widening will require replacement of the three bridges within the corridor, all of which are over 80 years old and functionally obsolete. The creek underneath Bridge 2 and Bridge 3 will be converted from concrete to a natural soft bottom and Bridge 1 will remain a natural soft bottom. To increase the hydraulic capacity underneath the three bridges, the height and span of each bridge will increase. The new bridge sections are considered a modified Primary Arterial Highway Bridge Sections per OC Public Works' Standard Plan 1104 for Standard Street Sections because the median width is increased but it will not include sidewalk.

The vertical alignment (road elevation) of the road between Canyon Country Road to after Bridge # 3 will increase by 5-feet or less to increase the elevation of the bridge decks which increases hydraulic capacity while not impacting Brea Creek, reduce the volume of exported material from cut slopes, and reduce the retaining wall height at the curve within the corridor (i.e., the "bend" as seen in Figure 2).

There are approximately 13 culvert crossings (for drainage or utilities or both) that will need to be extended or reconfigured as part of the widening.

Bridge replacement and culvert work will require dewatering[5]. Dewatering will consist of sand bag cofferdams to divert the water around the piers and abutments depending on phasing of the Project. Additionally, Bridges 1, 2, and 3 will each require abutment facing walls that will extend to 10 feet below the creek surface, which may result in the need to temporarily pump groundwater from the vicinity of the proposed walls during installation. Also, if a bridge requires full closure for construction, surface dewatering may consist of temporary pumping from upstream of bridge to downstream.

Wildlife Movement Enhancements

To enhance wildlife movement across Brea Boulevard between Bridge # 1 and Tonner Canyon Road, the three existing bridges (and their undercrossings) will be widened and a new wildlife overpass/land bridge would be constructed.

All three existing bridges will be enlarged/expanded, resulting in their openness ratios[6] being increased. The existing bridge designs have two to three internal support walls that will be eliminated with the new bridge designs. Hence the openness ratio post-construction will be greatly improved for Bridges 1, 2, and 3. Because existing culverts will need to be lengthened commensurate with the wider roadway, their openness ratios will decrease if their cross section are not also expanded. Widening of some culverts would occur where culverts have the potential to function for small animal passage, along with improvements such as using alternative erosion treatments (e.g., articulated hydraulic block) at culvert outlets in lieu of other more common treatments that limit wildlife passage such as rock rip-rap.

A new wildlife overpass/land bridge would be installed approximately 550 feet west of the Brea Boulevard/Tonner Canyon Road intersection, where the roadway is presently situated approximately 25 feet lower than the adjacent ridges on both sides. The wildlife overpass/land bridge structure will be a single-span cast-in-place (CIP) prestressed concrete box girder that is 85-feet-long by 75-feet-wide, spanning the full width of the widened roadway and matching the existing top of ridge on either side (with minimum vertical clearance of over 19 feet above the widened roadway). Three feet of earthen fill will be placed on top of the structure to preserve a natural appearance for wildlife and allow for growth of shallow-rooted vegetation. Cast-in-place parapet walls will be used to retain the fill and to provide a visual barrier for wildlife. Parapet mounted fencing is required to provide continuity with fences at the approaches to the

[5] For construction work within wet conditions (such as for culverts and bridges) water needs to be removed from the work area to avoid soil erosion and provide a safe workspace.

[6] Openness ratio is defined as the width of an undercrossing (horizontal distance between each wall) multiplied by the height and divided by the length (the distance an animal has to travel to pass through the undercrossing). In general, the greater the openness ratio of an undercrossing, the more likely it is to be used by a variety of species, especially large herbivores.

bridge to guide animals to the crossing location. The structure will be supported by seat type abutments founded on cast-in-drilled-hole (CIDH) concrete piles with CIP fascia walls.

To ensure effective use of existing bridge undercrossings, culverts, and the overpass/land bridge, and to promote motorist safety by preventing wildlife vehicle collisions, wildlife fencing (6.5 to 8 feet in height) will be constructed on both sides of the widened roadway throughout the corridor where concrete retaining walls (>8 feet in height) that supersede the need for fencing are not present. Wildlife fencing is a critical element that funnels animals to the overpass/land bridge and/or through underpasses (bridges and culverts) where below-grade crossings are unaffected by vehicular traffic that otherwise presents a barrier to at-grade crossings.

While an essential element, there are several considerations for erecting fences along the roadway. There are multiple driveway access roads along the corridor requiring control measures to prevent animal breaches of wildlife fencing. Control measures at these locations may include cattle guards/grates, swinging metal gates, or electrified mats imbedded into the pavement which safely deter wildlife entry. To address breaches of wildlife fencing, wildlife "jump-outs"/escape ramps will be provided to facilitate escape. Cost-effective and maintenance-free jump-outs (5.5−6 feet above the outside terrain) will be integrated at suitable retaining walls and bridge abutments. In order to provide at least two escape points (one on each side of the road) spaced along each 0.5 mile of roadway, engineered escape ramps will be integrated with fencing to provide elevated escapes where retaining walls and bridge abutments do not already provide for escape. The beginning and ending of the corridor and at Tonner Canyon Road as it approaches SR-57 will include fence termination designs at structural, topographic, or other barriers to minimize wildlife entry.

Construction Schedule and General Activity

The Project is anticipated to be divided into two phases:

1. Phase I will include utility relocations, the infrastructure necessary for utility companies to relocate their utilities, wildlife overpass/land bridge, bridge replacement, retaining walls, associated temporary transition pavement, and associated grading; and

2. Phase II will include the widening of the road, the three intersections at Canyon Country Road, 1,200 feet north of Canyon Country Road, and at Tonner Canyon Road along with other associated roadway features.

Construction is expected to last approximately 5 years and is anticipated to begin in the year 2026.

The normal hours of construction for the Project would be between 7:00 am and 7:00 pm, Monday through Saturday, consistent with the City of Brea Municipal Code, which does not regulate noise from construction activities that are limited to these daytime hours. However, due to bridge replacement-related work construction will require periodic full closure of Brea Boulevard from north of Canyon Country Road to Tonner Canyon Road from Friday at 8:00 pm to Monday at 5:00 am. During these times (up to a maximum

26 weekends with the full roadway closure), construction crews will work extended hours, night shifts, and weekends.

During night shifts and extended hours, construction lighting will be required. Access will remain for emergency responders and oil field operators.

A construction crew of approximately 40 construction workers (daily) will be in the project area during construction. For safety purposes, a temporary fence will be installed to secure the construction site and restrict public access while maintaining vehicular access to Brea Boulevard.

VEGETATION COMMUNITIES

For the approximately 17 acres of riparian habitat and streambeds mapped within the study area, only 0.85 acre and 0.44 acre may be affected by temporary and permanent impacts, respectively. Table 11 shows potential impacts to vegetation communities.

Table 11. Potential Impacts to Mapped Vegetation Communities

Vegetation Communities/ Land Cover Types	Acres within Study Area (500-foot Buffer)	Permanent Impacts (acres)	Temporary Impacts (acres)
Natural Vegetation Communities			
Blue Elderberry Stands	1.27	0.07	0.04
Blue Elderberry - Toyon	8.34	0.30	0.81
California Walnut Groves	0.88	0	0
California Walnut - Laurel Sumac	6.58	0.27	0.49
Coast Live Oak Woodland	8.09	1.19	1.17
Disturbed Coastal Sage Scrub	20.87	0.06	0.81
Poison Oak Scrub	1.35	0	0
Toyon - Laurel Sumac	6.09	0	0
Subtotal	***53.47***	***1.89***	***3.32***
Non-Native Vegetation Communities			
Eucalyptus Groves	9.18	0.71	0.83
Ornamental–Landscape Plants	9.68	0.02	0.37
Pepper Tree Groves	33.67	1.46	2.04
Ruderal	3.73	0.33	0.67
Tree of Heaven Groves	0.50	0.03	0.13
Upland Mustards and Ruderal Forbs	28.56	0.38	0.89
Subtotal	***85.32***	***2.93***	***4.93***

Vegetation Communities/ Land Cover Types	Acres within Study Area (500-foot Buffer)	Permanent Impacts (acres)	Temporary Impacts (acres)
Aquatic and Riparian Communities			
Arroyo Willow Thickets	4.84	0.24	0.50
Black Willow Thickets	8.70	0.13	0.30
Coast Live Oak Riparian Forest	0.43	0.07	0.05
Unvegetated Channel	3.46	0	0
Subtotal	***17.43***	***0.44***	***0.85***
Land Cover Types			
Developed	76.54	3.99	5.88
Disturbed	35.61	1.82	2.84
Subtotal	***112.15***	***5.81***	***8.72***
TOTALS	**268.38**	**11.07**	**17.82**

USACE

Potential Impacts

The Project will temporarily impact approximately 0.31 acre of WoUS and approximately 0.15 acre of permanent impacts to WoUS. Table 12 presents the proposed impacts by water type.

Table 12. Potential Impacts to Clean Water Act Waters

USACE/RWQCB	Study Area (Buffer)		Potential Temporary Impact[1]		Potential Permanent Impact[2]	
	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)
Unvegetated Waters						
Non-Wetland WoUS (Open Water Channel) - Brea Creek	2.14	10,798	0.22	489	0.14	221
Tonner Canyon Creek	0.14	772	0	0	0	0
Non-Wetland WoUS (Bridge 1)[3]	0.02	n/a	0.02	n/a	0	0
Non-Wetland WoUS (Bridge 2)[3]	0.03	n/a	0.03	n/a	0	0
Non-Wetland WoUS (Bridge 3)[3]	0.02	n/a	0.02	n/a	0	0
Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)	1.52	1,760	0	0	0	0
Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237	0	0	0	0

USACE/RWQCB	Study Area (Buffer)		Potential Temporary Impact[1]		Potential Permanent Impact[2]	
	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)
Non-Wetland WoUS (Unvegetated; Ephemeral Drainages)	0.16	3,398	0.02	531	0.01	133
Vegetated Waters						
Wetland WoUS	1.89	n/a	0	n/a	0	n/a
USACE/RWQCB Jurisdiction	**6.52**	**17,965**	**0.31**	**1,020**	**0.15**	**354**

[1] Temporary impact acreage values may be considered a worst-case scenario. It is probable that many of the direct but temporary impacts to Brea Creek could be avoided.
[2] Essentially all impacts for this project are temporary, and the bridge covering open water is assumed to not be a permanent impact, especially given that the channel bottom will change from being concrete-lined to soft bottom (for Bridges 2 and 3). A trace acreage of wetlands was located under the new, larger bridges. This could be considered a permanent loss, but due to the soft bottom and large bridge sizes, it is anticipated that any wetlands may persist with the presence of the proposed bridges.
[3] Because the bridges allow for water and wildlife to freely move under the bridges (no culverts), the area of waters under the bridges is part of the overall calculation of surface waters. Culverts are viewed as a disruption in surface water area and linear feet, and thus are not counted as surface waters (see Figures for depiction of culverts). See Table 12 for explanation of calculations for waters under bridges. The temporary impact numbers come from the "Temporary Impacts" column in Table 12.

Permitting Discussion

Per the analysis presented herein, proposed discharges of fill to Brea Creek would require authorization by USACE. Per the Los Angeles District's Final Regional Conditions that were issued for USACE's 2017 Nationwide Permit (NWP) Program, the Project may be authorized to proceed under NWP 14 for transportation activities.

Table 13. Assumptions for Calculation of Waters under Existing and Proposed Bridges

	Existing Bridge (Neutral) [1] (acres)	Temporary Impacts[2] (acres)	Increase Width[3] (acres)	Proposed Bridge[4] (acres)	Net Change in Water Under Bridge[5] (acres)
Bridge 1	0.02	-0.02	+0.07	0.11	+0.04
Bridge 2	0.03	-0.03	+0.08	0.14	+0.06
Bridge 3	0.02	-0.02	+0.12	0.16	+0.04
Total	**0.07**	**-0.07**	**+0.27**	**0.41**	**+0.14**

See Appendix C for supplemental figures and acreage assumptions for Bridges 1 through 3.
[1] The water under the existing bridges are considered "neutral," which refers to the fact that the area of waters calculated for existing conditions remains waters after construction; thus, this area is not considered either a loss or gain, hence neutral. This area is not considered in the calculation of net change in water surface area. In addition, the existing Bridges 2 and 3 are concrete-lined, box channels.
[2] Temporary impacts refers to the removal of the concrete-lined bottom under each bridge, and the additional cover due to the increase in proposed bridge size.
[3] OCPW supplied the following regarding the *wetted widths under bridges* (Existing → Proposed; numbers provide by OCPW and rounded to the nearest foot): Bridge 1: 22' → 53'; Bridge 2: 38' → 50'; Bridge 3: 24' → 49'. Although not depicted in this table, there were also changes to *linear feet (wetted lengths) of waters under bridges* (numbers from GIS and rounded to nearest foot): Bridge 1: 54' → 90' (+36 feet); Bridge 2: 30' → 90' (+60 feet); Bridge 3: 30' → 90' (+60 feet).

[4] The area for the proposed bridges is the sum of the first three columns of data in this table (existing, temporary impact, increased width).
[5] This column represents the increase in acreage of waters under the proposed bridges. In addition, the soft bottom of Brea Creek will be restored in the proposed condition for Bridges 2 and 3 (Bridge 1 remains soft bottom). Total area of waters under bridges changes from 0.07 acre (concrete bottom) to 0.41 acre (soft bottom), a change of +0.14 acre. This change is expected to increase the hydrologic connection under the bridges; current condition has some level of hydrologic disruption due to the concrete-lined, box channel.

RWQCB

Potential Impacts

The Project will temporarily impact approximately 0.31 acre of WoST under the purview of RWQCB, of which 0.05 acre is wetlands. The Project will have approximately 0.15-acre of permanent impacts to WoST under the purview of RWQCB. Table 12 shows the proposed impacts by water type. Figure 14 and 14A-D shows the Project impacts in relation to WoST in the study area.

Permitting Discussion

Proposed discharges of dredge or fill to the aquatic resources within the study area that are regulated under a RWQCB policy or the CWA would require a Water Quality Certification (WQC) issued by RWQCB. If proposed impacts qualify for authorization via an NWP, then an individual WQC would need to be obtained unless the applicable NWP has been pre-certified by the State.

If USACE determines through a formal AJD process or a PJD that the waters within the study area are non-jurisdictional under the CWA, and development of the Project is proposed, then RWQCB would regulate proposed discharges of fill under the State's Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2020). In this case, OCPW would need to obtain individual authorization from RWQCB, which would include Waste Discharge Requirements applicable to the Project.

CDFW

Impacts

The Project will temporarily impact approximately 0.90 acre and permanently impact approximately 0.50 acre of streambed/banks that would be subject to CFGC Sections 1600–1616. Table 14 shows the proposed impacts by water type. Figure 14 and 14A-D shows the Project impacts in relation to CDFW jurisdiction in the study area. All features overlap with USACE/RWQCB waters, except for CDFW-Only riparian habitat and the ephemeral drainages.

Table 14. Potential Impacts to Waters of the State and CDFW Streambed and Riparian Habitat

RWQCB (Water of the State)/ CDFW (Streambed & Riparian Habitat)	Study Area (Buffer)		Potential Temporary Impact[1]		Potential Permanent Impact[2]	
	(acres)	(linear feet)	(acres)	(linear feet)	(acres)	(linear feet)
Unvegetated Waters						
Brea Creek - Open Water Channel	2.14	10,798	0.22	489	0.14	221
Tonner Canyon Creek	0.14	772	0	0	0	0
CDFW Streambed (Bridge 1)[3]	0.02	n/a	0.02	36	0	0
CDFW Streambed (Bridge 2)[3]	0.03	n/a	0.03	60	0	0
CDFW Streambed (Bridge 3)[3]	0.02	n/a	0.02	60	0	0
CDFW Streambed (Unvegetated; Concrete-lined Box Channel)	1.52	1,760	0	0	0	0
CDFW Streambed (Unvegetated; Rip rap-lined Trapezoidal Channel)	0.60	1,237	0	0	0	0
CDFW Streambed (Unvegetated; Rip rap-lined Trapezoidal Banks)	1.09	n/a	0	0	0	0
RWQCB (WoST)/CDFW Streambed (Ephemeral Tributary Drainages)	0.16	3,398	0.02	531	0.01	133
Vegetated Waters						
CDFW Streambed Wetlands	1.89	n/a	0	n/a	0	n/a
CDFW-Only Riparian Habitat (adjacent to "Streambed Wetlands")	10.12	n/a	0.61	n/a	0.35	n/a
CDFW Jurisdiction	**17.73**	**17,965**	**0.90**	**1,176**	**0.50**	**354**

[1] Temporary impact acreage values may be considered a worst-case scenario. It is probable that many of the direct but temporary impacts to Brea Creek could be avoided.
[2] Essentially all impacts for this project are temporary, and the bridge covering open water is assumed to not be a permanent impact, especially given that the channel bottom will change from being concrete-lined to soft bottom (for Bridges 2 and 3). A trace acreage of wetlands was located under the new, larger bridges. This could be considered a permanent loss, but due to the soft bottom and large bridge sizes, it is anticipated that any wetlands may persist with the presence of the proposed bridges.
[3] Because the bridges allow for water and wildlife to freely move under the bridges (no culverts), the area of waters under the bridges is part of the overall calculation of surface waters. Culverts are viewed as a disruption in surface water area and linear feet, and thus are not counted as surface waters (see Figures for depiction of culverts). See Table 12 for explanation of calculations for waters under bridges. The temporary impact numbers come from the "Temporary Impacts" column in Table 12.

Permitting Discussion

Proposed impacts to the aquatic resources within the study area are regulated under CFGC Sections 1600–1616 and the Project would need to obtain a Streambed Alteration Agreement from CDFW.

AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

Avoidance and minimization measures are recommended as precautionary measures relevant to the protection of biological resources, and regulatory permits and mitigation measures would be required to

offset potentially significant adverse Project impacts. A reporting mechanism will be associated with the measures, upon coordination with the regulatory agencies, in order to document mitigation completion and performance. Potential impacts to waters will be avoided, minimized, and/or mitigated by incorporation of Project-specific mitigation measures.

The following standard best management practices (BMPs) would avoid and minimize Project-related impacts to biological resources in general, and which would serve to avoid and minimize potential effects from construction-related activities occurring adjacent to or near aquatic resources:

1. Prior to the initiation of construction, a qualified biologist (i.e., is familiar and experienced with the identification and life histories of wildlife and plant species in southern California) shall be identified and approved by OC Public Works to conduct biological surveys, monitor construction activities, and advise construction personnel of the potential biological issues associated with Project construction.

    a. The qualified biologist will be responsible for avoiding impacts to sensitive species to the fullest extent possible.

    b. The qualified biologist shall be present on a daily basis to monitor construction activities and support impact avoidance and minimization measures detailed in permits and approvals obtained for the Project.

    c. The qualified biologist shall attend weekly construction meetings and provide on-site direction for addressing habitat- or species-specific issues.

2. The qualified biologist shall present a Worker Environmental Awareness Program to all Project personnel discussing the biology of the habitats and species in the project area. Information about the distribution and habitat needs of any protected species that may be present, legal protections for those species, penalties for violations, and Project-specific protective measures will be included in the education program. Cards or fact sheets containing this information will be provided to all personnel and they will be required to sign a form stating they attended the program and understand the protective measures.

3. The qualified biologist shall ensure the project limits (including staging areas) are clearly delineated with fencing or other boundary markers prior to the start of construction. During construction, construction workers shall strictly limit their activities, vehicles, equipment, and construction materials to the designated project limits and staging areas.

4. The project limits shall be clearly marked on Project maps provided to the construction contractor(s) and areas outside of the project limits shall be designated as “environmentally sensitive areas.” A construction manager shall be present during all construction activities to ensure that work is limited to designated project limits.

5. During construction, the project limits shall be kept as clean of debris as possible to avoid attracting predators of sensitive wildlife. All food-related trash items shall be enclosed in sealed containers and removed daily from the construction work zone.

The following mitigation measures reduce potentially significant impacts to jurisdictional waters:

JD-1 Regulatory Permits for impacts to jurisdictional waters.

Prior to approval of the Project plans and specifications, OC Public Works shall obtain all applicable regulatory permits, including coverage under NWP 14 for Transportation projects from the USACE, a Water Quality Certification from RWQCB, and an LSAA from CDFW.

The Project will result in mostly temporary impacts, although some permanent impacts may occur. Regulatory permits obtained in coordination with the applicable regulatory agencies would include measures to mitigate all temporary and permanent impacts. Mitigation Measure JD-2 is included to illustrate examples of the options to mitigate for impacts associated with the Project.

JD-2 Examples of Mitigation Options for Temporary and Permanent Impacts

Regulatory permits obtained in coordination with the applicable regulatory agencies, as identified in JD-1, would include measures to mitigate all temporary and permanent impacts. Examples of the options to mitigate for impacts associated with the Project may include some combination of the following:

(1) Treatment of non-native, invasive plant species (castor bean, tree tobacco, etc.)

(2) On-site revegetation for temporary impacts to wetland/riparian vegetation

(3) Obtaining credits from the Soquel Mitigation Bank, located upstream of the Project within the headwaters of Tonner Creek for permanent impacts to wetland/riparian vegetation

This page intentionally left blank.

CONCLUSION

As presented above, the aquatic resource delineation and analysis of potential jurisdiction have led to the conclusion that Brea Creek and tributaries are aquatic resources that may be regulated by USACE, RWQCB and CDFW. All jurisdictional determinations presented in this report are based upon the best available knowledge and considered preliminary until concurrence from the resource agencies is received.

This page intentionally left blank.

REFERENCES

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley. 1,600p.

Calflora: Information on California plants for education, research and conservation, with data contributed by public and private institutions and individuals, including the Consortium of California Herbaria. [web application]. 2020. Berkeley, California: The Calflora Database [a non-profit organization]. http://www.calflora.org/.

California Department of Fish and Wildlife (CDFW). 2018a. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. State of California, The Resources Agency. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=18959&inline.

California Department of Fish and Wildlife (CDFW). 2018b. Natural Communities List Arranged Alphabetically by Life Form. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153398.

California Department of Fish and Wildlife (CDFW). 2018c. Sensitive Natural Communities Only by Life Form. 2018. https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=153609.

California Invasive Plant Council (Cal-IPC). 2020. California Invasive Plant Inventory Database. http://www.cal-ipc.org/paf.

California Native Plant Society Rare Plant Program (CNPS). 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-02). California Native Plant Society. Sacramento, CA. Accessed at http://www.rareplants.cnps.org.

California Native Plant Society (CNPS). 2020. A Manual of California Vegetation, Online Edition. Accessed online at http://www.cnps.org/cnps/vegetation/. Accessed through November 2017. California Native Plant Society, Sacramento, CA.

California Soil Research Lab (CSRL) and Agriculture and Natural Resources (UC-ANR). 2020. SoilWeb: An Online Soil Survey Browser. Soils application developed by CSRL (U.C. Davis) and UC-ANR, and collaboration with USDA NRCS. https://casoilresource.lawr.ucdavis.edu/gmap/.

California State Water Resources Control Board (SWRCB). 2020. *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State.* Adopted: April 2, 2019; effective: May 28, 2020. https://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.html.

California Wetland Monitoring Workgroup (CWMW). 2014. California Aquatic Resources Status and Trends Program: Mapping Methodology. Version 1.0. 123p. http://www.mywaterquality.ca.gov/monitoring_council/wetland_workgroup/docs/2014/ca_status_trends_mthdlgy_v1_final.pdf.

California Wetlands Portal. 2020. Wetlands Portal Habitat Definitions Website. http://www.californiawetlands.net/tracker/habitats#habitats-definitions.

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79/31. US Fish and Wildlife Service, Washington, 103 p.

Curtis, Katherine E. and Robert W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Wetland Regulatory Assistance Program, ERDC/CRREL TN-10-1. July. https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/UpdatedDatasheetforIDOHWM_ERDC_2010.pdf.

Deters, Jason. 2020. Antecedent Precipitation Tool (APT) - v1.0.3. Released on June 18, 2020. https://github.com/jDeters-USACE; https://github.com/jDeters-USACE/Antecedent-Precipitation-Tool/releases/tag/v1.0.3.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

Google Earth. 2020. Website and Software. Accessed at http://www.google.com/earth/.

Holland, R. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California (PDF). https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=75893.

Jepson Flora Project (JFP). 2020. Jepson eFlora, v.1.0. http://ucjeps.berkeley.edu/IJM.html.

Lefebvre, L., Lichvar, R., Curtis, K., and J. Gillrich. 2013. Channel classification across Arid West landscapes in Support of OHW Delineation. ERDC/CRREL TR-13-3. January. 50p.

Lichvar, R.W. and S.M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. ERDC/CRREL Technical Report 08-12. 84p. http://www.crrel.usace.army.mil/library/technicalreports/ERDC-CRREL-TR-08-12.pdf; https://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/FinalOHWMManual_2008.pdf.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. *Phytoneuron* 2016-30:1–17. Published 28 April 2016. ISSN 2153 733X. Available at http://www.phytoneuron.net/.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society, Sacramento. 1300 pp. Web Link: A Manual of California Vegetation, Second Edition. http://www.dfg.ca.gov/biogeodata/vegcamp/veg_manual.asp.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*. ERDC/EL TR-08-28. 133p. September. Available at http://www.usace.army.mil/CECW/Documents/cecwo/reg/trel08-28.pdf; http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/trel08-28.pdf.

U.S. Army Corps of Engineers (USACE). 2008. Regional supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ERDC/EL TR-08-28. 133p. September. http://www.usace.army.mil/CECW/Documents/cecwo/reg/trel08-28.pdf; http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/trel08-28.pdf.

U.S. Army Corps of Engineers (USACE), Department of Army, Department of Defense, and Environmental Protection Agency (USEPA). 2015. *Clean Water Rule: Definition of "Waters of the United States."* June.

U.S. Army Corps of Engineers (USACE). 2018. National Wetland Plant List (NWPL). http://wetland-plants.usace.army.mil/.

U.S. Army Corps of Engineers (USACE), Los Angeles District. 2020. *Navigable Waters in Los Angeles District.* https://www.spl.usace.army.mil/Missions/Regulatory/Jurisdictional-Determination/Navigable-Waterways/.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2014. National Hydric Soils List. Available at http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

USDA-NRCS. 2020. Web Soil Survey. http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

USDA-NRCS. 2018. Field Indicators of Hydric Soils in the United States, version 8.2.

USDA-NRCS. 2020. *AgACIS for Orange County*. October. Available at https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html.

U.S. Environmental Protection Agency (USEPA). 2008. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States & Carabell v. United States*, December 2.

U.S. Fish and Wildlife Service (USFWS). 2020. Website. National Wetlands Inventory – Wetlands On-Line Mapper. Accessed at https://www.fws.gov/wetlands/data/mapper.html.

U.S. Geological Survey (USGS). 2020. *National Hydrography Dataset*. Available at https://nhd.usgs.gov/. August.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2020a. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/; http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2020b. Official Soils Series Descriptions. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/geo/?cid=nrcs142p2_053587; https://soilseries.sc.egov.usda.gov/osdname.aspx; https://soilseries.sc.egov.usda.gov/OSD_Docs/A/ARIZO.html; https://casoilresource.lawr.ucdavis.edu/see/#ARIZO; https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

U.S Department of Agriculture, Natural Resources Conservation Service (USDA-NRCS). 2020c. National List of Hydric Soils. http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

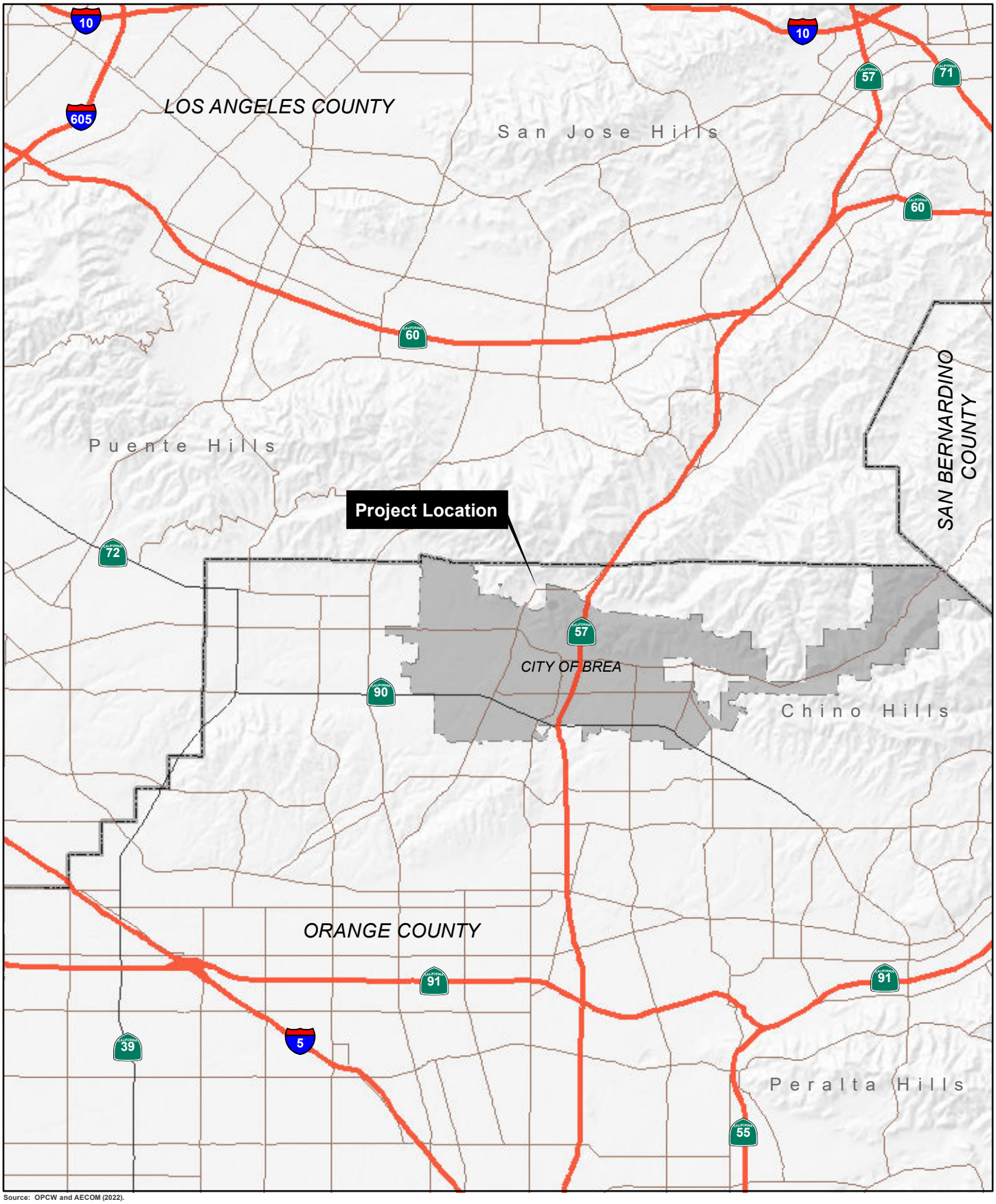
U.S. Geological Survey. 2020. National Hydrography Database.

U.S. Fish and Wildlife Service (USFWS). 2020. Website. National Wetlands Inventory- Wetlands On-Line Mapper. <URL: http://wetlandsfws.er.usgs.gov/wtlnds/launch.html; http://wetlandsfws.er.usgs.gov/NWI/codes.html.

Wohl, Ellen, Matthew K. Mersel, Aaron O. Allen, Ken M. Fritz, Steven L. Kichefski, Robert W. Lichvar, Tracie-Lynn Nadeau, Brian J. Topping, Patrick H. Trier, and Forrest B. Vanderbilt. December 2016. Synthesizing the Scientific Foundation for Ordinary High Water Mark Delineation in Fluvial Systems. ERDC/CRREL SR-16-5. 217p.

APPENDIX A

FIGURES

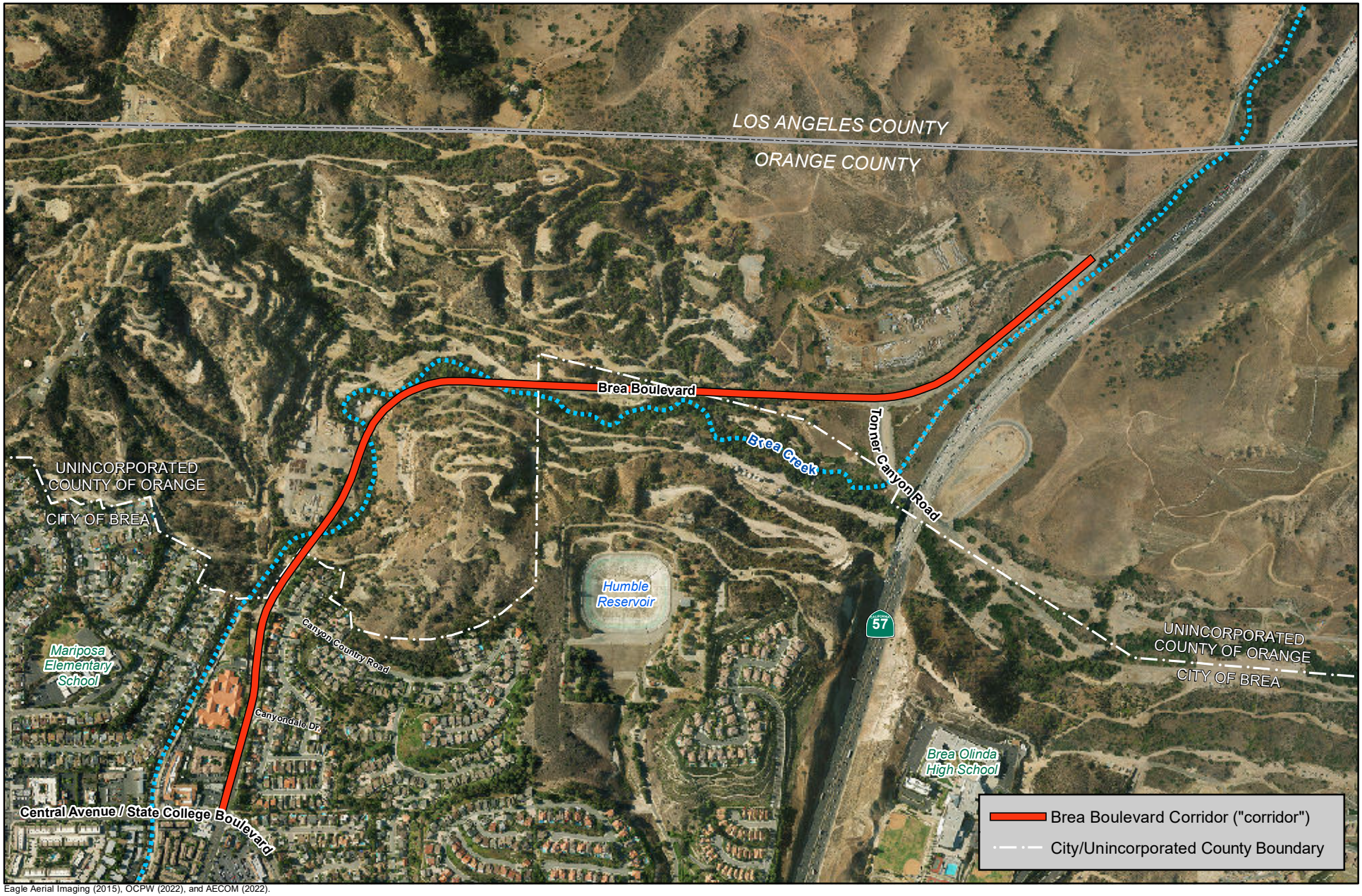


Source: OPCW and AECOM (2022).

Scale 1 : 126720
1" = 2 miles

0 1 2 4 Miles

Figure 1
Regional Map

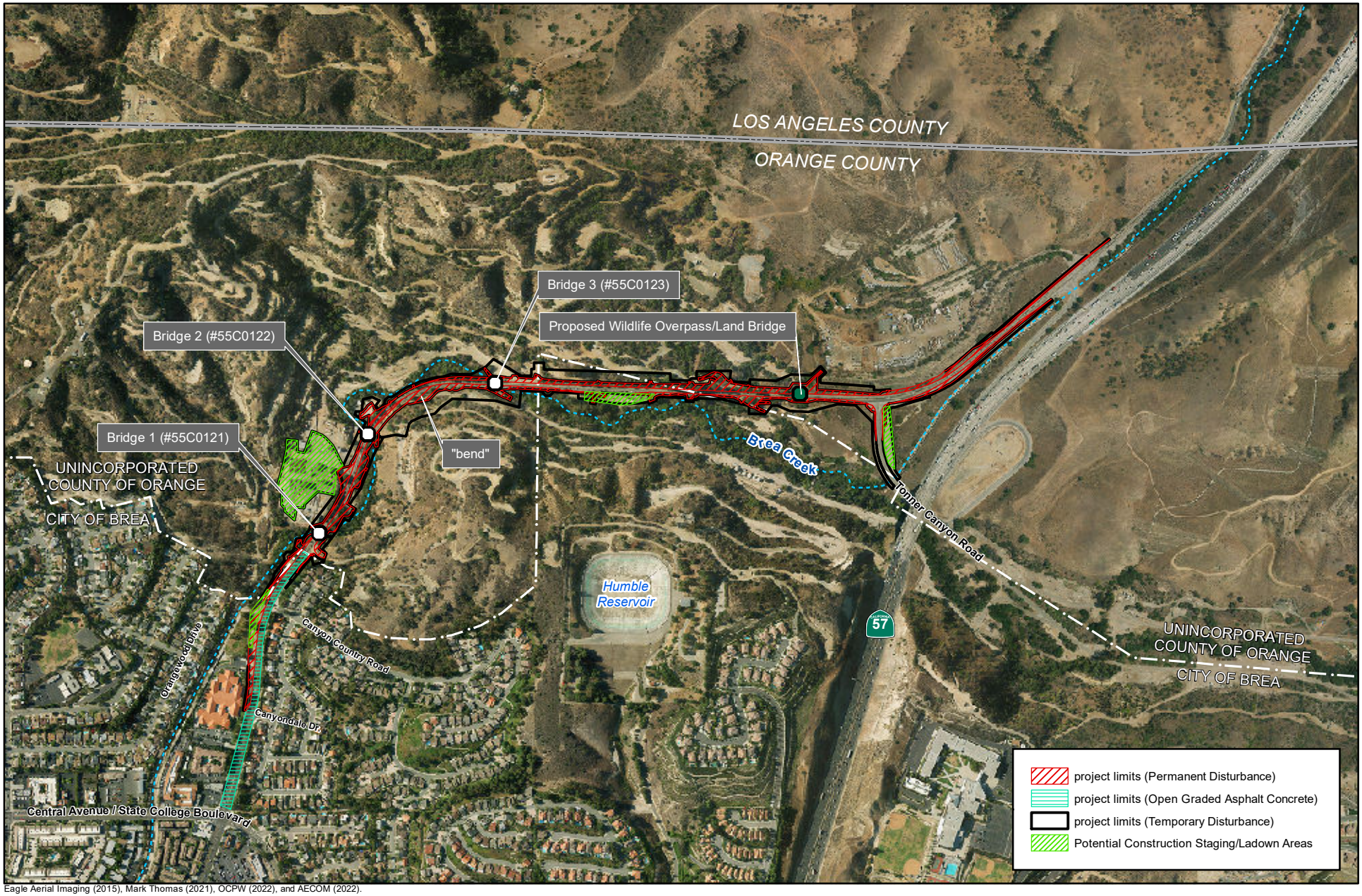


Eagle Aerial Imaging (2015), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 2
Vicinity Map

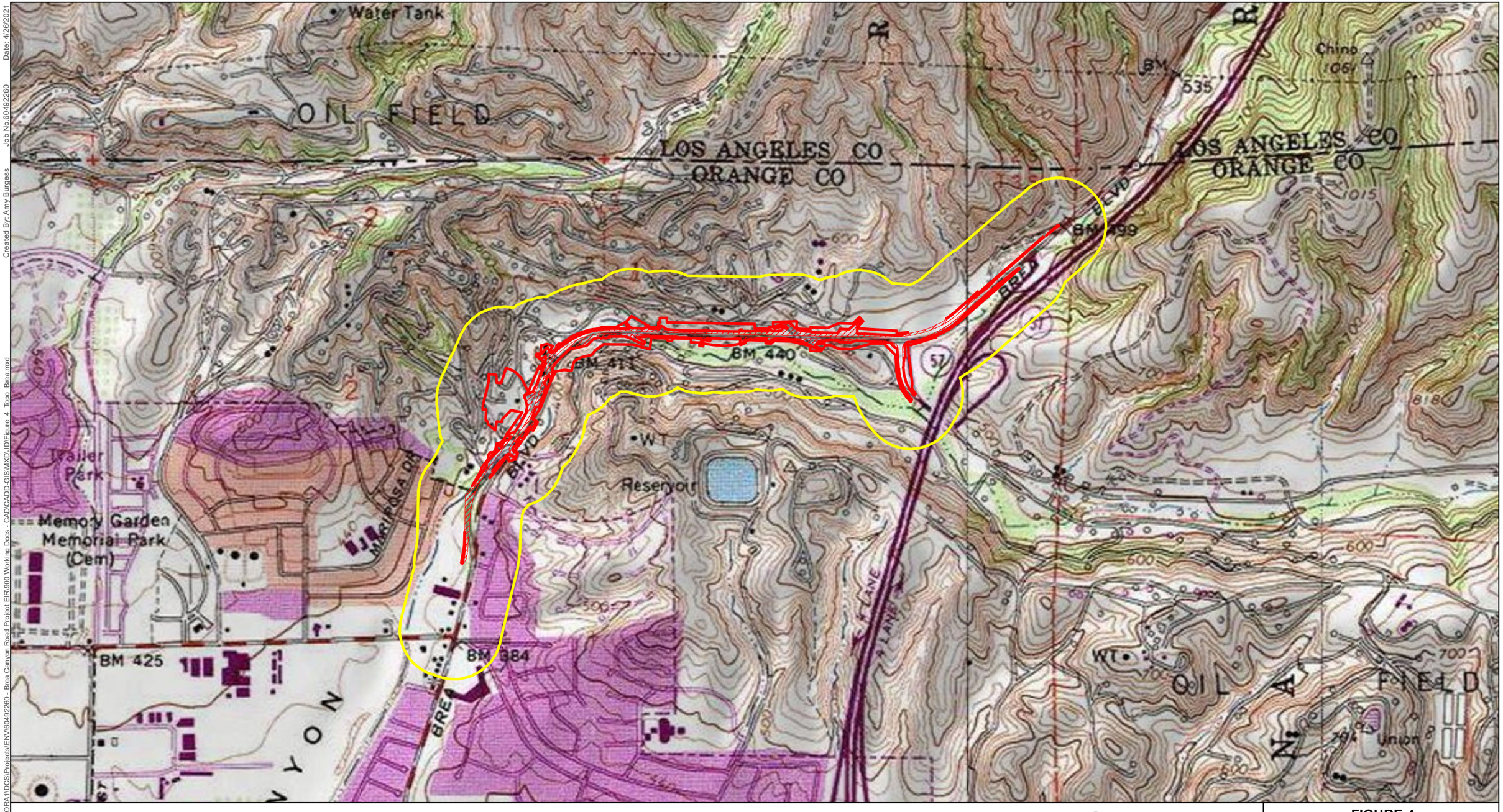


Eagle Aerial Imaging (2015), Mark Thomas (2021), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 3
Proposed Project



Legend

- Permanent Disturbance
- Temporary Disturbance
- 500 ft Disturbance Buffer

0 1,000 2,000 Feet

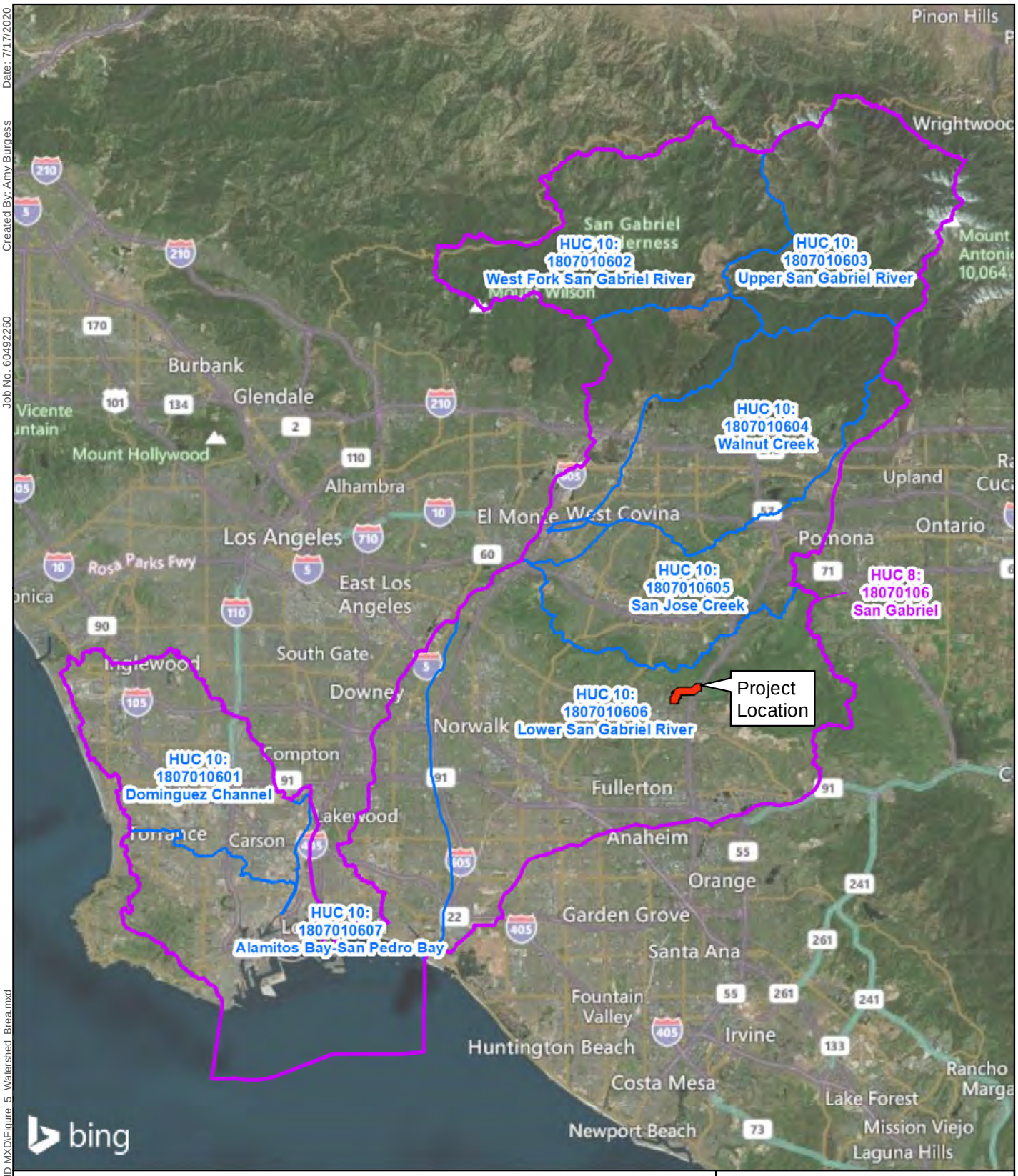
Base Map Source:
ESRI, ArcGIS Online - USA Topo Map
USGS 7.5' Quadrangles La Habra and Yorba Linda, CA

FIGURE 4
USGS TOPOGRAPHIC QUADRANGLES

Brea Boulevard Corridor Improvement Project

AECOM

Date: 4/26/2021
Job No:60492260
Created By: Amy Burgess
\\na.aecomnet.com\lfs\AMER\Orange-USOPA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\JD\Figure 4_Topo_Brea.mxd



Legend

- Project Location
- Watershed Boundary HUC 8
- Watershed Boundary HUC 10

0 5 10 Miles

Base Map Source:
ESRI, ArcGIS Online
Bing Map Hybrid

FIGURE 5
WATERSHED MAP

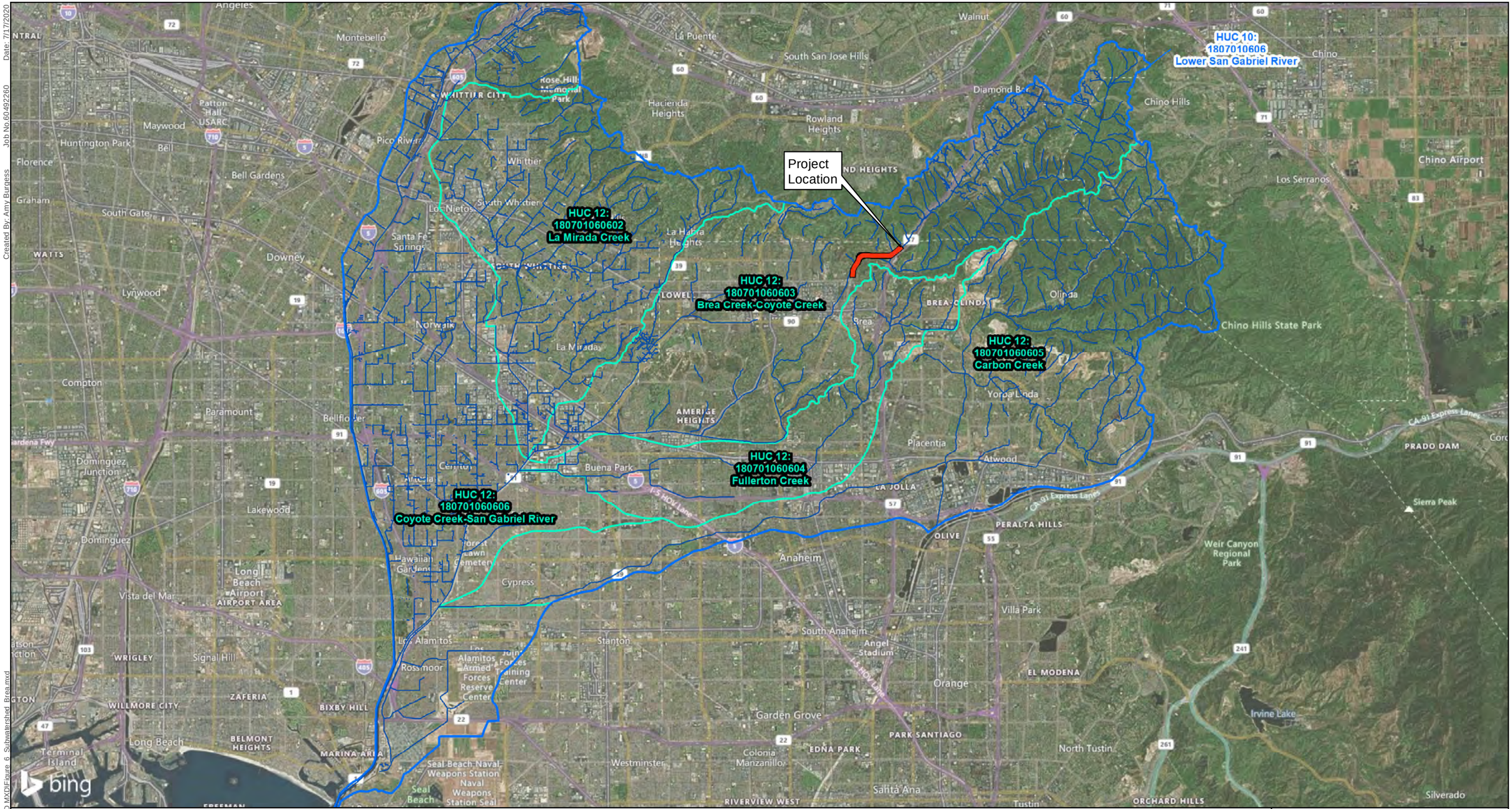
Brea Boulevard Corridor Improvement Project

AECOM

Date: 7/17/2020
Created By: Amy Burgess
Job No. 60492260
C:\Users\stevensona1\Desktop\Brea\New JD MXD\Figure 5 Watershed Brea.mxd

This page intentionally left blank.

Date: 7/17/2020
Job No.60492260
Created By: Amy Burgess



Legend

- Project Location
- Watershed Boundary HUC 10
- Subwatershed Boundary HUC 12
- National Hydrography Dataset

0 11,000 22,000 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

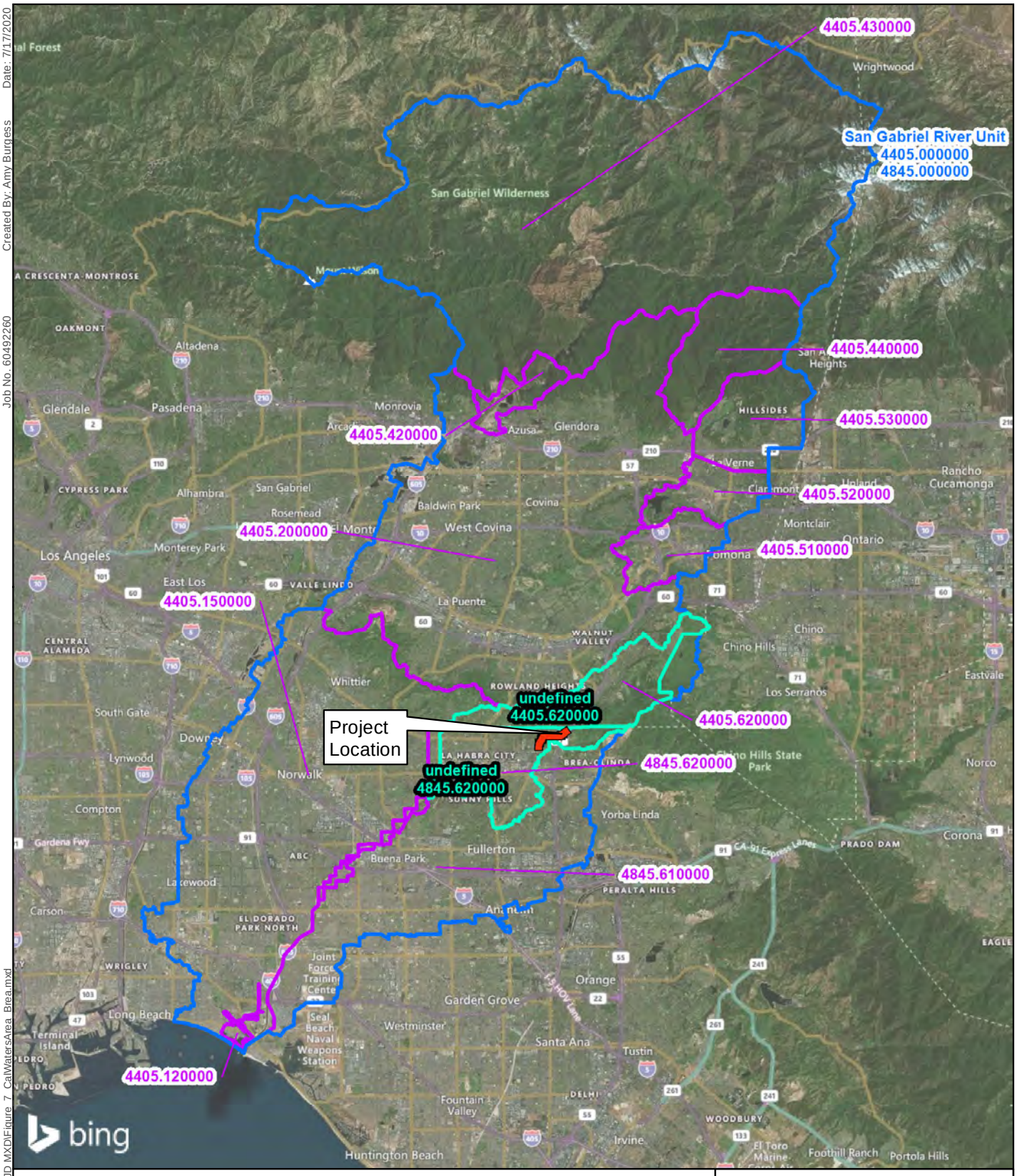
FIGURE 6
SUBWATERSHED MAP

Brea Boulevard Corridor Improvement Project

AECOM

C:\Users\stevensona1\Desktop\Brea\New JD MXD\Figure_6_Subwatershed_Brea.mxd

This page intentionally left blank.



Legend

- Project Location
- Hydrologic Sub-Area
- Hydrologic Area
- Hydrologic Unit

0 2.5 5 Miles

Base Map Source:
ESRI, ArcGIS Online
Bing Map Hybrid

FIGURE 7
CALWATERS HYDROLOGIC AREA MAP

Brea Boulevard Corridor Improvement Project

AECOM

Date: 7/17/2020
Created By: Amy Burgess
Job No. 60492260
C:\Users\stevensona1\Desktop\BreaNew JD MXD\Figure_7_CalWatersArea_Brea.mxd

This page intentionally left blank.

Date: 7/17/2020
Job No.60492260
Created By: Amy Burgess

Project Location

4405.150000
undefined 4405.620000
4405.620000
4845.620000
undefined 4845.620000
4845.610000
4405.120000

Legend

- Project Location
- Hydrologic Sub-Area
- Hydrologic Area
- National Hydrography Dataset

0 11,000 22,000 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

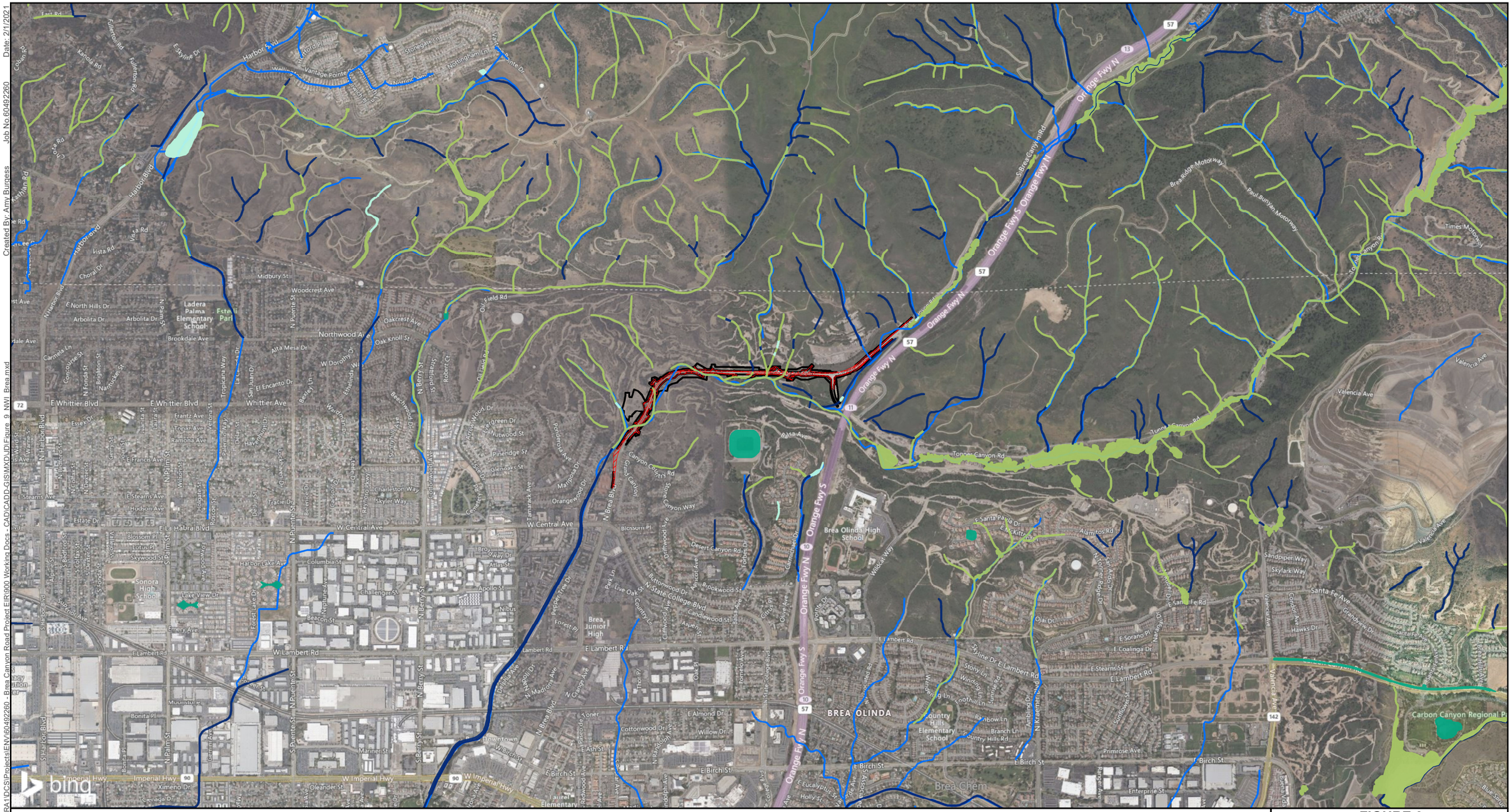
FIGURE 8
CALWATERS HYDROLOGIC SUBAREA MAP

Brea Boulevard Corridor Improvement Project

AECOM

C:\Users\stevensora1\Desktop\BreaNew JD MXD\Figure_8_CalWatersSubArea_Brea.mxd

Date: 2/1/2021
Job No 60492260
Created By: Amy Burgess
\\na.aecomnet.com\lfs\AMER\Orange-USORA1\DOS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\JD\Figure 9 NWI Brea.mxd



Legend

- Permanent Disturbance
- Temporary Disturbance

Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine
- National Hydrography Dataset

0 2,000 4,000 Feet

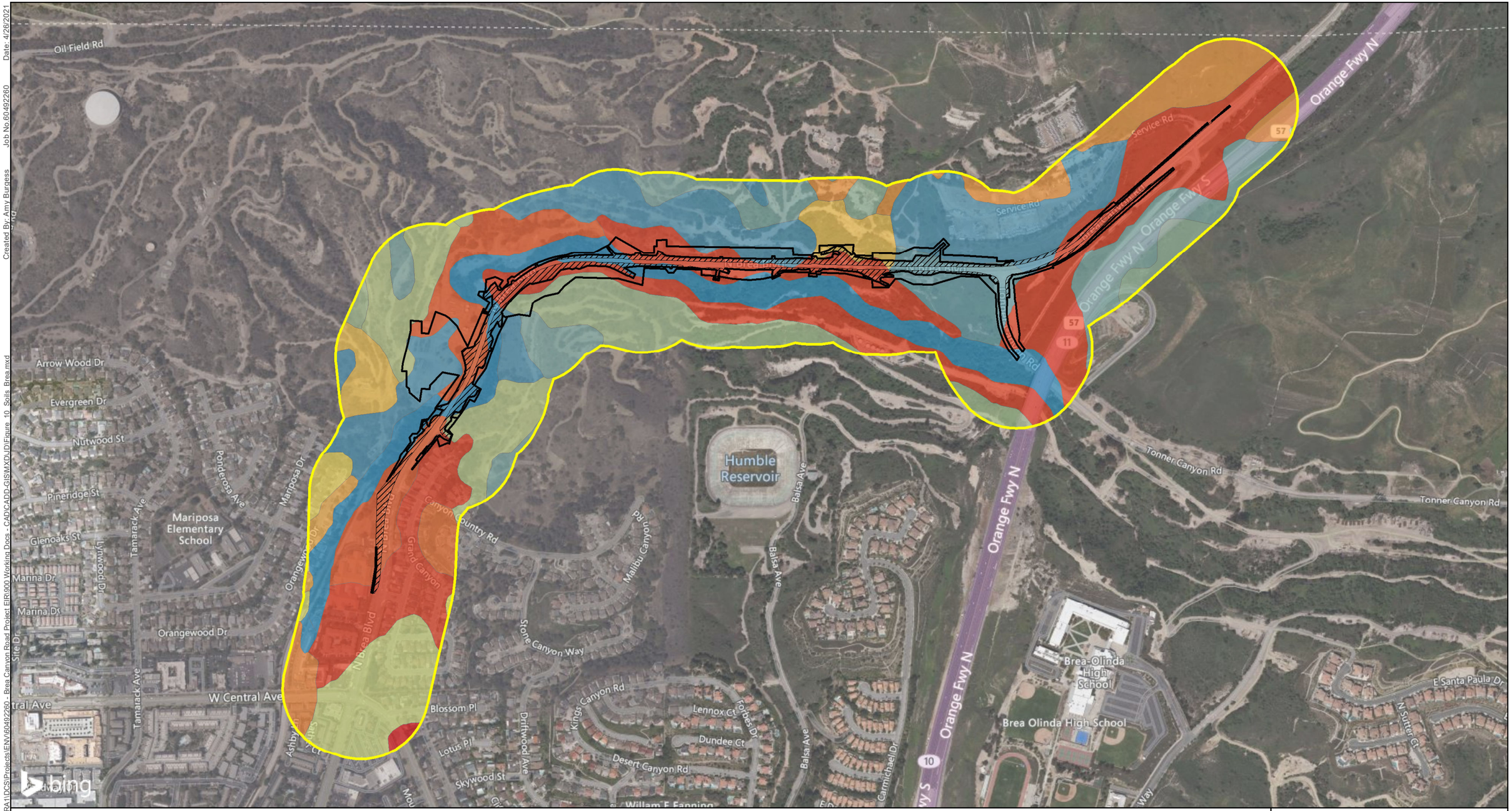
Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

FIGURE 9
NATIONAL WETLAND INVENTORY MAP

Brea Boulevard Corridor Improvement Project

AECOM

Date: 4/26/2021
Job No:60492260
Created By: Amy Burgess
\\na.aecomnet.com\lfs\AMER\Orange-US\ORA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\JD\Figure 10_Soils_Brea.mxd



Legend

- Permanent Disturbance
- Temporary Disturbance
- 500 ft Disturbance Buffer

Soils

- 101: Alo clay, 15 to 30 percent slopes
- 102: Alo clay, 30 to 50 percent slopes, warm MAAT, MLRA 20
- 110: Anaheim clay loam, 50 to 75 percent slopes
- 1141LA: Zaca-Apollo, warm complex, 20 to 55 percent slopes
- 134: Calleguas clay loam, 50 to 75 percent slopes, eroded
- 167: Mocho loam, 2 to 9 percent slopes, warm MAAT, MLRA 19
- 174: Myford sandy loam, 2 to 9 percent slopes, eroded
- 175: Myford sandy loam, 9 to 15 percent slopes
- 176: Myford sandy loam, 15 to 30 percent slopes
- 177: Myford sandy loam, 9 to 30 percent slopes, eroded
- 180: Nacimiento clay loam, 15 to 30 percent slopes, MLRA 20, warm MAAT
- 181: Nacimiento clay loam, 30 to 50 percent slopes, MLRA 20, warm MAAT
- 191: Riverwash
- 194: San Emigdio fine sandy loam, 0 to 2 percent slopes
- 195: San Emigdio fine sandy loam, 2 to 9 percent slopes
- 206: Sorrento loam, 0 to 2 percent slopes, warm MAAT, MLRA 19
- 209: Sorrento clay loam, 2 to 9 percent slopes, warm MAAT, MLRA 19
- 219: Xerorthents loamy, cut and fill areas, 9 to 15 percent slopes
- 220: Xerorthents loamy, cut and fill areas, 15 to 30 percent slopes

0 600 1,200 Feet

Base Map Source:
ESRI, ArcGIS Online
Bing Maps Hybrid

FIGURE 10
SOILS MAP

Brea Boulevard Corridor Improvement Project

AECOM

Los Angeles County

Orange County

Unincorporated County of Orange

EX-Bridge 3

EX-Bridge 2

EX-Bridge 1

Brea Creek

Brea Canyon Channel

Brea Boulevard

57

Brea Creek

Tonner Canyon Creek

Tonner Canyon Road

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP

- Biological Survey Area
- Existing Bridges
- City Boundary

Natural Vegetation Communities

- Blue Elderberry - Toyon
- Blue elderberry stands
- California Walnut - Laurel Sumac
- California walnut groves
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black willow thickets
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Land Cover Types

- Developed
- Disturbed

0 550

Feet

NORTH

Scale 1:6,600

1 inch = 550 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

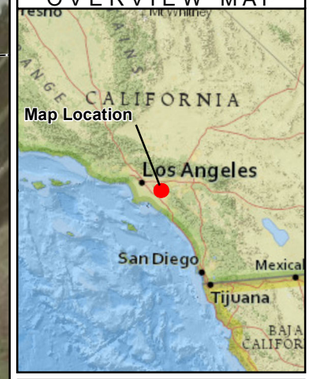
Date: 9/27/2022 Project: 60492260

AECOM

Figure 11

Los Angeles County
Orange County
Unincorporated County of Orange
Page b
Page c
Page d
Bridge 1
Bridge 2
Bridge 3
Brea Creek
Brea Canyon Channel
Tonner Canyon Creek
Tonner Canyon Road
57
Brea Boulevard
City of Brea

OVERVIEW MAP



Biological Survey Area
Existing Bridges
City Boundary
Map Index

Natural Vegetation Communities

Natural Vegetation Communities
- Blue Elderberry - Toyon
- Blue elderberry stands
- California Walnut - Laurel Sumac
- California walnut groves
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities
- Arroyo willow thickets
- Black willow thickets
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities
- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types
- Developed
- Disturbed

0 620
Feet
NORTH

Scale 1:7,500
1 inch = 625 feet

Brea Boulevard Corridor Improvement Project

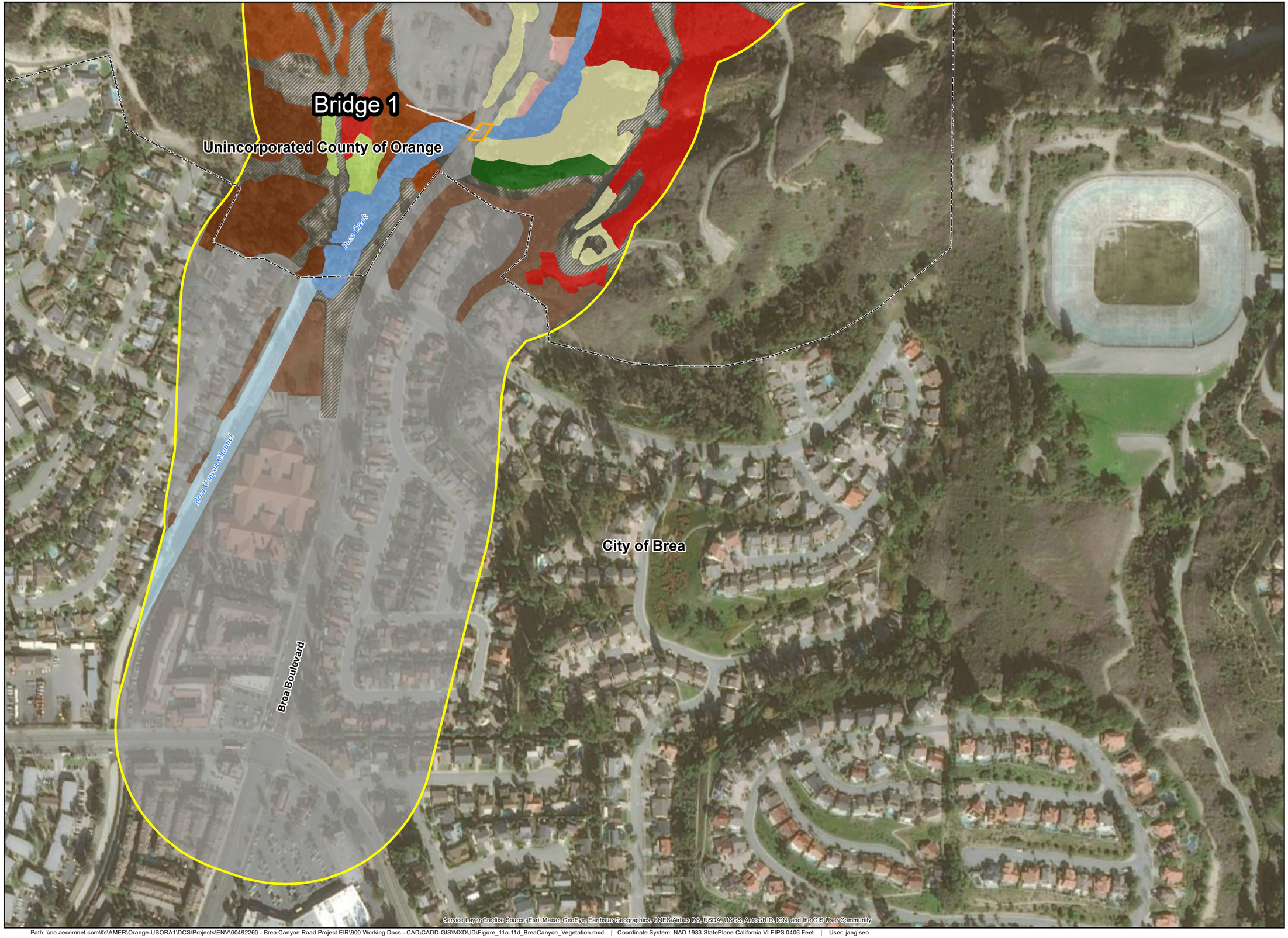
Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

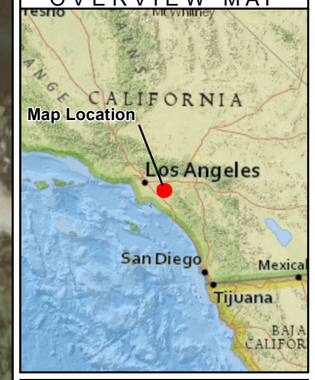
AECOM **Figure 11a**

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\JD\Figure_11a-11d_BreaCanyon_Vegetation.mxd | Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet | User: jang.seo



OVERVIEW MAP



- Biological Survey Area
- Existing Bridges
- City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue Elderberry - Toyon
- Blue elderberry stands
- California Walnut - Laurel Sumac
- Coast live oak woodland

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300
Feet

NORTH

Scale 1:3,600
1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 11b

Bridge 3

Unincorporated County of Orange

Bridge 2

Bridge 1

Brea Creek

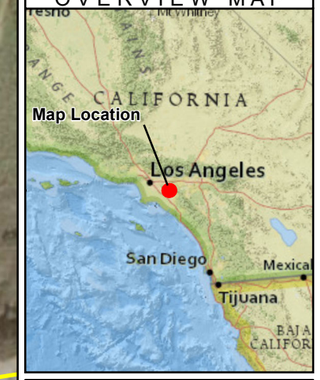
City of Brea

Brea Creek

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP



Biological Survey Area
Existing Bridges
City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue Elderberry - Toyon
- Blue elderberry stands
- California Walnut - Laurel Sumac
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black willow thickets
- Coast Live Oak Riparian Forest
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300
Feet

NORTH

Scale 1:3,600
1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 11c

Unincorporated County of Orange

City of Brea

Brea Creek

Brea Creek

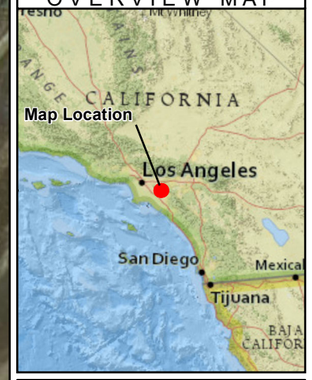
Tonner Canyon Creek

Tonner Canyon Road

57

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP



Biological Survey Area

City Boundary

Natural Vegetation Communities

Natural Vegetation Communities

- Blue Elderberry - Toyon
- California Walnut - Laurel Sumac
- California walnut groves
- Coast live oak woodland
- Disturbed Coastal Sage Scrub
- Poison oak scrub
- Toyon - Laurel Sumac

Aquatic and Riparian Communities

Aquatic and Riparian Communities

- Arroyo willow thickets
- Black willow thickets
- Unvegetated Channel

Non-Native Vegetation Communities

Non-Native Vegetation Communities

- Eucalyptus groves
- Ornamental–Landscape Plants
- Pepper tree groves
- Ruderal
- Tree of heaven groves
- Upland mustards and ruderal forbs

Land Cover Types

Land Cover Types

- Developed
- Disturbed

0 300

Feet

NORTH

Scale 1:3,600

1 inch = 300 feet

Brea Boulevard Corridor Improvement Project

Vegetation Communities (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 11d

Los Angeles County

Orange County

Unincorporated County of Orange

Bridge 3

Bridge 2

Bridge 1

Brea Creek

Brea Creek

Brea Creek

Brea Canyon Creek

Brea Canyon Channel

Brea Boulevard

Tonner Canyon Road

57

57

City of Brea

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP

500 ft Disturbance Buffer

City Boundary

Existing Bridges

Erosional Feature

Streambed / Ephemeral Drainage

Streambed / V-ditch

Underground Culvert

USACE/CDFW Non-Wetland WoUS (Open Water)

USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)

USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)

USACE/CDFW Wetland WoUS (Vegetated)

CDFW Only Streambed/Riparian Habitat

Non-Jurisdictional Pepper Grove

0 500

Feet

NORTH

Scale 1:6,400

1 inch = 533 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions)

Date: 9/27/2022 Project: 60492260

AECOM

Figure 12

Los Angeles County

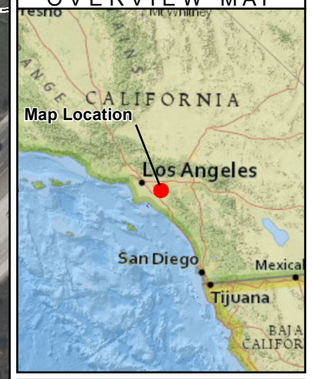
Orange County

Brea Creek

bing

Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS

OVERVIEW MAP



- 500 ft Disturbance Buffer
- City Boundary
- Existing Right of Way
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 200

Feet

NORTH

Scale 1:2,640

1 inch = 220 feet

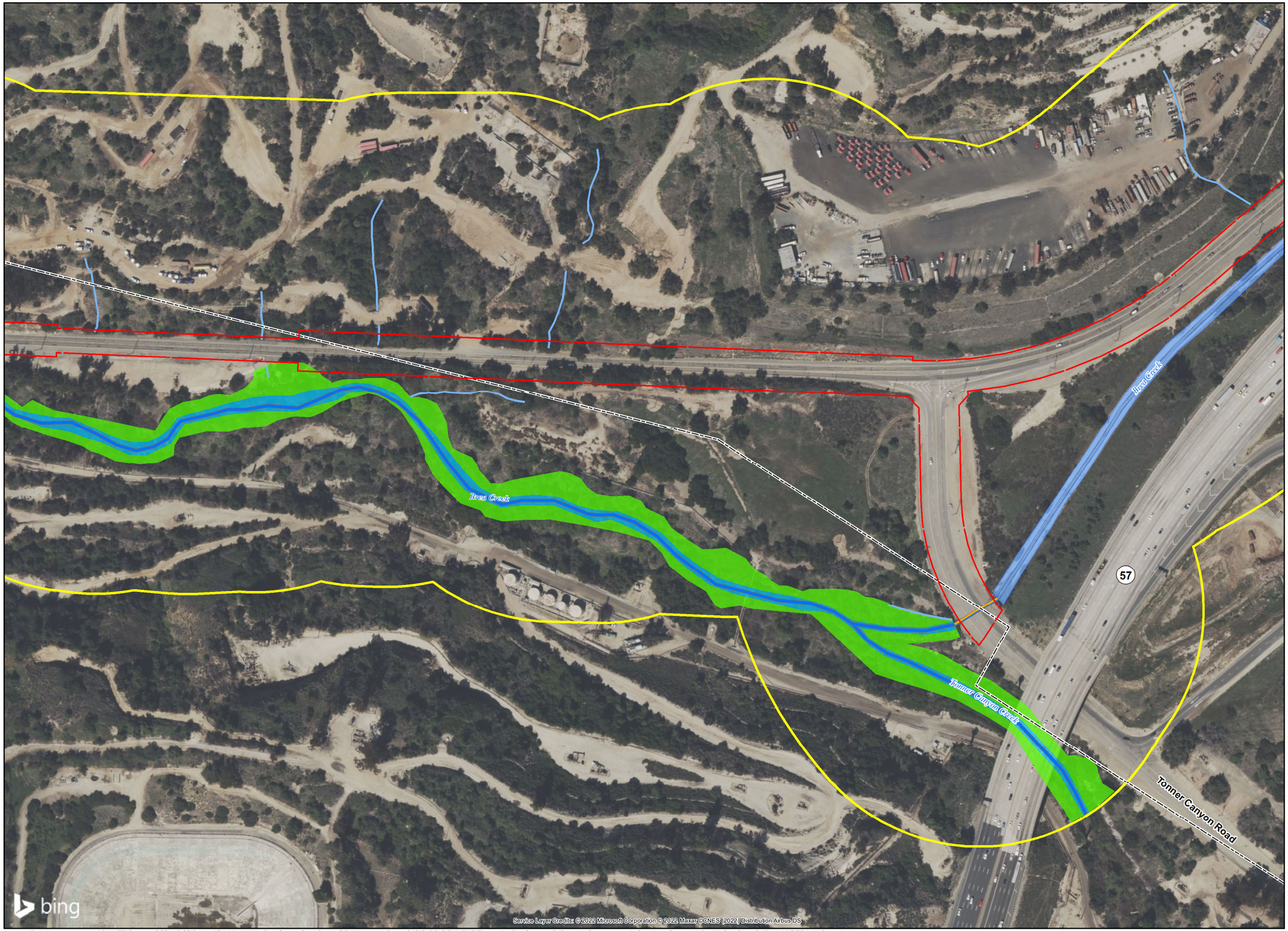
Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions) Closeup

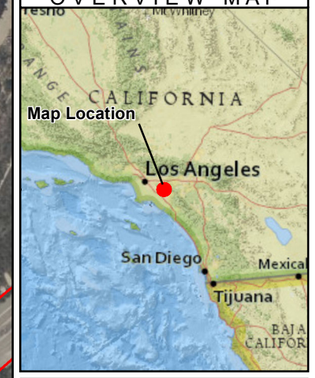
Date: 9/27/2022 Project: 60492260

AECOM

Figure 12-a



OVERVIEW MAP



- 500 ft Disturbance Buffer
- City Boundary
- Existing Right of Way
- Streambed / Ephemeral Drainage
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

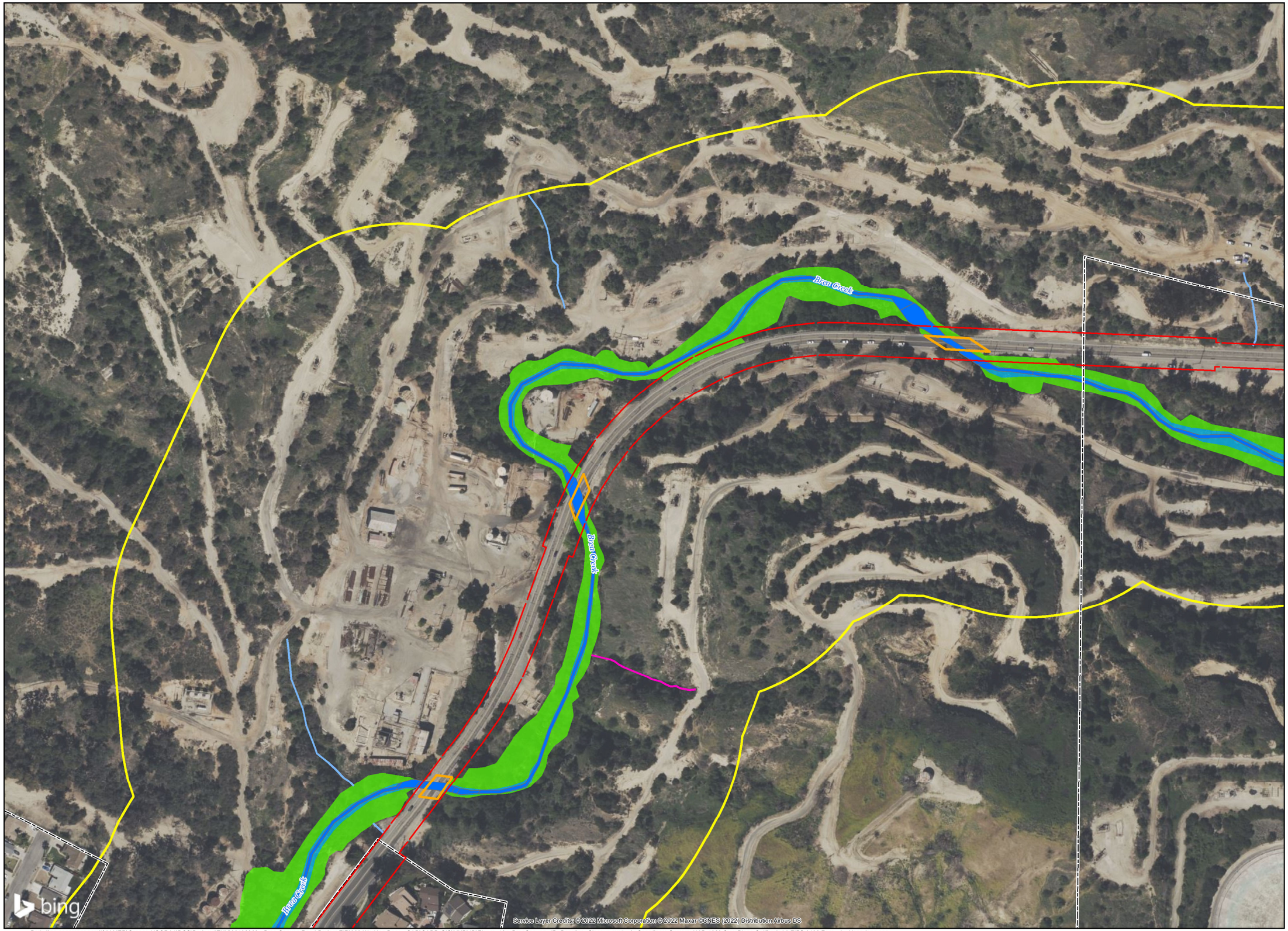
Scale 1:2,640
1 inch = 220 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions) Closeup

Date: 9/27/2022 Project: 60492260

AECOM **Figure 12-b**



OVERVIEW MAP

- 500 ft Disturbance Buffer
- City Boundary
- Existing Bridges
- Existing Right of Way
- Erosional Feature
- Streambed / Ephemeral Drainage
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:2,640
1 inch = 220 feet

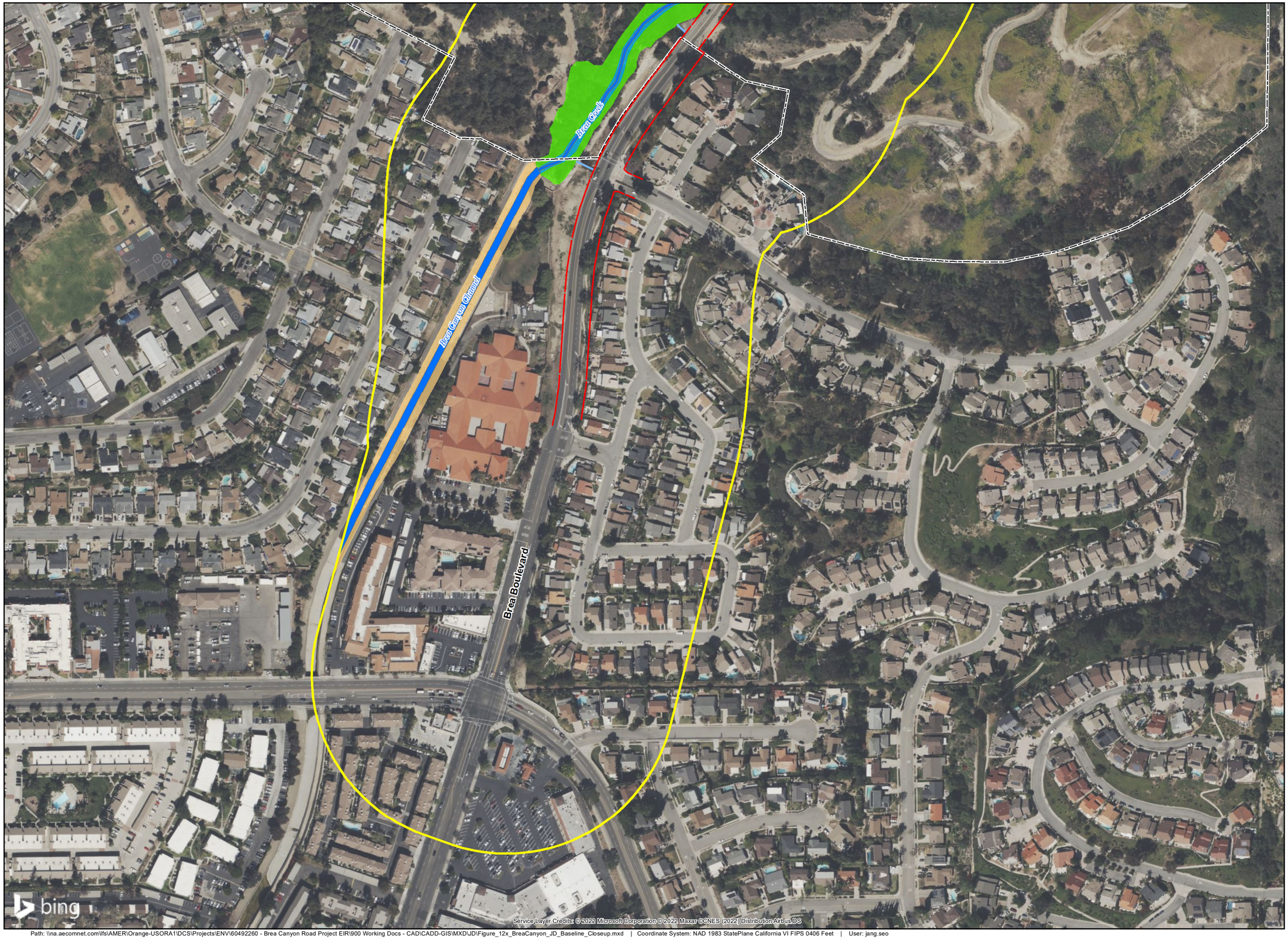
Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions) Closeup

Date: 9/27/2022 Project: 60492260

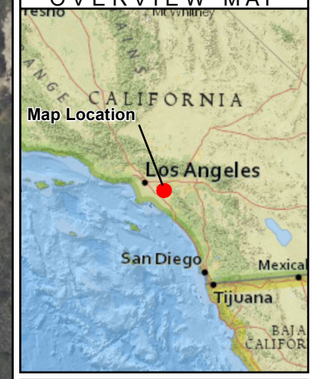
AECOM

Figure 12-c



Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS

OVERVIEW MAP



- 500 ft Disturbance Buffer
- City Boundary
- Existing Bridges
- Existing Right of Way
- Streambed / Ephemeral Drainage
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:3,150
1 inch = 263 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Existing Conditions) Closeup

Date: 9/27/2022 Project: 60492260

AECOM **Figure 12-d**

Los Angeles County
Orange County

Unincorporated County of Orange

Call-out 1
Call-out 2
Call-out 3

Brea Creek
Tonner Canyon Creek
Brea Canyon Channel
Tonner Canyon Road
Brea Boulevard
57

City of Brea

OVERVIEW MAP

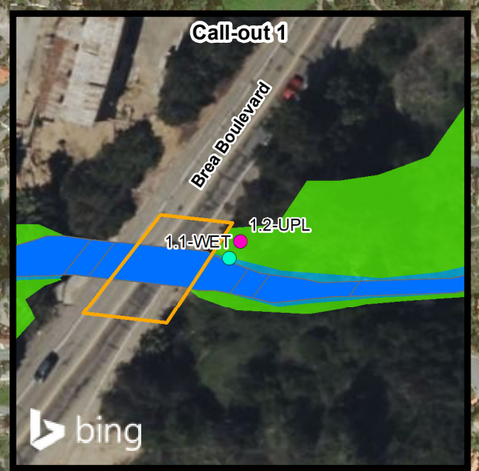
- Wetland
- Upland
- City Boundary
- 500 ft Disturbance Buffer
- Existing Bridges
- Erosional Feature
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 500
Feet

NORTH

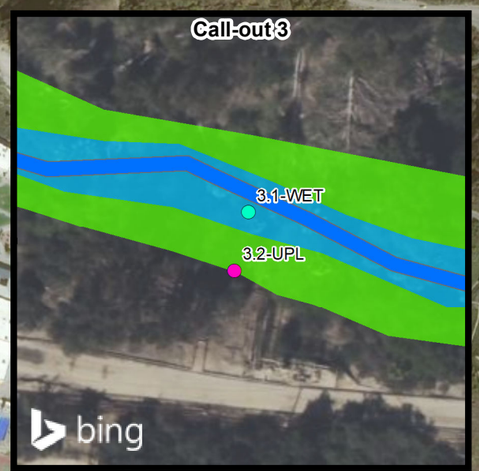
Scale 1:6,400
1 inch = 533 feet

Call-out 1



Call-out 2

Call-out 3



Brea Boulevard Corridor Improvement Project

Wetlands Data Points

Date: 9/27/2022 Project: 60492260

AECOM

Figure 13

Los Angeles County

Orange County

Unincorporated County of Orange

Bridge 3

Proposed Wildlife Overpass/ Land Bridge

Bridge 2

Bridge 1

Brea Creek

Brea Canyon Channel

Tonner Canyon Creek

Tonner Canyon Road

57

City of Brea

Brea Boulevard

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

OVERVIEW MAP

- 500 ft Disturbance Buffer
- City Boundary
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- Erosional Feature
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- USACE/CDFW Non-Wetland WoUS (Open Water)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 500 Feet

NORTH

Scale 1:6,600

1 inch = 550 feet

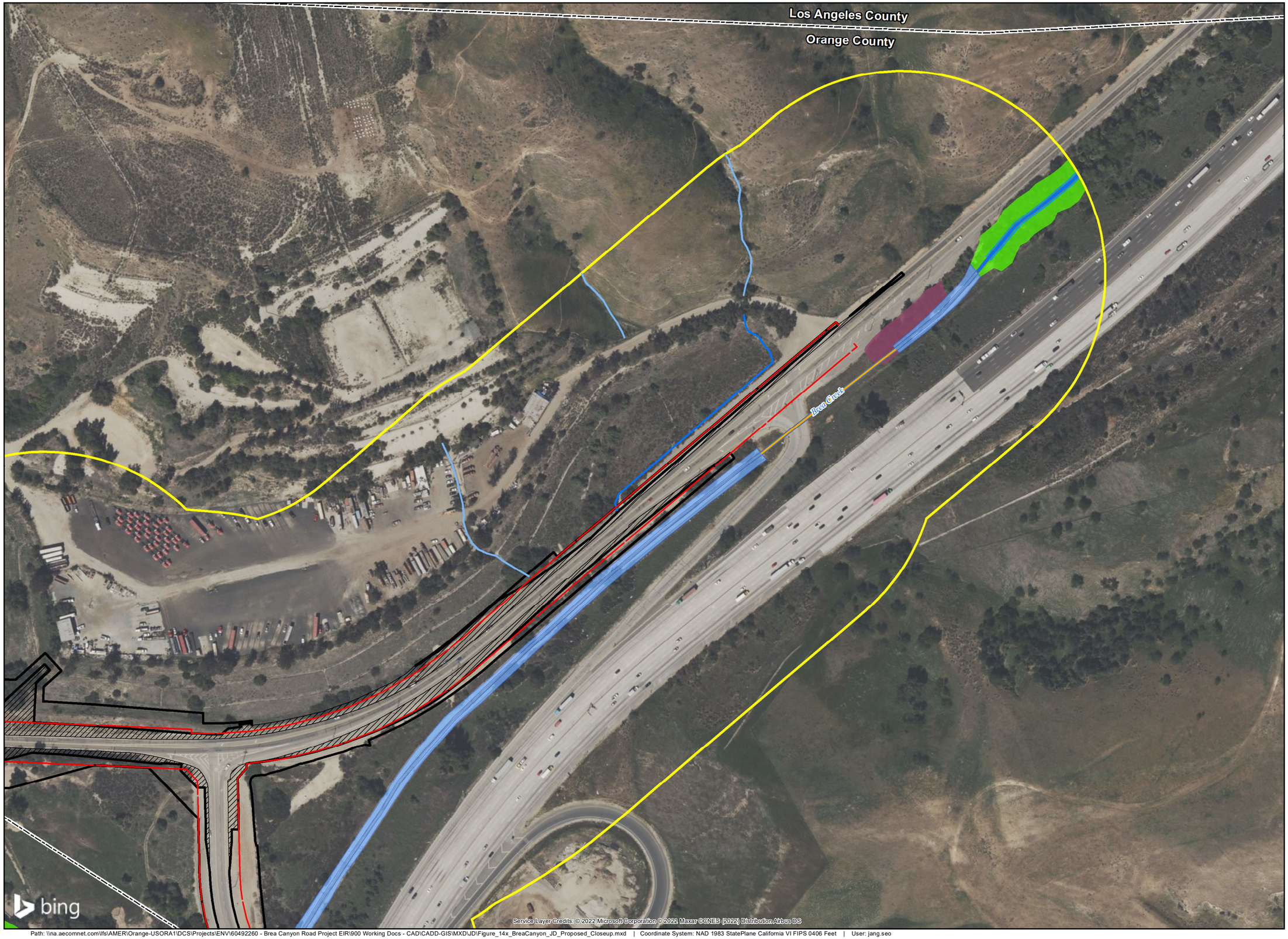
Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project)

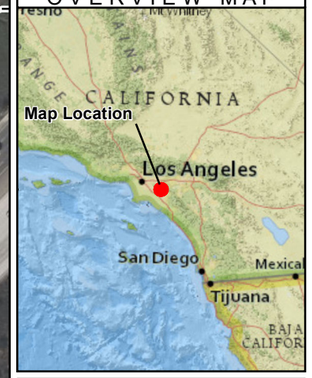
Date: 9/27/2022 Project: 60492260

AECOM

Figure 14



OVERVIEW MAP



- Existing Right of Way
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- City Boundary
- 500 ft Disturbance Buffer
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 200
Feet

NORTH

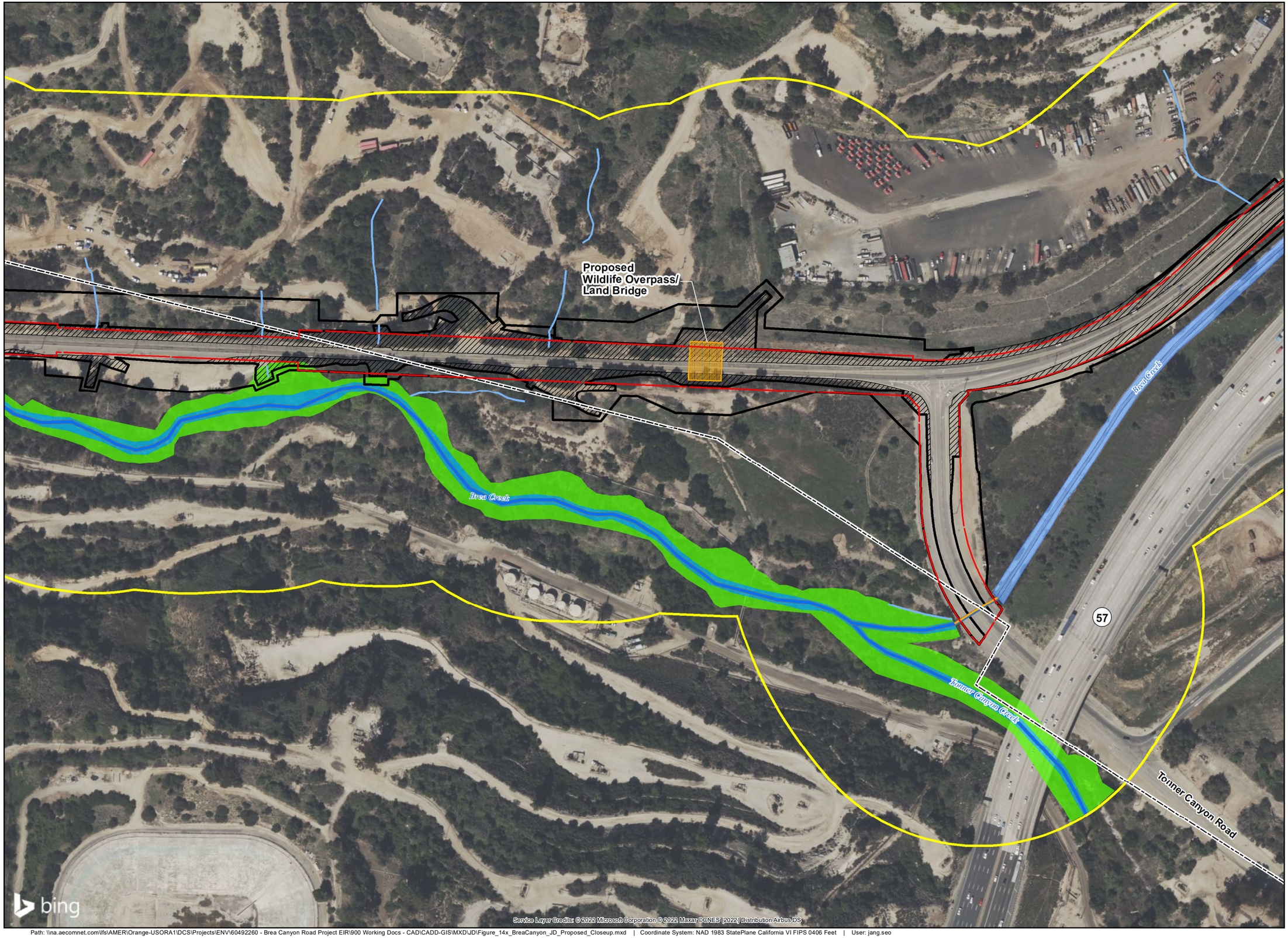
Scale 1:2,640
1 inch = 220 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/27/2022 Project: 60492260

AECOM **Figure 14-a**



OVERVIEW MAP

- Existing Right of Way
- Streambed / Ephemeral Drainage
- Underground Culvert
- City Boundary
- 500 ft Disturbance Buffer
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

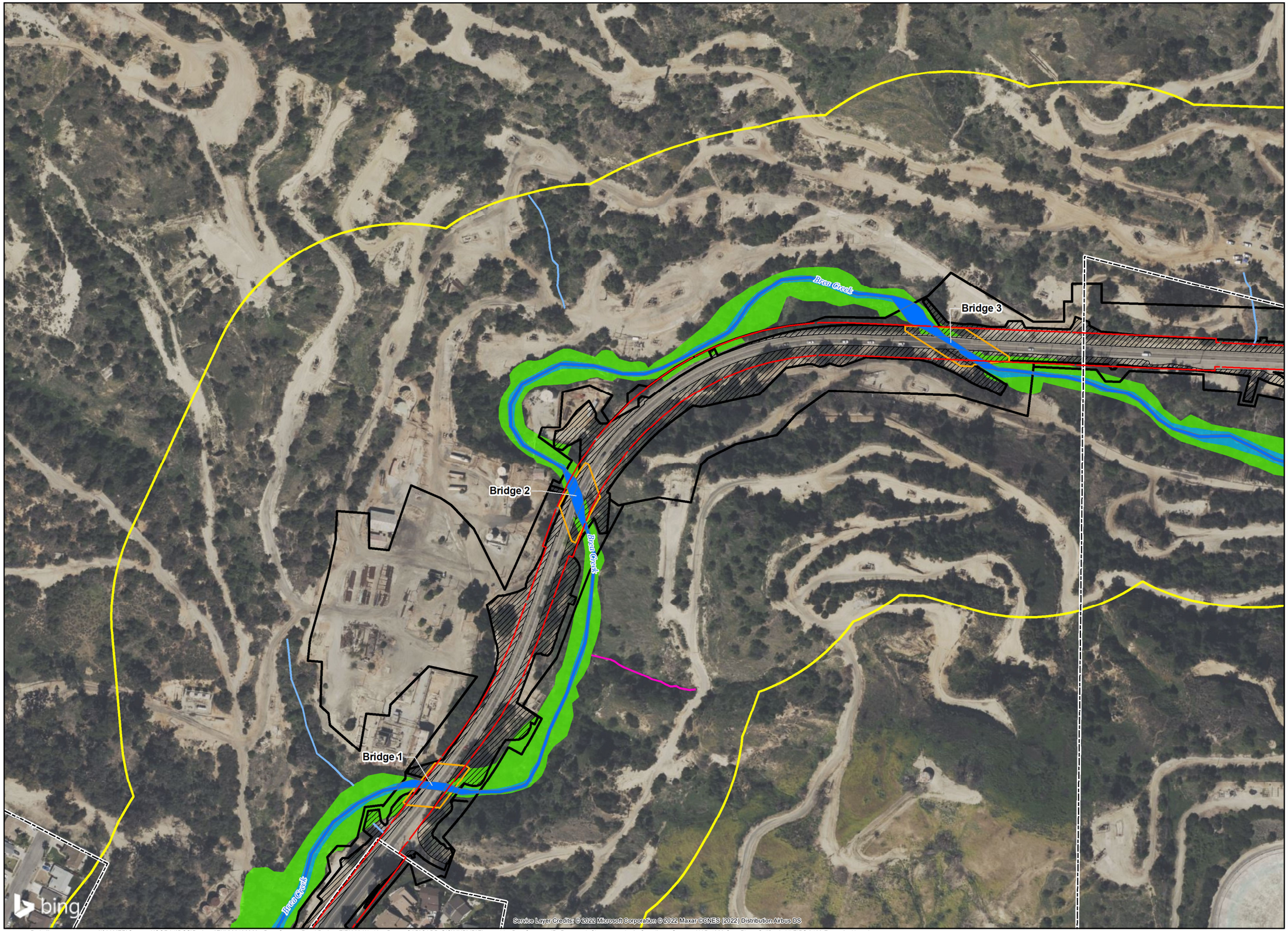
Scale 1:2,640
1 inch = 220 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

Date: 9/27/2022 Project: 60492260

AECOM **Figure 14-b**



OVERVIEW MAP

- Existing Right of Way
- Erosional Feature
- Streambed / Ephemeral Drainage
- City Boundary
- 500 ft Disturbance Buffer
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

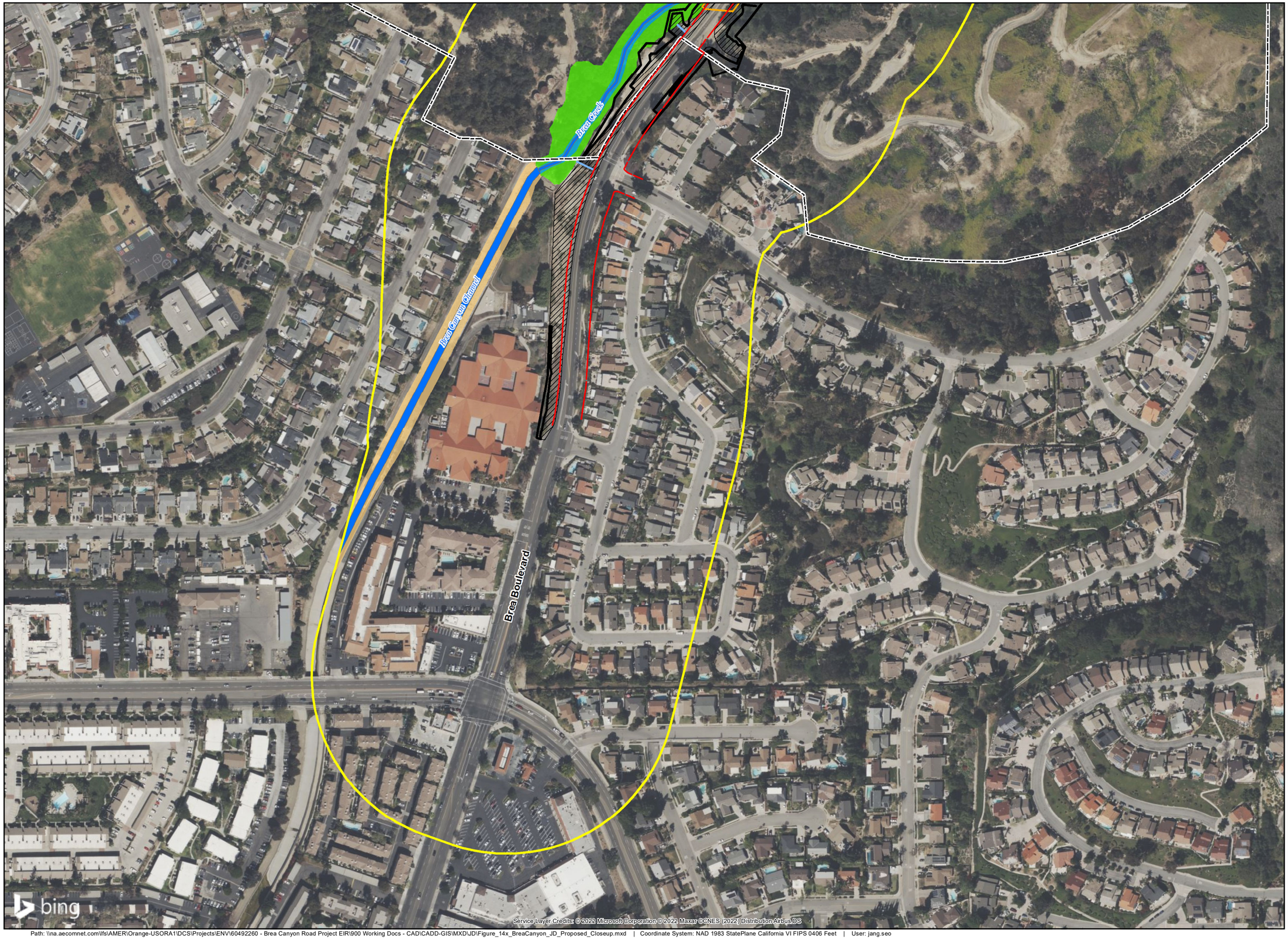
Scale 1:2,640
1 inch = 220 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

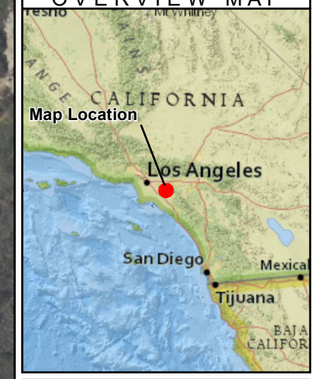
Date: 9/27/2022 Project: 60492260

AECOM **Figure 14-c**



Service Layer Credits: © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS

OVERVIEW MAP



- Existing Right of Way
- Streambed / Ephemeral Drainage
- City Boundary
- 500 ft Disturbance Buffer
- Proposed Bridges
- Permanent Disturbance
- Temporary Disturbance
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat

0 200
Feet

NORTH

Scale 1:3,150
1 inch = 263 feet

Brea Boulevard Corridor Improvement Project

Jurisdictional Delineation (Proposed Project) Closeup

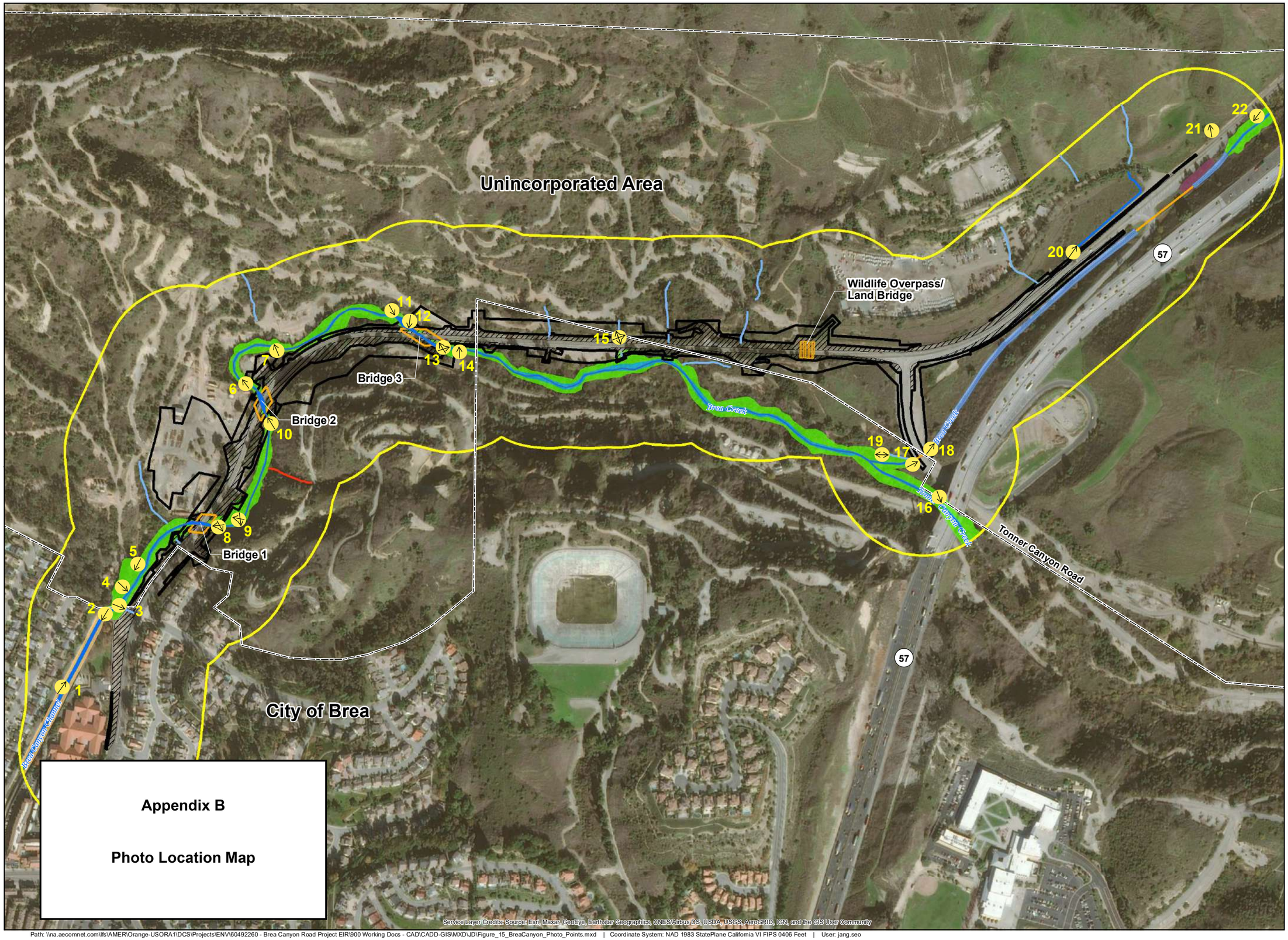
Date: 9/27/2022 Project: 60492260

AECOM **Figure 14-d**

This page intentionally left blank.

APPENDIX B

SITE PHOTOGRAPHS



Appendix B

Photo Location Map

OVERVIEW MAP

- City Boundary
- Erosional Feature
- Streambed / Ephemeral Drainage
- Streambed / V-ditch
- Underground Culvert
- 500 ft Disturbance Buffer
- Permanent Disturbance
- Temporary Disturbance
- Proposed Bridges
- Wildlife Overcrossing
- USACE/CDFW Non-Wetland WoUS (Open Water)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Concrete-lined Box Channel)
- USACE/CDFW Non-Wetland WoUS (Unvegetated; Rip rap-lined Trapazoidal Channel)
- USACE/CDFW Wetland WoUS (Vegetated)
- CDFW Only Streambed/Riparian Habitat
- Non-Jurisdictional Pepper Grove

0 500
Feet

NORTH

Scale 1:6,235
1 inch = 520 feet

Brea Boulevard Corridor Improvement Project

Photo Points

Date: 2/3/2021 Project: 60492260

AECOM

Figure 15

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60492260 - Brea Canyon Road Project EIR\900 Working Docs - CAD\CADD-GIS\MXD\JD\Figure_15_BreaCanyon_Photo_Points.mxd | Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet | User: jang.seo

This page intentionally left blank.

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No.	**Date:**
1, 2	[10/01/19]

Direction Photo Taken:

Upper: North

Lower: South

Description:

Figure 15.

Downstream of project area; within buffer.

Perennial trapezoidal channel (rip rap).

Photo No.	**Date:**
3, 4	[10/01/19]

Direction Photo Taken:

Upper: East

Lower: Southeast

Description:

Figure 15.

Downstream portion of project within/adjacent to Eucalyptus trees.

Upper: Culvert with perennial urban runoff (from adjacent residential area).

Lower: Perennial, soft-bottom channel.

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No.	**Date:**
5	[10/01/19]

Direction Photo Taken:

Southeast

Description:

Figure 15.

Downstream portion of project within/adjacent to Eucalyptus trees.

Perennial, soft-bottom channel with adjacent riparian habitat.

Photo No.	**Date:**
6	[10/01/19]

Direction Photo Taken:

Upper: West

Lower: Northwest

Description:

Figure 15.

Between Bridges 2 and 3.

Perennial, soft-bottom channel and riparian habitat.

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No. **7** | **Date:** [10/01/19]

Direction Photo Taken:

Upper: North

Lower: South

Description:

Figure 15.

Between Bridges 2 and 3.

Perennial, soft-bottom channel and riparian habitat.

Photo No. **8** | **Date:** [10/01/19]

Direction Photo Taken:

Upper: Southwest

Lower: Southeast

Description:

Figure 15.

Upstream side of Bridge 1.

Perennial, soft-bottom channel with adjacent wetlands and riparian habitat.

Lower: Wetland Sample Points 1.1 and 1.2 (left side of photograph).

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No.	**Date:**
9	[05/29/18]

Direction Photo Taken:

Upper: South

Lower: West

Description:

Figure 15.

Between Bridges 1 and 2.

Perennial, soft-bottom channel with adjacent wetlands and riparian habitat.

A homeless encampment is located within the riparian area, and disturbance has removed vegetation.

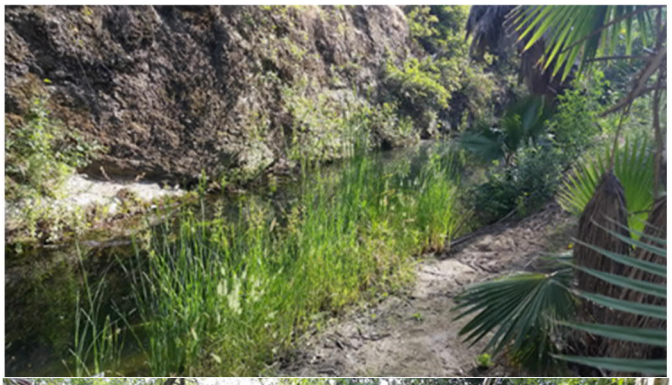


Photo No.	**Date:**
10	[06/02/16]

Direction Photo Taken:

Left: West (facing upstream)

Right: South (facing downstream)

Description:

Figure 15.

Bridge 2.

Perennial, concrete-lined box channel.

PHOTOGRAPHIC LOG

Client Name: OC Public Works	**Site Location:** Orange County, California	**Project No.** 60492260.30003

Photo No. **11**	**Date:** [12/29/16]

Direction Photo Taken:

Left: South

Right: West

Description:

Figure 15.

Bridge 3 (Upstream Side).

Perennial, concrete-lined box channel under Bridge 3; upstream side of bridge.

Photo No. **12**	**Date:** [12/29/16]

Direction Photo Taken:

South

Description:

Figure 15.

Between Bridges 2 and 3.

Perennial, soft-bottom channel; floodplain and reinforced wall on far side; flow is from upstream (left) to downstream (right).

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No. **13** | **Date:** [10/02/19]

Direction Photo Taken:

Left: Northwest

Right: Northeast

Description:

Figure 15.

Bridge 3.

Perennial, concrete-lined box channel under Bridge 3; downstream side of bridge.

Photo No. **14** | **Date:** [10/02/19]

Direction Photo Taken:

Upper: Northwest

Lower: North

Description:

Figure 15.

Just upstream from Bridge 3.

Perennial, soft-bottom channel with wetlands and adjacent riparian habitat.

Wetland Sample Points 2.1, 2.2.

PHOTOGRAPHIC LOG

Client Name: OC Public Works	**Site Location:** Orange County, California	**Project No.** 60492260.30003

Photo No. **14**	**Date:** [10/01/19]

Direction Photo Taken:

n/a

Description:

Figure 15.

Just upstream from Bridge 3.

Perennial, soft-bottom channel with wetlands and adjacent riparian habitat.

Wetland Soil Pit 2.1.

Photo No. **14**	**Date:** [10/01/19]

Direction Photo Taken:

n/a

Description:

Figure 15.

Just upstream from Bridge 3. Perennial, soft-bottom channel with wetlands and adjacent riparian habitat.

Wetland Sample Point 2.1. Photograph is of the water-pimpernel (*Samolus parviflorus;* (Theophrastaceae), and Obligate wetland plant observed along Brea Creek.

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No.	**Date:**
15	[06/02/16]

Direction Photo Taken:

Upper Left: North
Upper Right: South
Lower Center: East

Description:

Figure 15.

North side of Brea Blvd.

Ephemeral drainage connected to Brea Creek via culvert.

Photo No.	**Date:**
16	[06/02/16]

Direction Photo Taken:

Southeast

Description:

Figure 15.

Tonner Canyon Creek, facing upstream under the 57 Fwy.

Perennial/Intermittent soft-bottom channel with wetlands and adjacent riparian habitat.

PHOTOGRAPHIC LOG

Client Name: OC Public Works	**Site Location:** Orange County, California	**Project No.** 60492260.30003

Photo No. **17, 18**	**Date:** [06/02/16]

Direction Photo Taken:

Left: Northeast

Right: North (towards Los Angeles County)

Description:

Figure 15.

Near the confluence of Brea Creek and Tonner Canyon Creek.

Perennial, concrete-lined box channel/culvert (left); open box channel (right).

Photo No. **19**	**Date:** [05/31/18]

Direction Photo Taken:

Upper: East

Lower: West

Description:

Figure 15.

Near the confluence of Brea Creek and Tonner Canyon Creek

Upper: Ephemeral side channel on floodplain; facing upstream.

Lower: Ephemeral channel joins Brea Creek with eroding drop-off and plunge pool; facing downstream.

PHOTOGRAPHIC LOG

Client Name:	**Site Location:**	**Project No.**
OC Public Works	Orange County, California	60492260.30003

Photo No.	**Date:**
20	[05/31/18]

Direction Photo Taken:

North

Description:

Figure 15.

Along Brea Blvd., facing towards Los Angeles County.

Confluence of two v-ditches; facing upstream.

Photo No.	**Date:**
21, 22	[06/02/16]

Direction Photo Taken:

Left: Northwest

Right: Southeast

Description:

Figure 15.

Along Brea Blvd.

Example of ephemeral drainages and swales flowing East towards Brea Creek.

Left: California walnut is the dominant tree in the photographs.

Right: Riparian corridor along Brea Blvd.

APPENDIX C

SUPPLEMENTAL FIGURES AND ACREAGE ASSUMPTIONS FOR BRIDGES 1 – 3

&

FLOODING FREQUENCY FOR BREA CREEK (2016 – 2019); APT GRAPHS

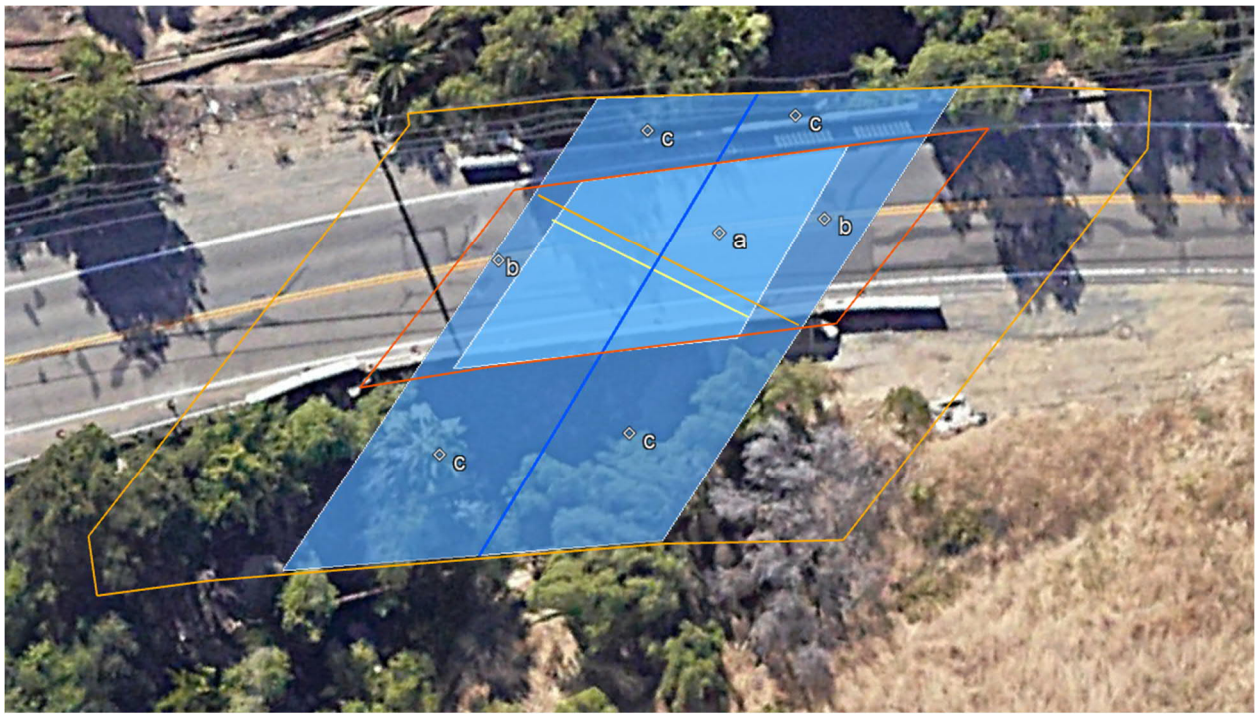
Appendix C-1.

Supplemental Figures for Bridges 1 – 3

Bridge 1. Brea Creek flows from bottom to top in this Google Earth image. The red polygon is the existing bridge structure, and the larger yellow polygon is proposed bridge structure.

The smaller blue polygon (labeled “a” with white trim) represents the waters under the existing bridge, and the larger blue polygon represents the new waters under the proposed bridge. The increase in width within the existing structure is shown with label “b.” The new coverage of waters due to the larger, proposed bridge in a linear feet orientation (upstream/downstream) is shown with label “c.” Positioned perpendicular across the flow line (dark blue line) are two width measurements provided by OCPW: yellow (original wetted width; 22 ft) and orange (proposed wetted width; 53 ft).

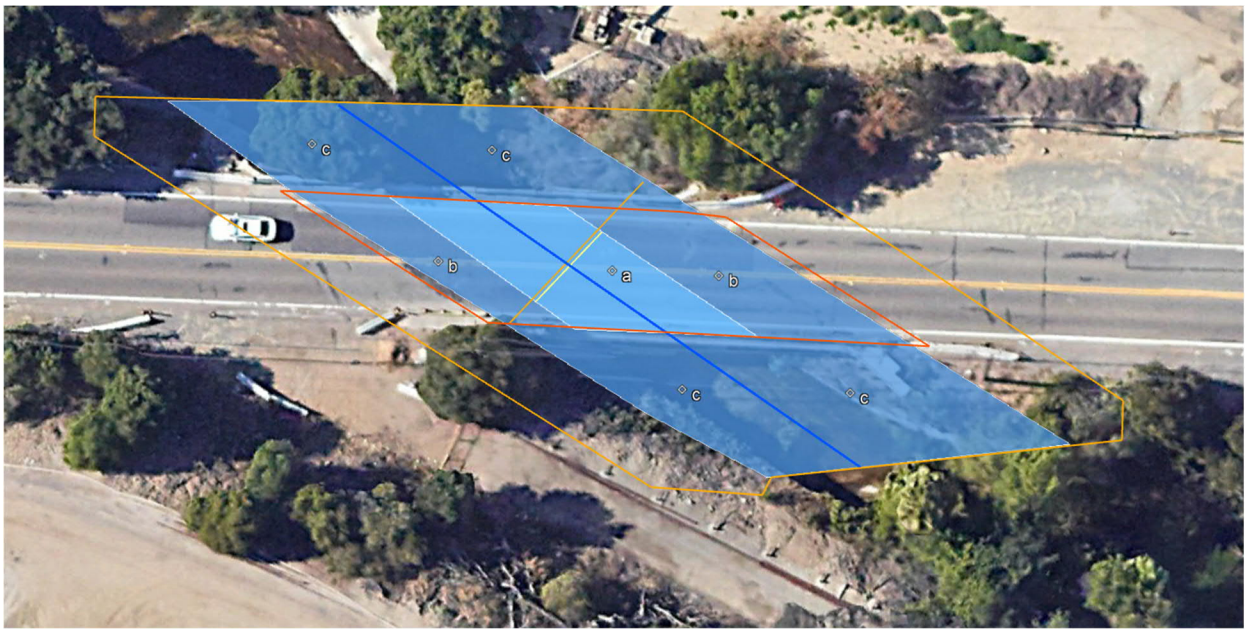
Appendix C-1.



Bridge 2. Brea Creek flows from top to bottom in this Google Earth image. The red polygon is the existing bridge structure, and the larger yellow polygon is proposed bridge structure.

The smaller blue polygon (labeled “a” with white trim) represents the waters under the existing bridge, and the larger blue polygon represents the new waters under the proposed bridges. The increase in width within the existing structure is shown with label “b.” The new coverage of waters due to the larger, proposed bridge in a linear feet orientation (upstream-to-downstream) is shown with label “c.” Positioned perpendicular across the flow line (dark blue line) are two width measurements provided by OCPW: yellow (original wetted width; 38 ft) and orange (proposed wetted width; 50 ft).

Note: Associated rip rap and wing-walls are not included in this figure, and are part of permanent impacts to non-wetland WoUS.



Bridge 3. Brea Creek flows from lower right to upper left in this Google Earth image. The red polygon is the existing bridge structure, and the larger yellow polygon is proposed bridge structure. The smaller blue polygon (labeled “a” with white trim) represents the waters under the existing bridge, and the larger blue polygon represents the new waters under the proposed bridge. The increase in width within the existing structure is shown with label “b.” The new coverage of waters due to the larger, proposed bridge in a linear feet orientation (upstream-to-downstream) is shown with label “c.” Positioned perpendicular across the flow line (dark blue line) are two width measurements provided by OCPW: yellow (original wetted width; 24 ft) and orange (proposed wetted width; 49 ft).

Appendix C-1.

Acreage Assumptions of Existing and Proposed Bridges

	Water Under Existing Bridge[1] (acres)	New Covered Waters Due to Larger Bridge (New Linear Length)[2] (acres)	Water Resulting from Removal of Existing Bridge (New Width)[3] (acres)	Total Waters Under Proposed Bridge[4] (acres)
Bridge 1 (soft-bottom)	0.02	0.07	0.04	0.11 (remains soft-bottom)
Bridge 2 (concrete-lined box channel)	0.03	0.08	0.06	0.14 (converted to soft-bottom)
Bridge 3 (concrete-lined box channel)	0.02	0.12	0.04	0.16 (converted to soft-bottom)
Total	0.07	0.27	0.14	0.41

[1] The water under the existing bridges are considered "neutral," which refers to the fact that the area of waters calculated for existing conditions remains waters after construction; thus, this area is not considered either a loss or gain, hence neutral. The existing Bridges 2 and 3 are concrete-lined, box channels.

[2] This column represents the net increase in creek coverage (linear length, upstream to downstream) over the existing creek. This also may be considered a temporary (though positive) impact. The increase in cover can also be explained by changes to the linear feet (wetted lengths) of waters under bridges: Bridge 1: 54' → 90' (+36 feet); Bridge 2: 30' → 90' (+60 feet); Bridge 3: 30' → 90' (+60 feet).

[3] The proposed bridges allow for an *increase in wetted width as compared to the existing bridges due to removal of the existing concrete slab/box bridge that presently occurs within the creek*. This column provides the *increase in water due to the new widths (original + new width)*. OCPW supplied the following regarding the *wetted widths under bridges* (Existing → Proposed; numbers are rounded to the nearest foot): Bridge 1: 22' → 53'; Bridge 2: 38' → 50'; Bridge 3: 24' → 49'.

[4] This column represents the total acreage of waters under the proposed bridges. In addition, the soft bottom of Brea Creek will be restored in the proposed condition for Bridges 2 and 3 (Bridge 1 remains soft-bottom). This change is expected to increase the hydrologic connection under the bridges; current condition has some level of hydrologic disruption due to the concrete-lined, box channel.

Appendix - Permanent / Temporary Impacts; Existing / Proposed Bridges (Page 1 of 2)

$TIME$
$DATE

EXISTING R/W
R/W
TEMP DISTURBANCE LIMITS
PERM DISTURBANCE LIMITS
TEMP DISTURBANCE LIMITS
PREVIOUS ENVIR. IMPACT LIMITS
R/W
EXISTING R/W
CANYONDALE RD
EXISTING R/W
CANYON COUNTRY RD
EXISTING R/W
PREVIOUS ENVIR. IMPACT LIMITS
PERM DISTURBANCE LIMITS
TEMP DISTURBANCE LIMITS
MATCHLINE STA 20+50 SEE BELOW

LEGEND:
TEMP DISTURBA LIMITS
PERM DISTURBA LIMITS

Bridge 1 (Left) and Bridge 2 (Right)

Smaller, Inner Black Outline = Existing Bridge Structure

Green = Water under Existing Bridge

Larger Black Outline = Proposed Bridge Structure

Blue = New Water under Proposed Bridge due to Increased Width

Yellow = New Coverage of Water under Proposed Bridge

Red = Red Rectangles show New Design Features which add permanent impacts (approx. 0.04 acre; October 2021)

PERM DISTURBANCE LIMITS
R/W
TEMP DISTURBANCE LIMITS
MATCHLINE STA 20+50 SEE ABOVE
R/W
PERM DISTURBANCE LIMITS
PREVIOUS ENVIR. IMPACT LIMIT
TEMP DISTURBANCE LIMITS
PERM DISTURBANCE LIMITS
PREVIOUS ENVIR. IMPACT LIMITS
TEMP DISTURBANCE LIMITS
PERM DISTURBANCE LIMITS
EXISTING R/W
TEMP DISTURBANCE LIMITS
R/W
MATCHLINE STA 34+50 SEE SHEET 02

$FILE$

MARK THOMAS

100 50 0
SCALE: 1"=100'

OVERALL - PROJECT DISTURBANCE LIMITS EXHIBIT

Brea Cyn/Brea Blvd Widening
January 4, 2021

Appendix - Permanent / Temporary Impacts; Existing / Proposed Bridges (Page 2 of 2)

$DATE $TIME$

PERM DISTURBANCE LIMITS

EXISTING R/W

TEMP DISTURBANCE LIMITS

PREVIOUS ENVIR. IMPACT LIMITS

MATCHLINE STA 34+50 SEE SHEET 01

R/W

PREVIOUS ENVIR. IMPACT LIMITS

TEMP DISTURBANCE LIMITS

PERM DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

R/W

PREVIOUS ENVIR. IMPACT LIMIT

PERM DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

MATCHLINE STA 48+50 SEE BELOW

Bridge 3

Smaller, Inner Black Outline = Existing Bridge Structure

Green = Water under Existing Bridge

Larger Black Outline = Proposed Bridge Structure

Blue = New Water under Proposed Bridge due to Increased Width

Yellow = New Coverage of Water under Proposed Bridge

N

TEMP DISTURBANCE LIMITS

R/W

PERM DISTURBANCE LIMITS

MATCHLINE STA 48+50 SEE ABOVE

PERM DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

R/W

TEMP DISTURBANCE LIMITS

PERM DISTURBANCE LIMITS

PREVIOUS ENVIR. IMPACT LIMITS

PERM DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

PERM DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

TEMP DISTURBANCE LIMITS

PERM DISTURBANCE LIMITS

MATCHLINE STA 62+50 SEE SHEET 03

$FILE$

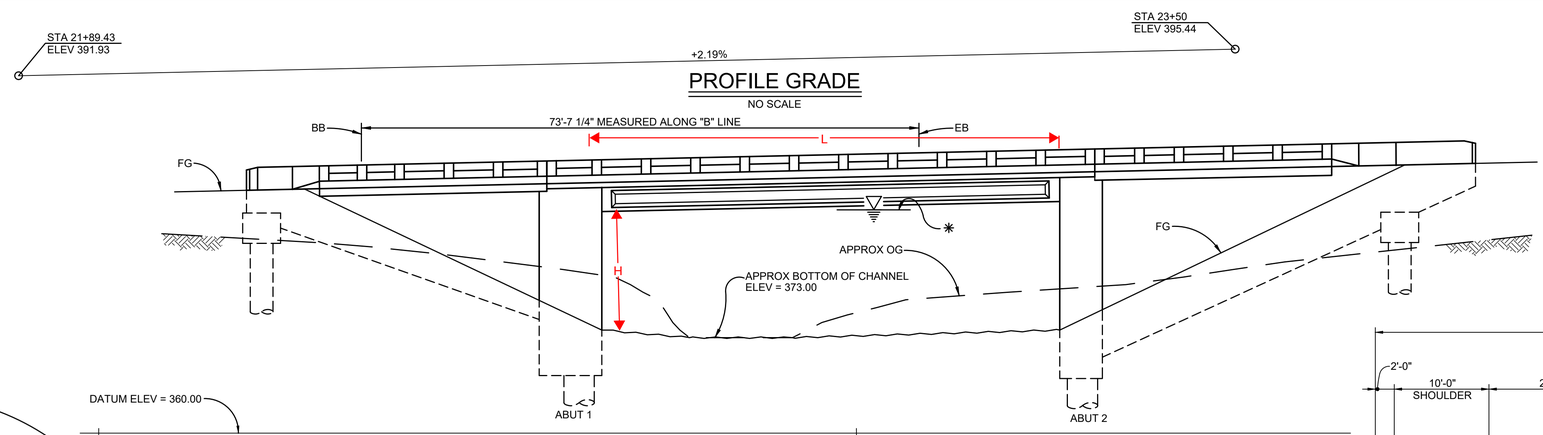
MARK THOMAS

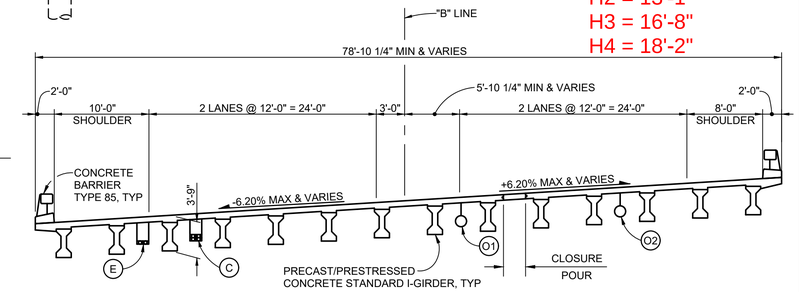
100 50 0

SCALE: 1"=100'

OVERALL - PROJECT DISTURBANCE LIMITS EXHIBIT

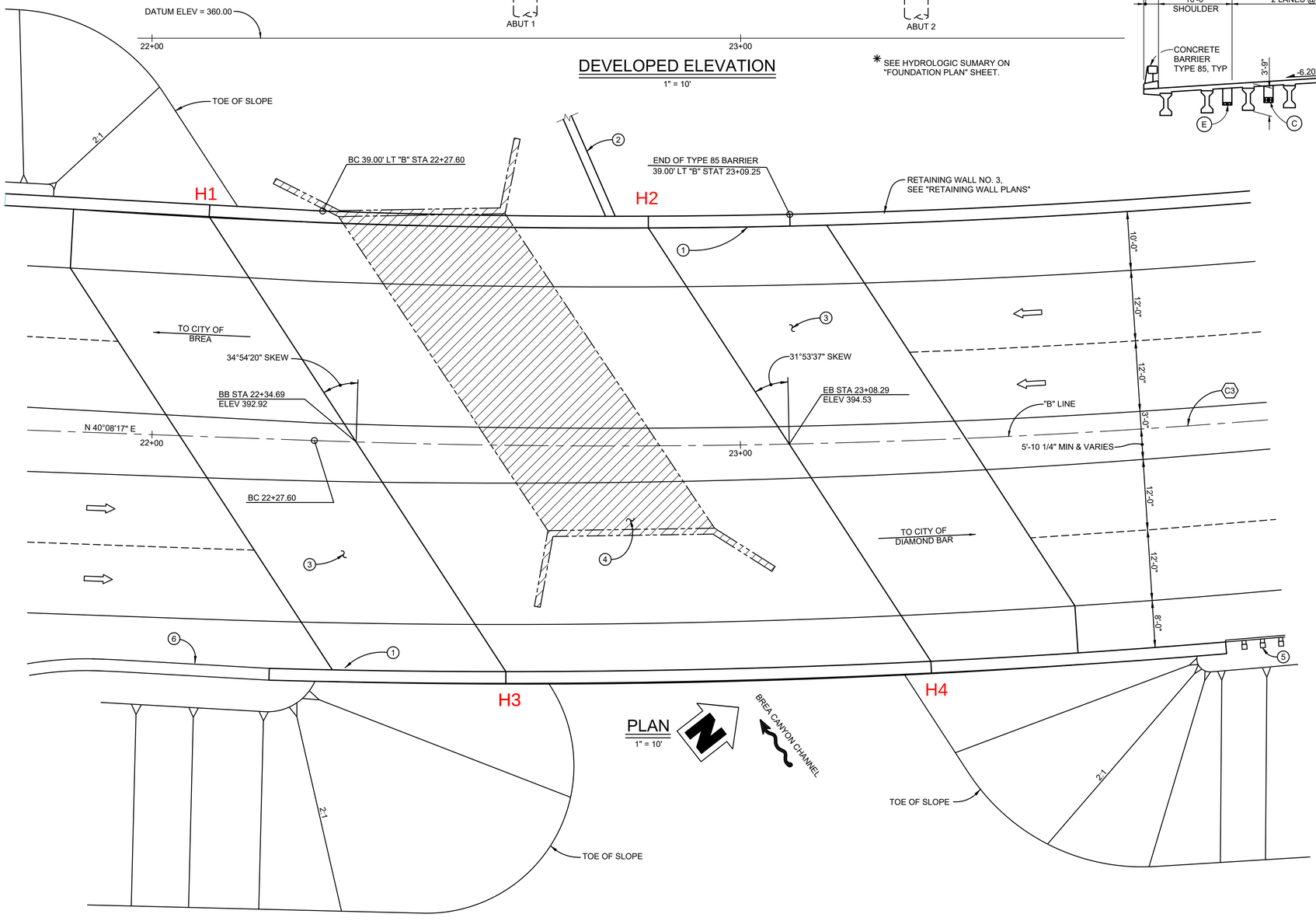
Brea Cyn/Brea Blvd Widening
January 4, 2021





TYPICAL SECTION

1/8" = 1'-0"



DIMENSIONS

EXISTING:
L = 22'-0" +/-
H1 = 13'-0" +/-
H2 = 13'-0" +/-
H3 = 13'-0" +/-
H4 = 13'-0" +/-

NEW:
L = 53'-1
H1 = 12'-4"
H2 = 13'-1"
H3 = 16'-8"
H4 = 18'-2"

UTILITIES

- (C) 4 - 4"Ø AT&T AND CHARTER COMMUNICATIONS LINES
- (E) 2 - 4"Ø SCE ELECTRICAL LINES
- (O1) 8"Ø OIL LINE
- (O2) 6"Ø OIL LINE

NOTES:

1. PAINT "BRIDGE NO. 55C0729"
2. TOP DOWN CONSTRUCTION CHANNEL WALL
3. STRUCTURE APPROACH SLAB TYPE N(30)
4. REMOVE EXISTING 55C021 BRIDGE IN STAGES
5. MIDWEST GUARD RAIL
6. CONCRETE BARRIER TYPE 60M

LEGEND:

- INDICATES EXISTING STRUCTURE TO BE REMOVED
- INDICATES DIRECTION OF FLOW
- INDICATES DIRECTION OF TRAFFIC

ALIGNMENT CURVE DATA				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C3	1400.00'	19°38'58"	242.44'	480.13'

100% SUBMITTAL
NOT FOR CONSTRUCTION

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER * ALBERT A. THOMAS * No. 54676 * Exp. 9/30/22 * STRUCTURAL * STATE OF CALIFORNIA

10-15-2021
DATE

DESIGNED BY: JL
DRAWN BY: AR
CHECKED BY: JW
DRAWING NO.:
FILE NAME: S-01 GENERAL PLAN.dwg
PLOT DATE: 10/17/2021
SCALE: AS SHOWN

County of Orange
OC PublicWorks

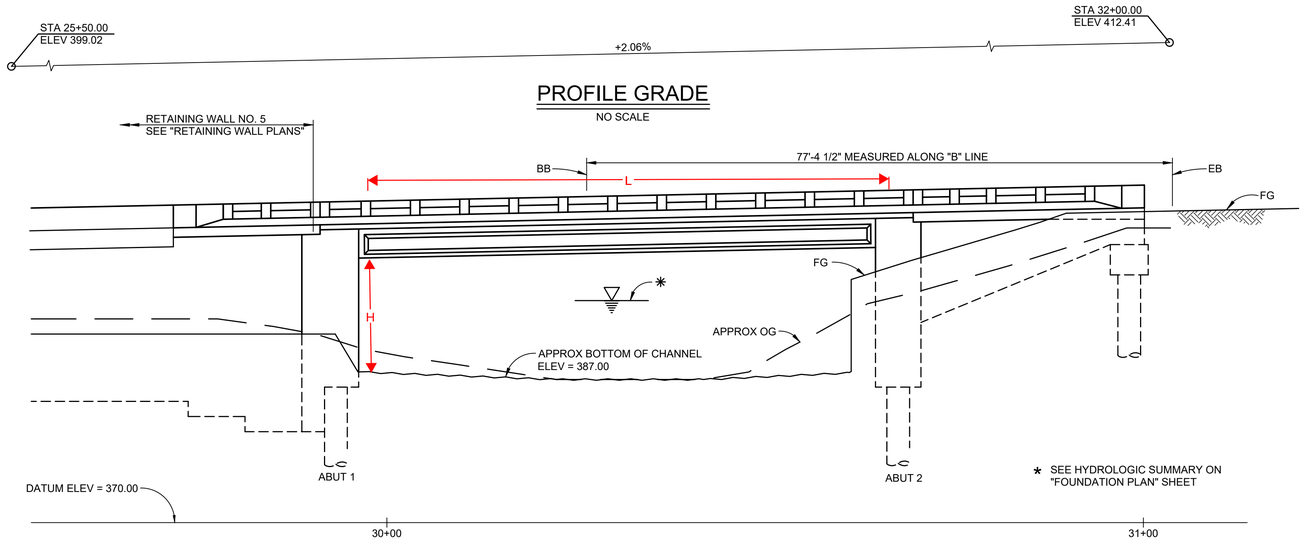
PREPARED BY:
BIGGS CARDOSA ASSOCIATES INC
STRUCTURAL ENGINEERS
500 S. Main Street, Suite 1200
Orange, California 92868
714-380-3460

BREA BLVD/BREA CANYON ROAD WIDENING
OCPW BRIDGE NO.55C0729

GENERAL PLAN

SHEET

S-01

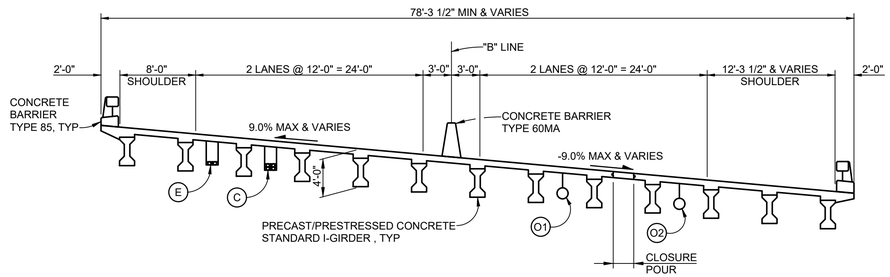


PROFILE GRADE
NO SCALE

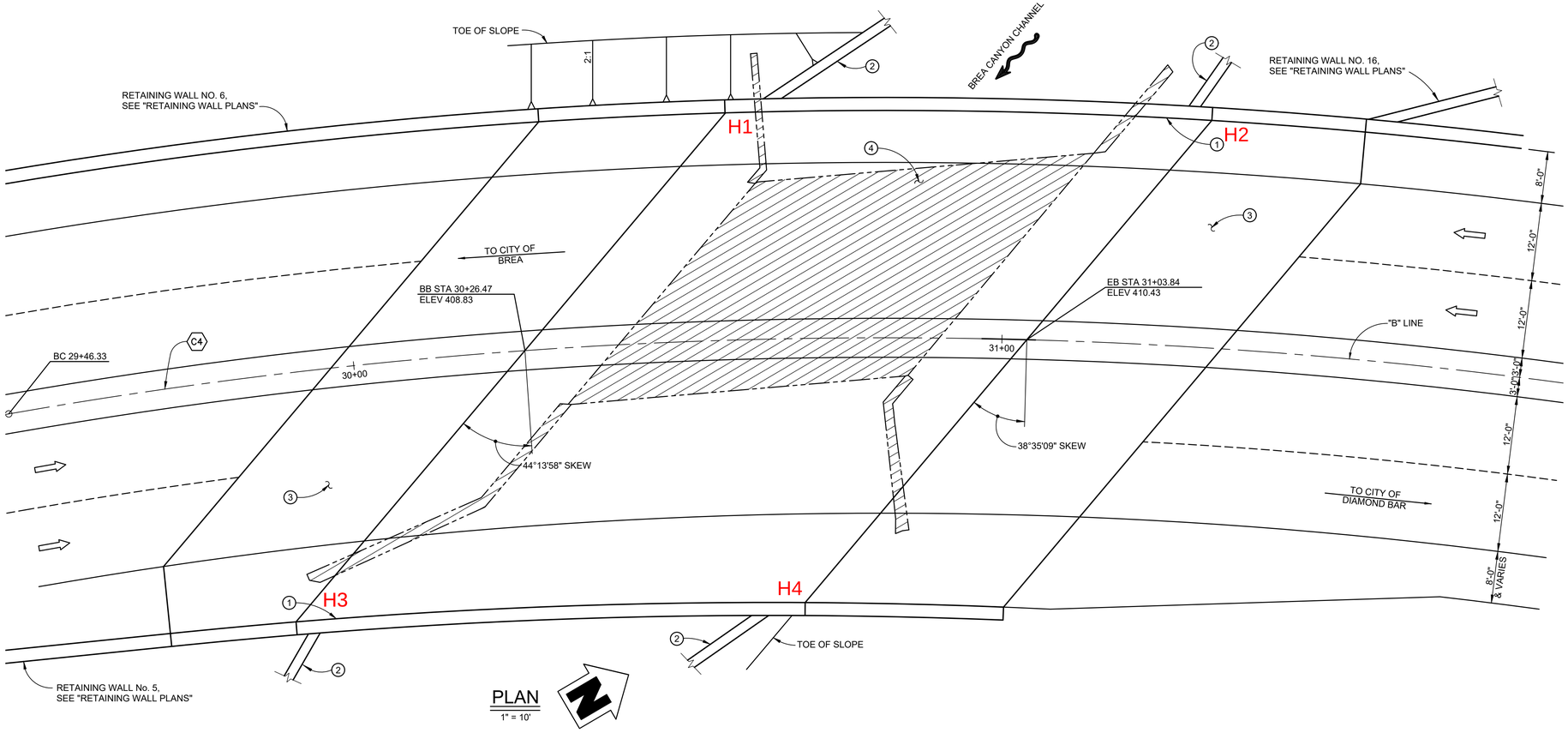
ELEVATION
1" = 10'

DIMENSIONS

EXISTING:	NEW:
L = 38'-6" +/-	L = 50'-7"
H1 = 17'-10" +/-	H1 = 20'-2"
H2 = 17'-10" +/-	H2 = 21'-4"
H3 = 15'-8" +/-	H3 = 13'-8"
H4 = 15'-8" +/-	H4 = 14' - 6"



TYPICAL SECTION
1/8" = 1'-0"



PLAN
1" = 10'

UTILITIES
- (C) 4 - 4"Ø AT&T AND CHARTER COMMUNICATION LINES
- (E) 2 - 4"Ø SCE ELECTRICAL LINES
- (O1) 8"Ø OIL LINE (CRIMSON PIPELINE)
- (O2) 6"Ø OIL LINE (CHEVRON PIPELINE)

NOTES:
1. PAINT "BRIDGE NO. 55C0730"
2. CHANNEL WALL
3. STRUCTURE APPROACH TYPE N(30)
4. REMOVE EXISTING 55C022 BRIDGE IN STAGES

LEGEND:
- INDICATES EXISTING STRUCTURE TO BE REMOVED
- INDICATES DIRECTION OF TRAFFIC
- INDICATES DIRECTION OF FLOW

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C4	785.00'	71°55'33"	569.56'	985.44'

100% SUBMITTAL
NOT FOR CONSTRUCTION

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER ALEJANDRA A. THOMAS No. 54676 Exp. 9/30/22 STATE OF CALIFORNIA
10-15-2021
DATE

DESIGNED BY: JL
DRAWN BY: AR
CHECKED BY: JW
DRAWING NO.:
FILE NAME: S-28 GENERALPLAN.dwg
PLOT DATE: 10/17/2021
SCALE: AS SHOWN

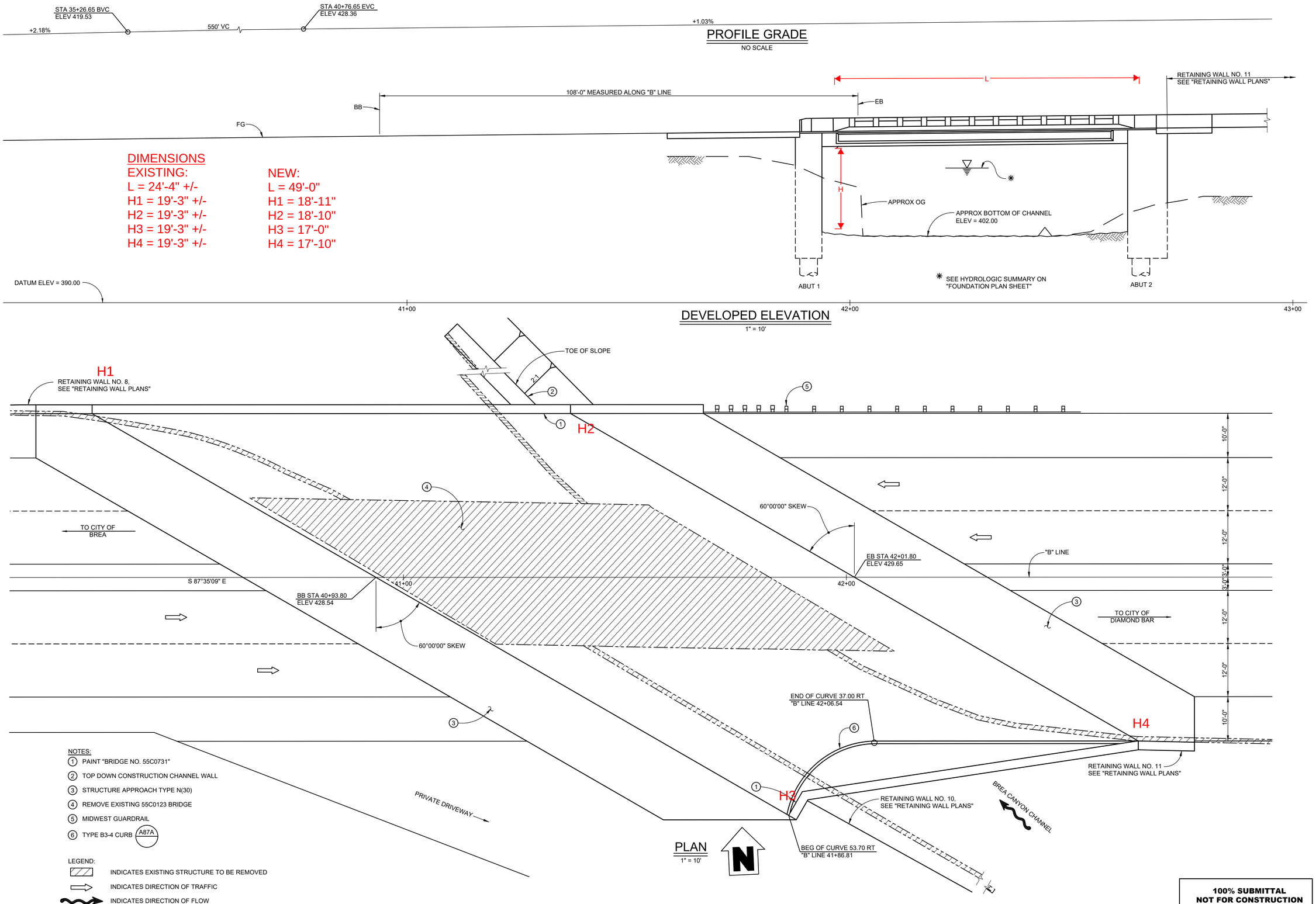
County of Orange
PublicWorks

PREPARED BY:
BIGGS CARDOSA ASSOCIATES INC
STRUCTURAL ENGINEERS
600 S. Main Street, Suite 1709
Orange, California 92868
714-558-8808

BREA BLVD/BREA CANYON ROAD WIDENING
OCPW BRIDGE NO.55C0730

GENERAL PLAN

SHEET
S-28
202 OF 278



COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

REGISTERED PROFESSIONAL ENGINEER * JAMES A THOMAS * No. 54676 * Exp. 9/30/22 * STRUCTURAL * STATE OF CALIFORNIA

DATE 10-15-2021

DESIGNED BY:	CHECKED BY:	FILE NAME:	SCALE:
JL	JW	S-55 GENERAL PLAN NO1.dwg	AS SHOWN
DRAWN BY: AR	DRAWING NO.:	PLOT DATE: 10/17/2021	

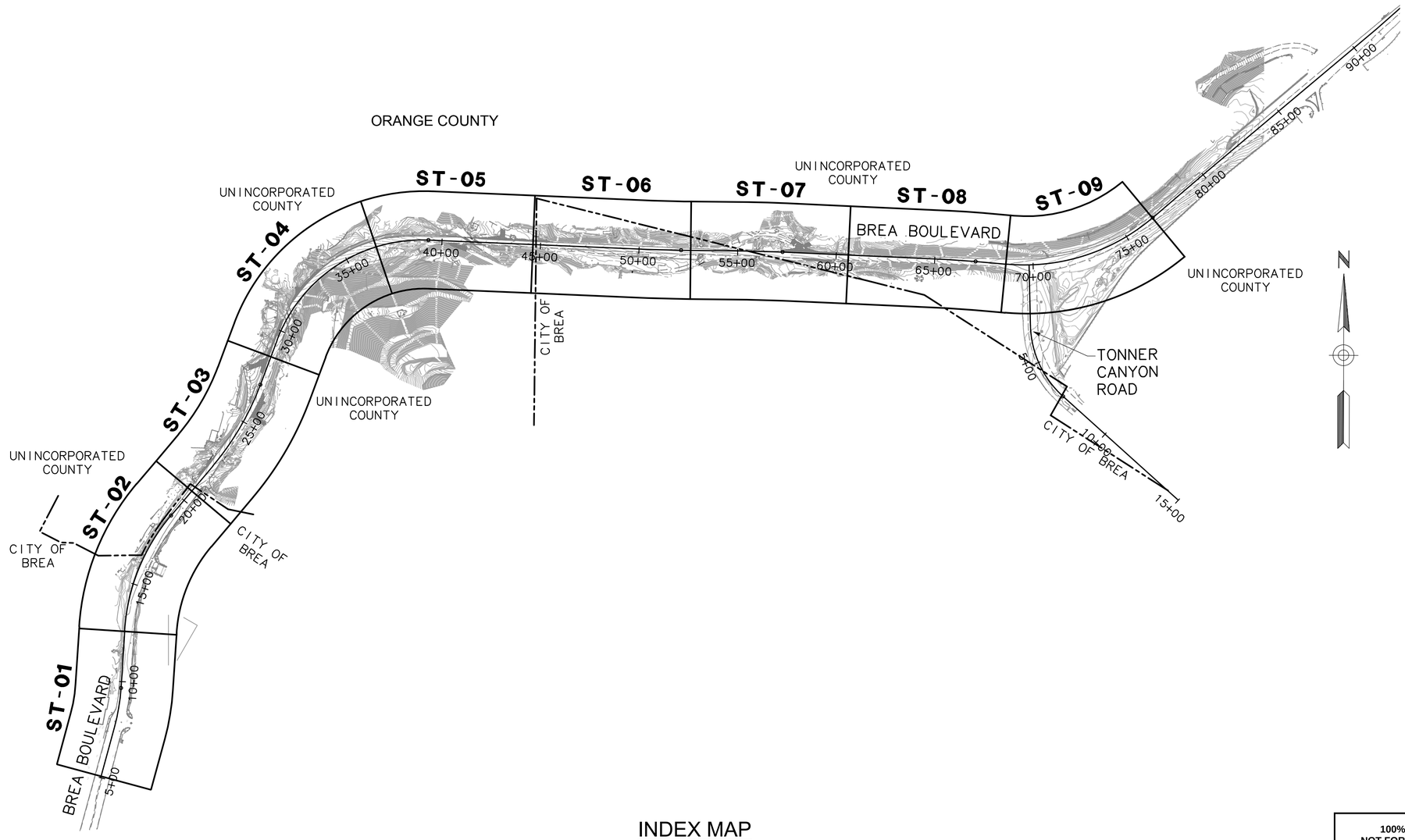
County of Orange PublicWorks

PREPARED BY:
BIGGS CARDOSA ASSOCIATES INC
STRUCTURAL ENGINEERS
500 S. Main Street, Suite 1200
Orange, California 92868
714-283-4488

BREA BLVD/BREA CANYON ROAD WIDENING
OCPW BRIDGE NO.55C0731

GENERAL PLAN No. 1

SHEET
S-55
229 OF 278



INDEX MAP
1" = 300'

100% SUBMITTAL
NOT FOR CONSTRUCTION

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
RAVI SHAH, P.E.
DATE 10-15-21

REGISTERED PROFESSIONAL ENGINEER — RAVI SHAH — No. C79183 — Exp. 3-31-22 — CIVIL — STATE OF CALIFORNIA

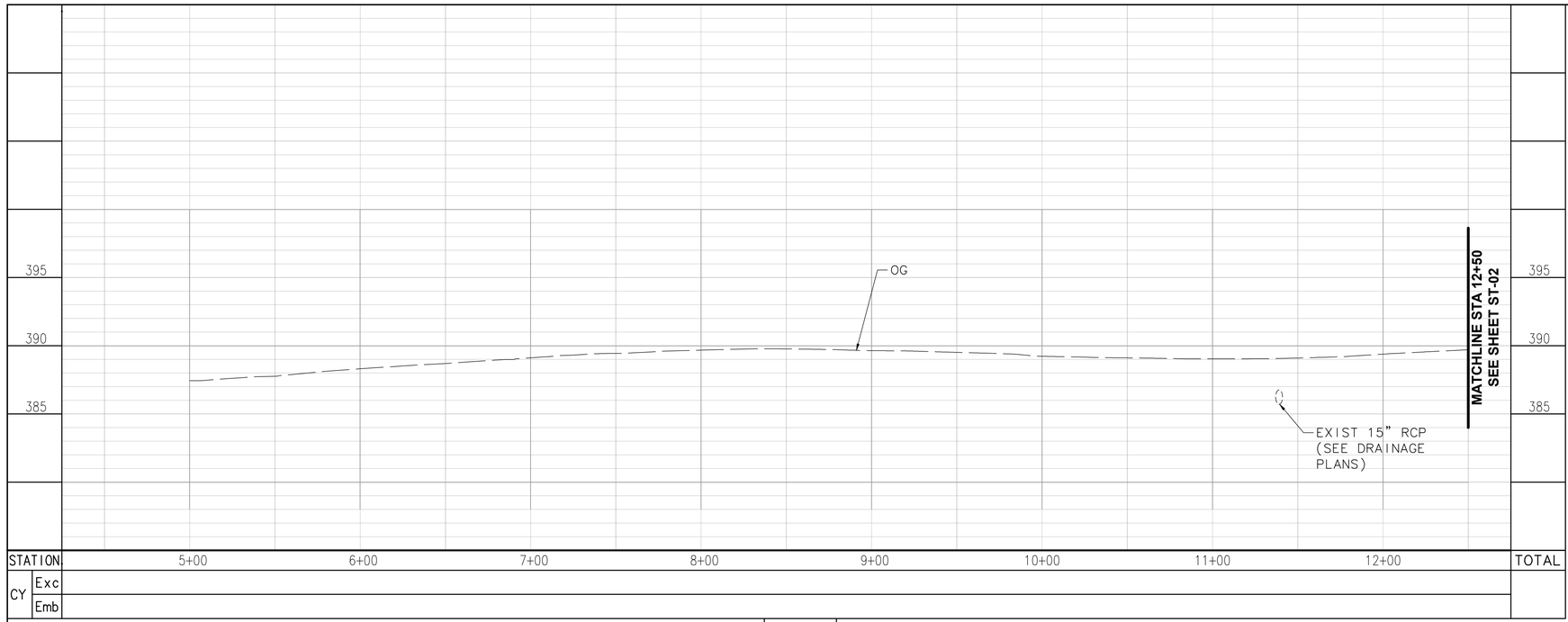
DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-00_RdwyPln Index PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

County of Orange
OC Public Works

PREPARED BY: MARK THOMAS

BREA BOULEVARD WIDENING
PHASE 1
STREET IMPROVEMENT INDEX MAP

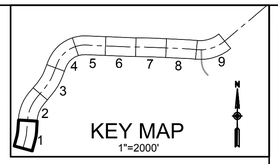
SHEET
ST-00



PROFILE
H=1" = 40'
V=1" = 5'

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITIES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.
3. FOR ACCURATE RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS, CONTACT ORANGE COUNTY RIGHT-OF-WAY DEPARTMENT.



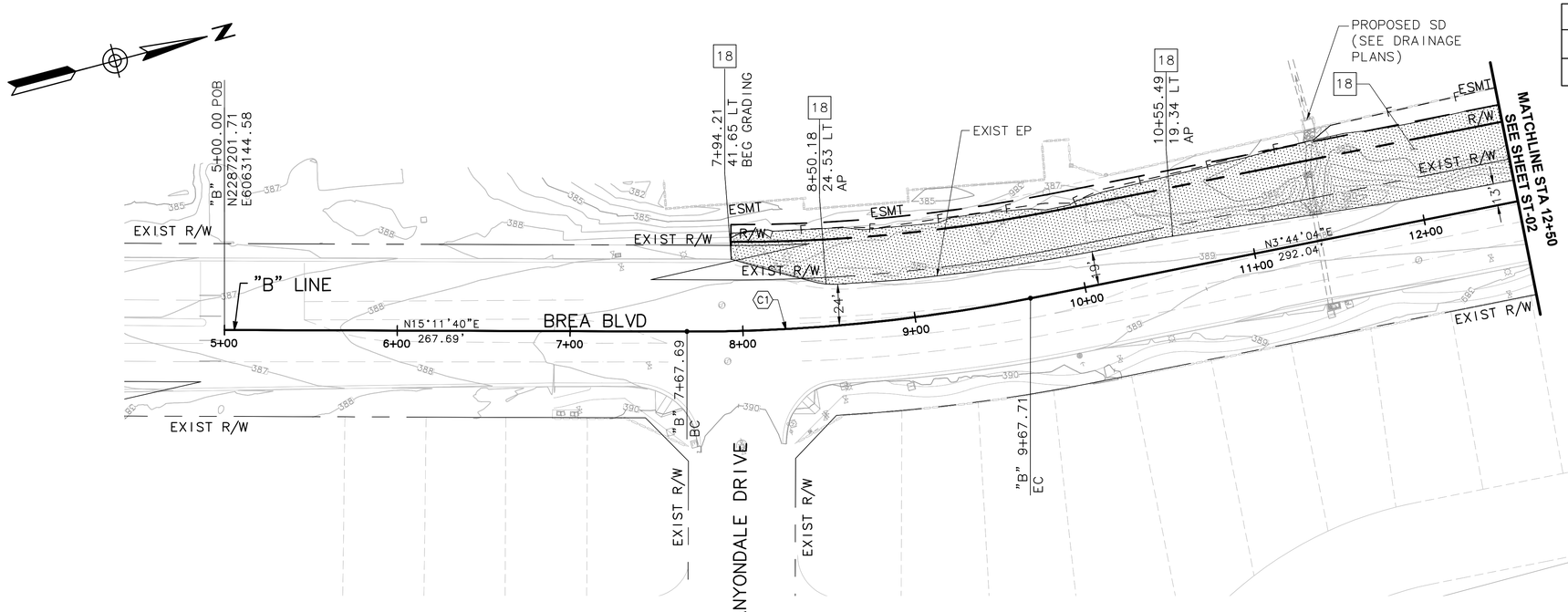
CONSTRUCTION NOTES:

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C CUT LINE
- F FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C1	1000.00'	11°27'36"	100.34'	200.01'



100% SUBMITTAL
NOT FOR CONSTRUCTION

0 10 20 30 40 60 80 120 160
GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER
RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-01-05_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

County of Orange
OC PublicWorks

PREPARED BY: MARK THOMAS

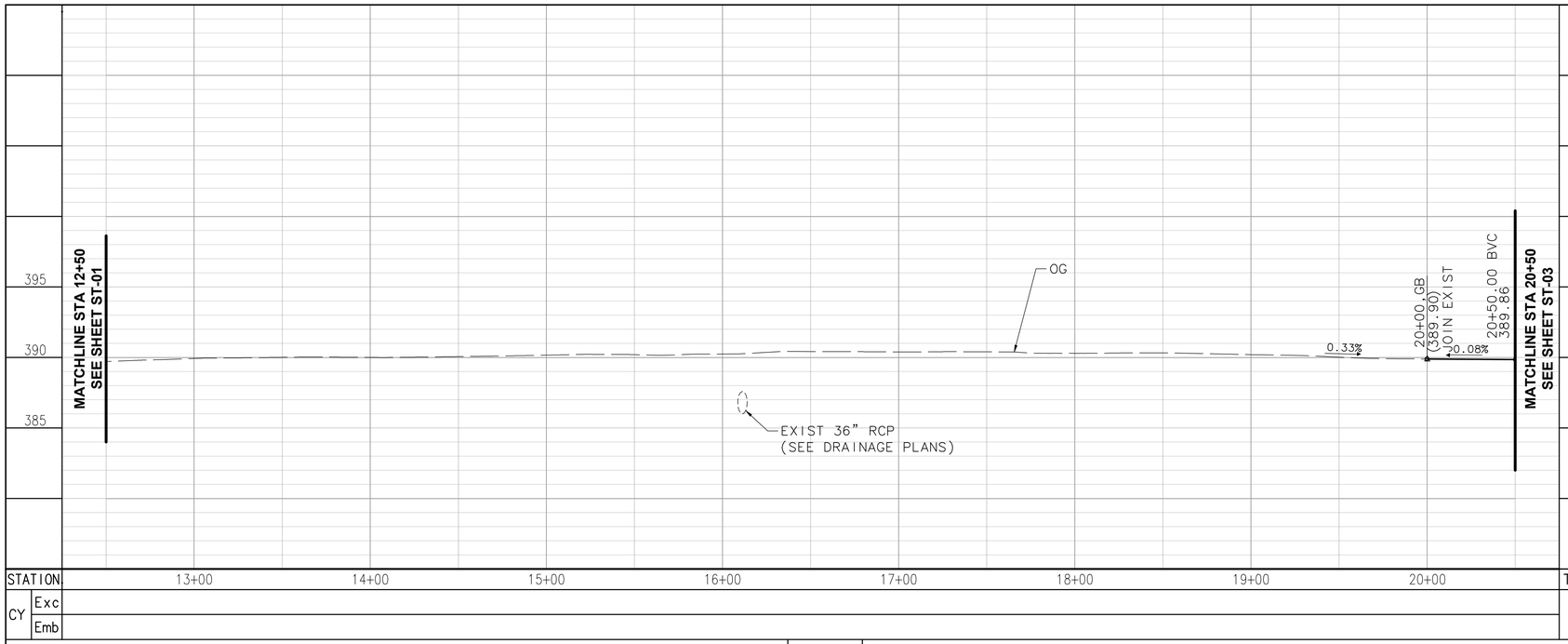
BREA BOULEVARD
WIDENING
PHASE 1
STA. 5+00 TO STA. 12+50

STREET IMPROVEMENT PLAN

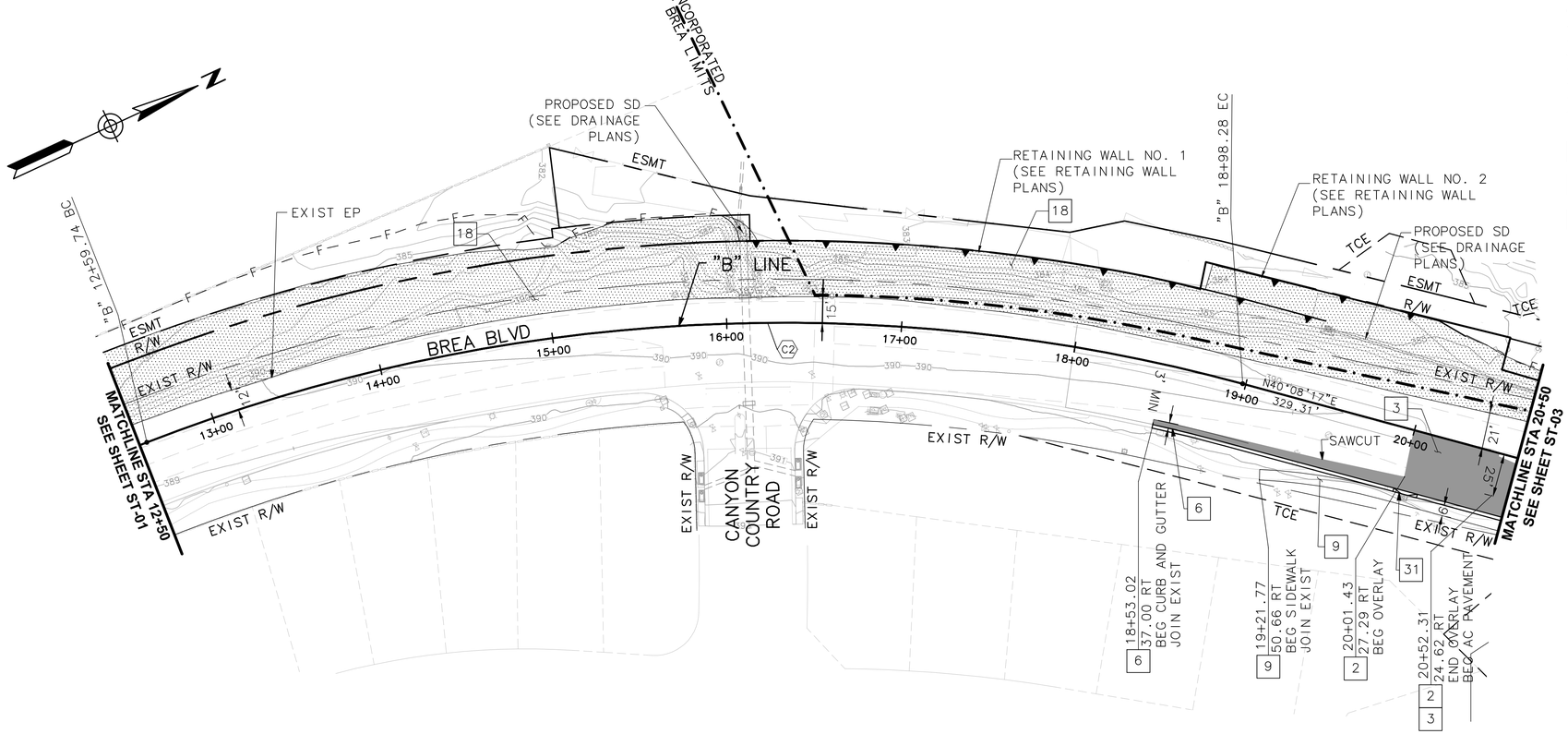
SHEET

ST-01

J:\Orange Co-IR-18112-Brea Canyon Road Widening\CADD_2018\Sheets\RD_ST-01-05_RdwyPln PH1.dwg

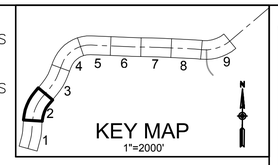


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.
3. SEE SHEETS ST-10 TO ST-14 FOR DRIVEWAY DETAILS PLANS.
4. FOR ACCURATE RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS, CONTACT ORANGE COUNTY RIGHT-OF-WAY DEPARTMENT.



CONSTRUCTION NOTES:

2 CONSTRUCT VAR DEPTH WARM MIX AC OVERLAY

3 CONSTRUCT 0.90' AC

6 CONSTRUCT PCC CURB TYPE A2-8, PER W=2', PER CITY OF BREA STD PLAN 106-0.

9 CONSTRUCT 4" PCC SIDEWALK PER CITY OF BREA STD PLAN 103-0.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS

31 CONSTRUCT LOCAL DEPRESSION, CASE B, PER APWA STD. PLAN 313-3.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C CUT LINE
- F FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C2	1005.00'	36°24'13"	330.46'	638.54'

100% SUBMITTAL
NOT FOR CONSTRUCTION

GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER — RAVI SHAH — No. C79183 — Exp. 3-31-22 — CIVIL — STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

DESIGNED BY: VG	CHECKED BY: FD
DRAWN BY: PB	DRAWING NO.: ViewTitle
PREPARED BY: MARK THOMAS	FILE NAME: RD_ST-01-05_RetwyPln PH1.dwg
	PLOT DATE: Tuesday, October 19, 2021
	SCALE: AS SHOWN

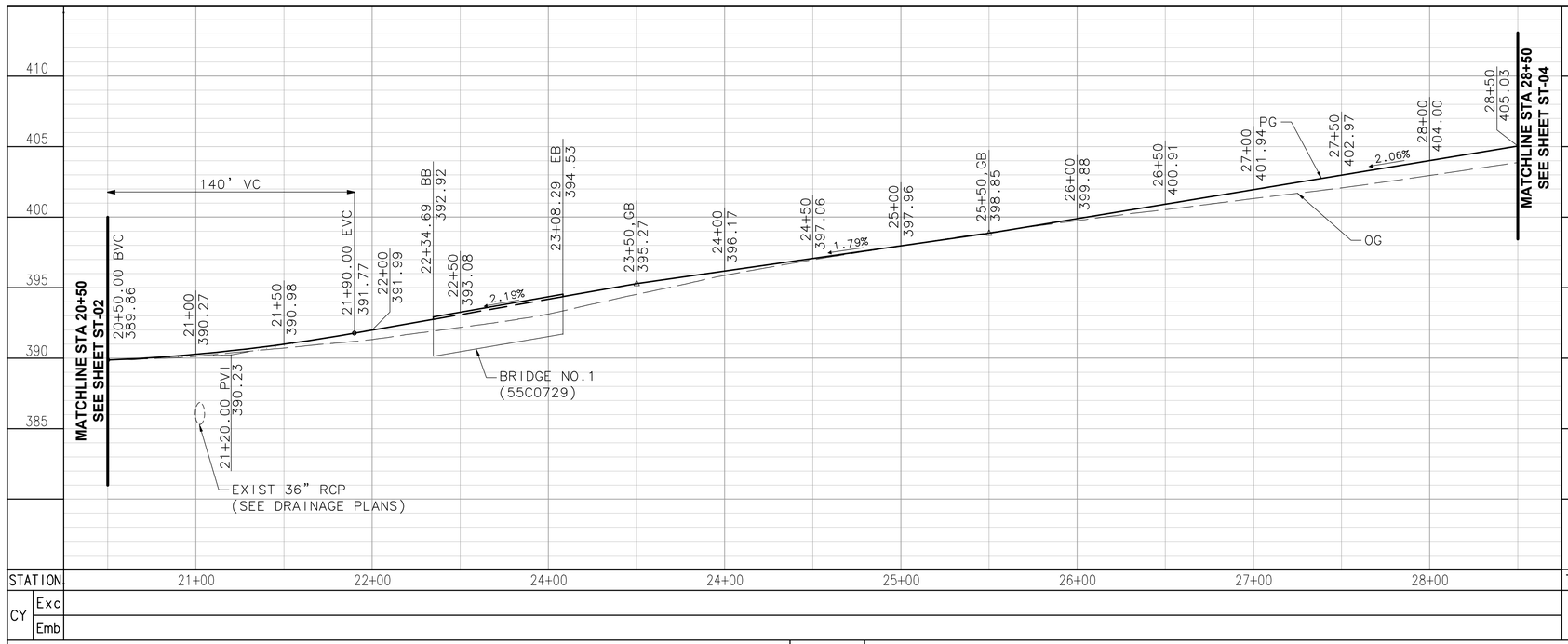
County of Orange
OC PublicWorks

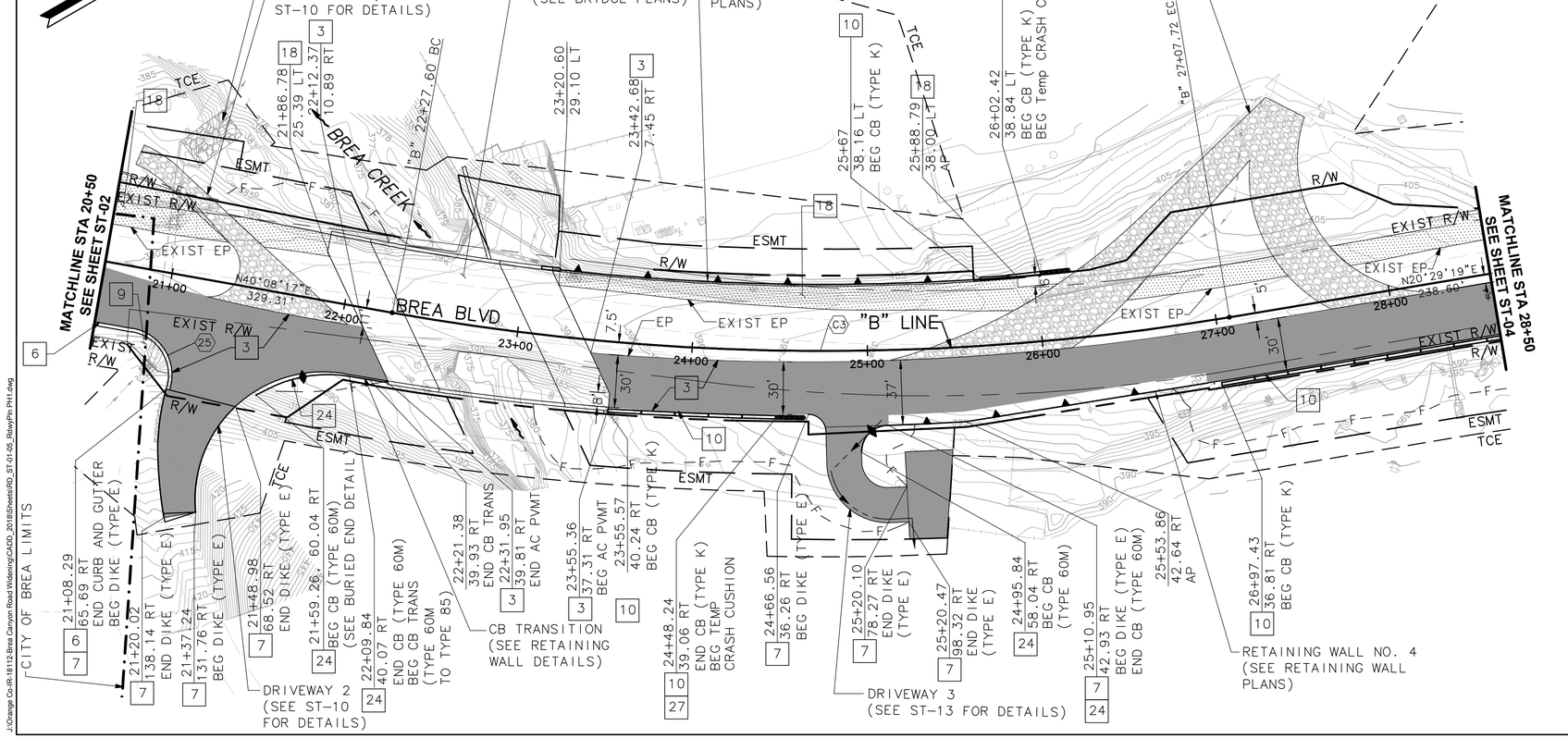
BREA BOULEVARD WIDENING
PHASE 1
STA. 12+50 TO STA. 20+50

STREET IMPROVEMENT PLAN

SHEET

ST-02

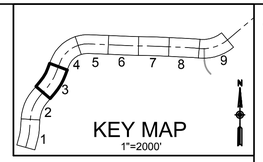




J:\Orange Co-IR-18112-Brea Canyon Road Widening\CADD_2018\Sheets\RD_ST-01-05_RdwyPln PH1.dwg

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.
3. SEE SHEETS ST-10 TO ST-14 FOR DRIVEWAYS DETAILS.
4. FOR ACCURATE RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS, CONTACT ORANGE COUNTY RIGHT-OF-WAY DEPARTMENT.



CONSTRUCTION NOTES:

- 3 CONSTRUCT 0.90' WARM MIX AC.
- 6 CONSTRUCT PCC CURB AND GUTTER TYPE A2-8, PER W=2', PER CITY OF BREA STD. PLAN 106-0.
- 7 CONSTRUCT AC DIKE, TYPE E, PER CALTRANS STD. PLAN A87B.
- 9 CONSTRUCT 4" PCC SIDEWALK PER CITY OF BREA STD PLAN 103-0.
- 10 INSTALL CONCRETE BARRIER (TYPE K) PER CALTRANS STD. PLAN T3A.
- 18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS.
- 24 CONSTRUCT CONCRETE BARRIER (TYPE 60M) PER CALTRANS STD. PLAN A76A AND A76B.
- 27 INSTALL TEMPORARY CRASH CUSHION ARRAY 'TS11' PER CALTRANS STD. PLAN T2.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C — CUT LINE
- F — FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C3	1400.00'	19°38'58"	242.44'	480.13'

CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
25	27.00'	99°33'44"	31.93'	46.92'

100% SUBMITTAL NOT FOR CONSTRUCTION

10 30 60 120
0 20 40 80 160
GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER — RAVI SHAH — No. C79183 — Exp. 3-31-22 — CIVIL — STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

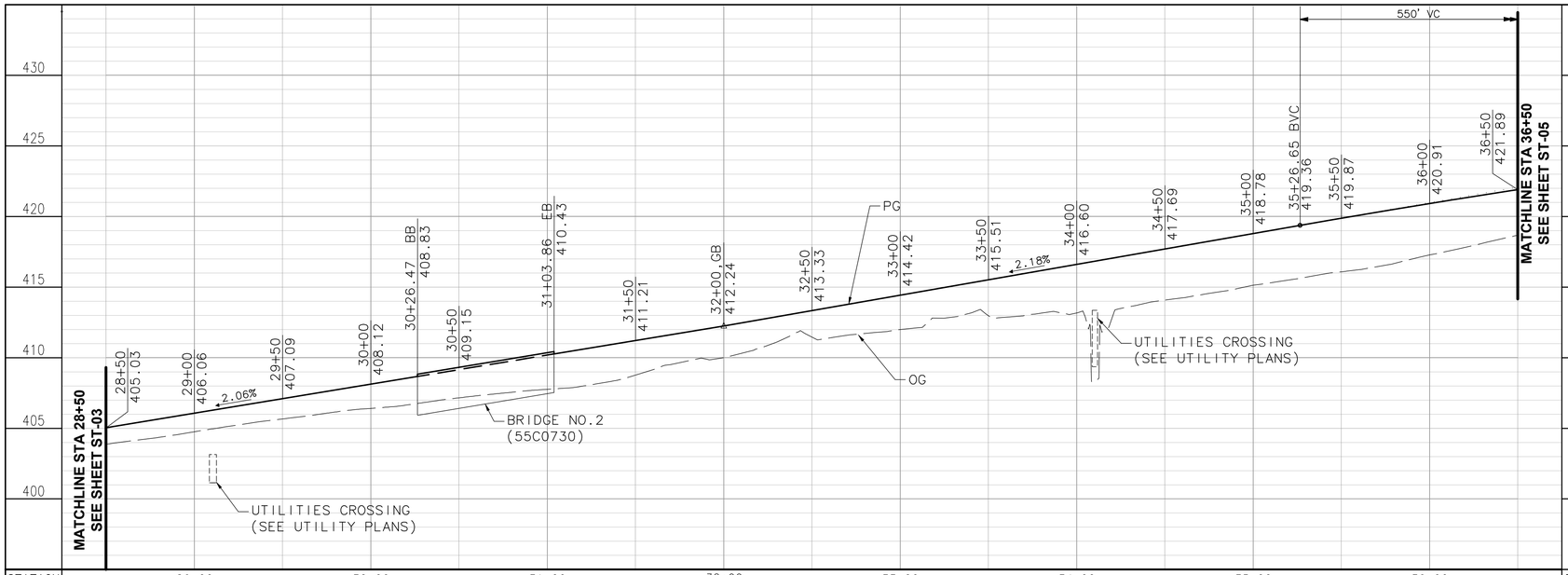
DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
PREPARED BY: MARK THOMAS
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-01-05_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

County of Orange
PublicWorks

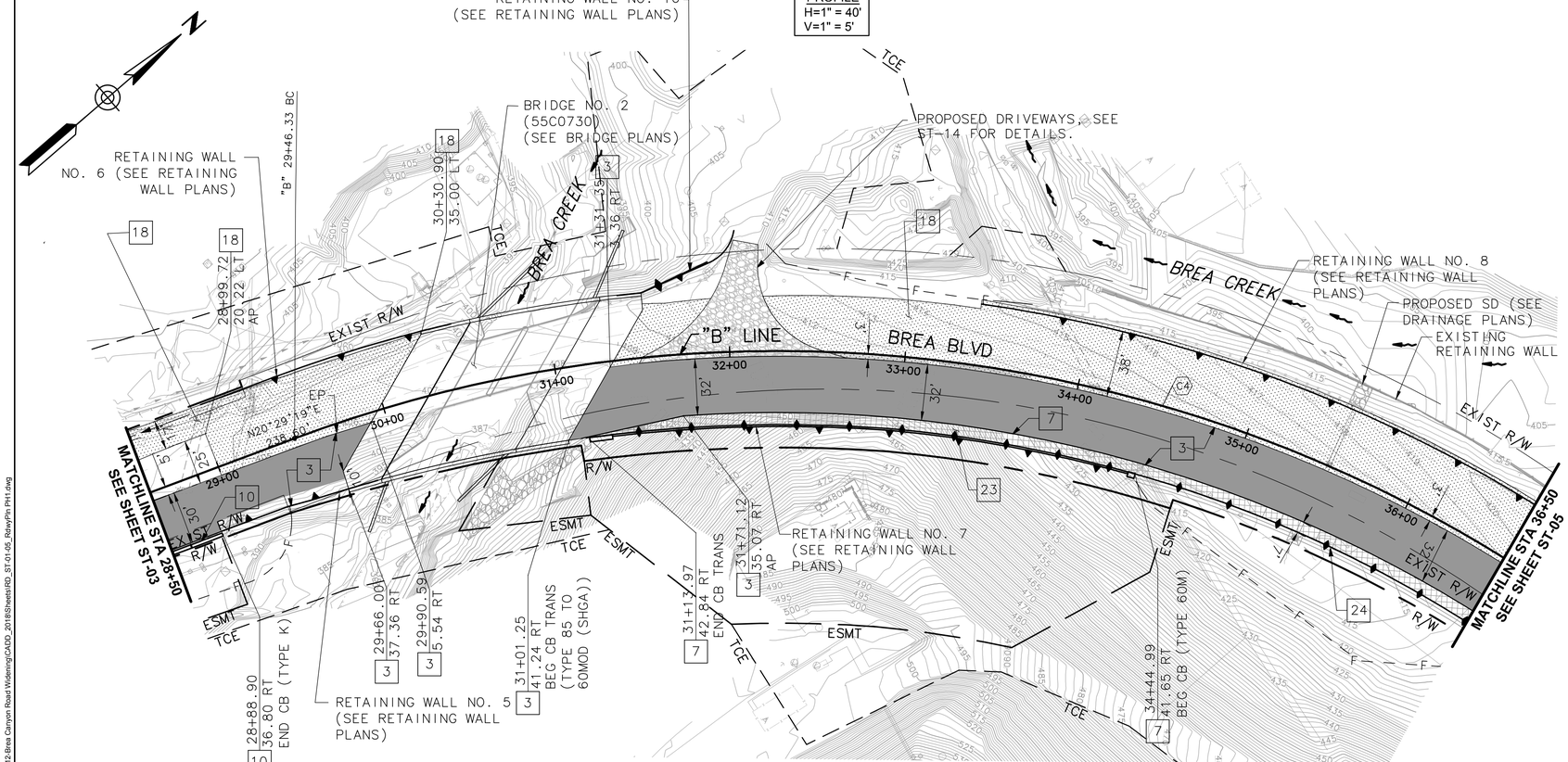
BREA BOULEVARD WIDENING
PHASE 1
STA. 20+50 TO STA. 28+50

STREET IMPROVEMENT PLAN

SHEET
ST-03
16 OF 278

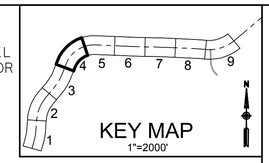


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.
3. SEE SHEETS ST-10 TO ST-14 FOR DRIVEWAYS DETAILS PLANS.
4. FOR ACCURATE RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS, CONTACT ORANGE COUNTY RIGHT-OF-WAY DEPARTMENT.



CONSTRUCTION NOTES:

3 CONSTRUCT 0.90' WARM MIX AC.

7 CONSTRUCT AC DIKE, TYPE E, PER CALTRANS STD. PLAN A87B.

10 INSTALL CONCRETE BARRIER (TYPE K) PER CALTRANS STD. PLAN T3A.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS.

23 CONSTRUCT STAMPED CONCRETE SLOPE TREATMENT PER CONSTRUCTION DETAILS.

24 CONSTRUCT CONCRETE BARRIER (TYPE 60M) PER CALTRANS STD. PLAN A76A AND A76B.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C – CUT LINE
- F – FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- GRAVEL ROAD
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C4	785.00'	71°55'33"	569.56'	985.44'

100% SUBMITTAL NOT FOR CONSTRUCTION

10 30 60 120
0 20 40 80 160
GRAPHIC SCALE
1" = 40'

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
RAVI SHAH, P.E.
10-15-21
DATE

REGISTERED PROFESSIONAL ENGINEER
RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
STATE OF CALIFORNIA

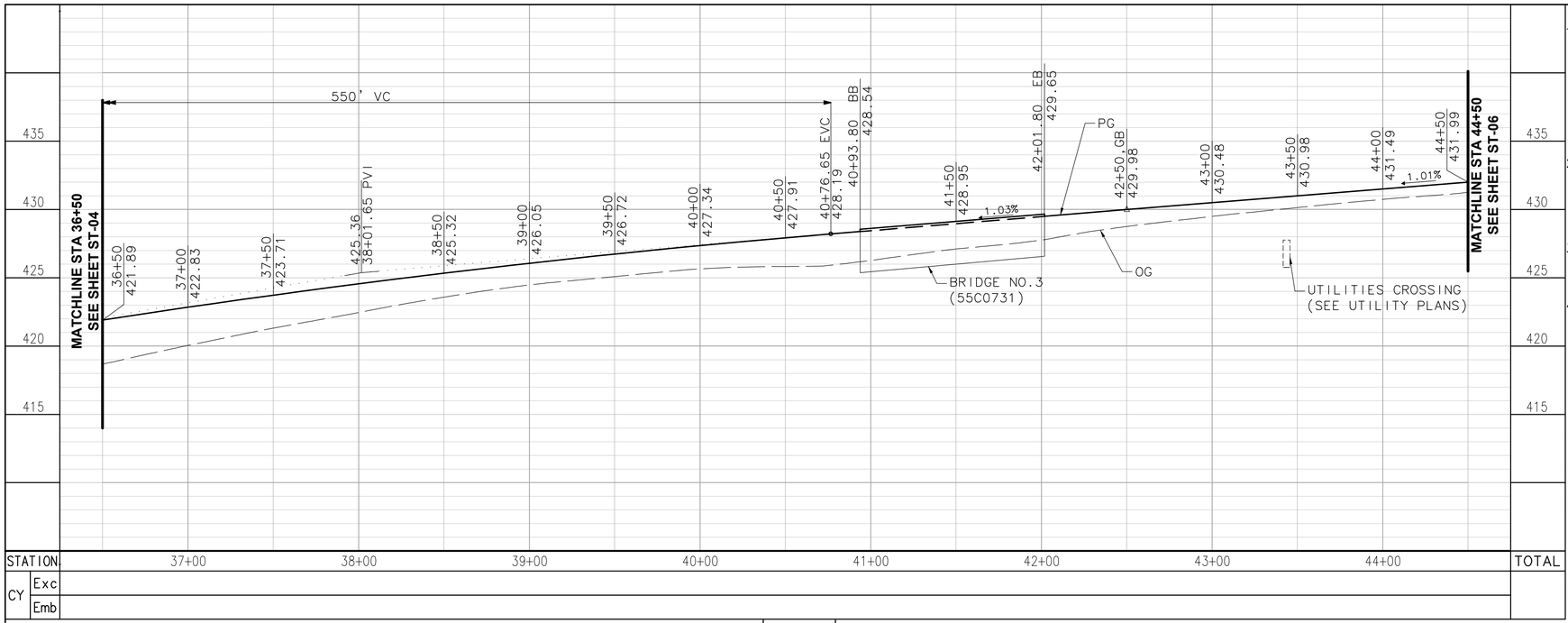
DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-01-05_RetwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

PREPARED BY: County of Orange OC Public Works
MARK THOMAS

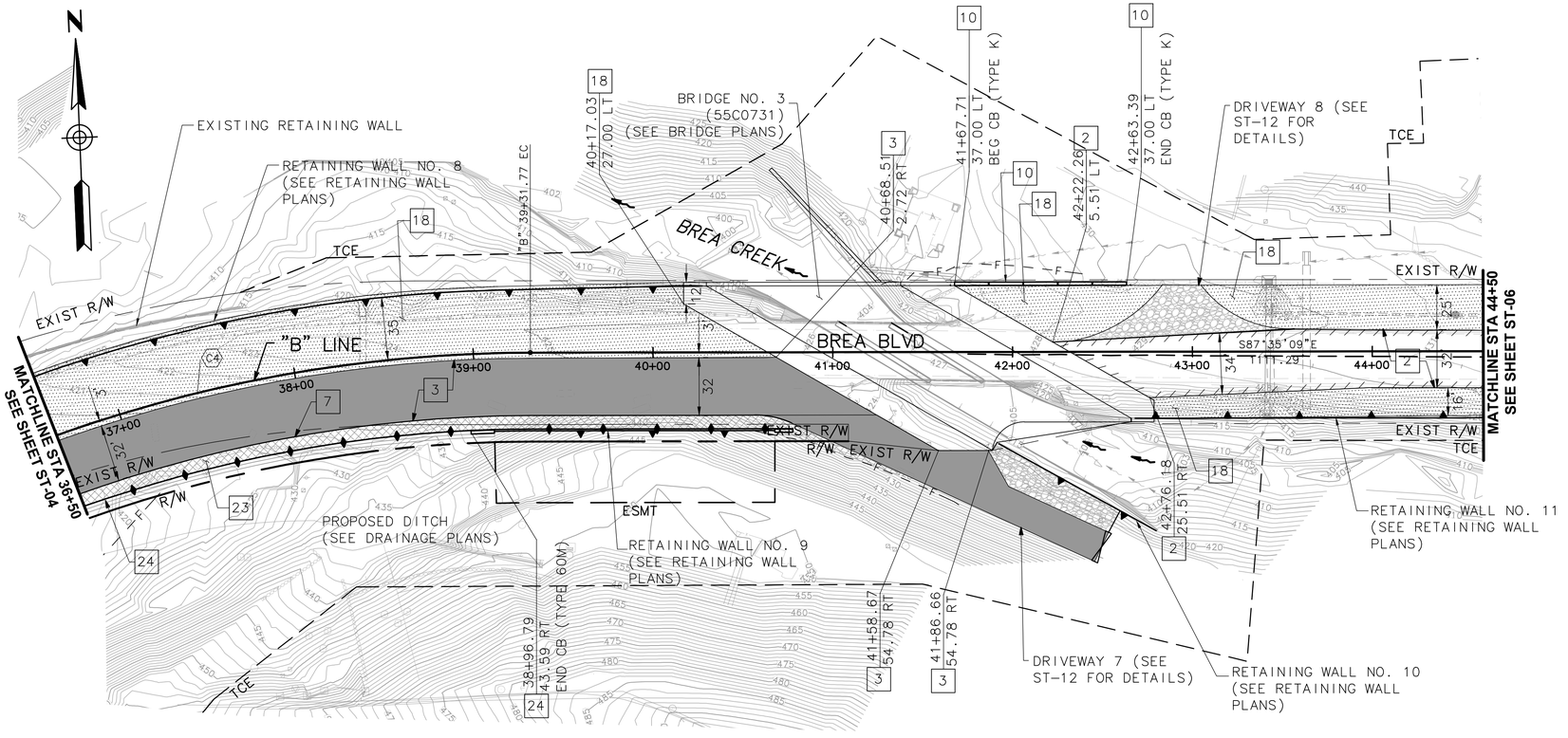
BREA BOULEVARD WIDENING
PHASE 1
STA. 28+50 TO STA. 36+50
STREET IMPROVEMENT PLAN

SHEET
ST-04
17 OF 278

J:\Orange Co-IR-18\12-Brea Canyon Road Widening\CADD_2018\Sheets\RD_ST-01-05_RetwyPln PH1.dwg

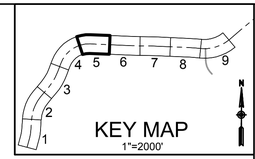


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.
3. SEE SHEET ST-10 TO ST-14 FOR DRIVEWAYS DETAILS PLANS.
4. FOR ACCURATE RIGHT-OF-WAY & TEMPORARY CONSTRUCTION EASEMENTS, CONTACT ORANGE COUNTY RIGHT-OF-WAY DEPARTMENT.



CONSTRUCTION NOTES:

2 CONSTRUCT VAR DEPTH WARM MIX AC OVERLAY

3 CONSTRUCT 0.90' WARM MIX AC

7 CONSTRUCT AC DIKE, TYPE E, PER CALTRANS STD. PLAN A87B.

10 INSTALL CONCRETE BARRIER (TYPE K) PER CALTRANS STD. PLAN T3A.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS.

23 CONSTRUCT STAMPED CONCRETE SLOPE TREATMENT PER CONSTRUCTION DETAILS.

24 CONSTRUCT CONCRETE BARRIER (TYPE 60M) PER CALTRANS STD. PLAN A76A AND A76B.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C CUT LINE
- F FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- GRAVEL ROAD
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C4	785.00'	71°55'33"	569.56'	985.44'

100% SUBMITTAL
NOT FOR CONSTRUCTION

GRAPHIC SCALE
1" = 40'
0 20 40 80 160
10 30 60 120

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
RAVI SHAHI
No. C79183
Exp. 3-31-22
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: ED
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-01-05_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

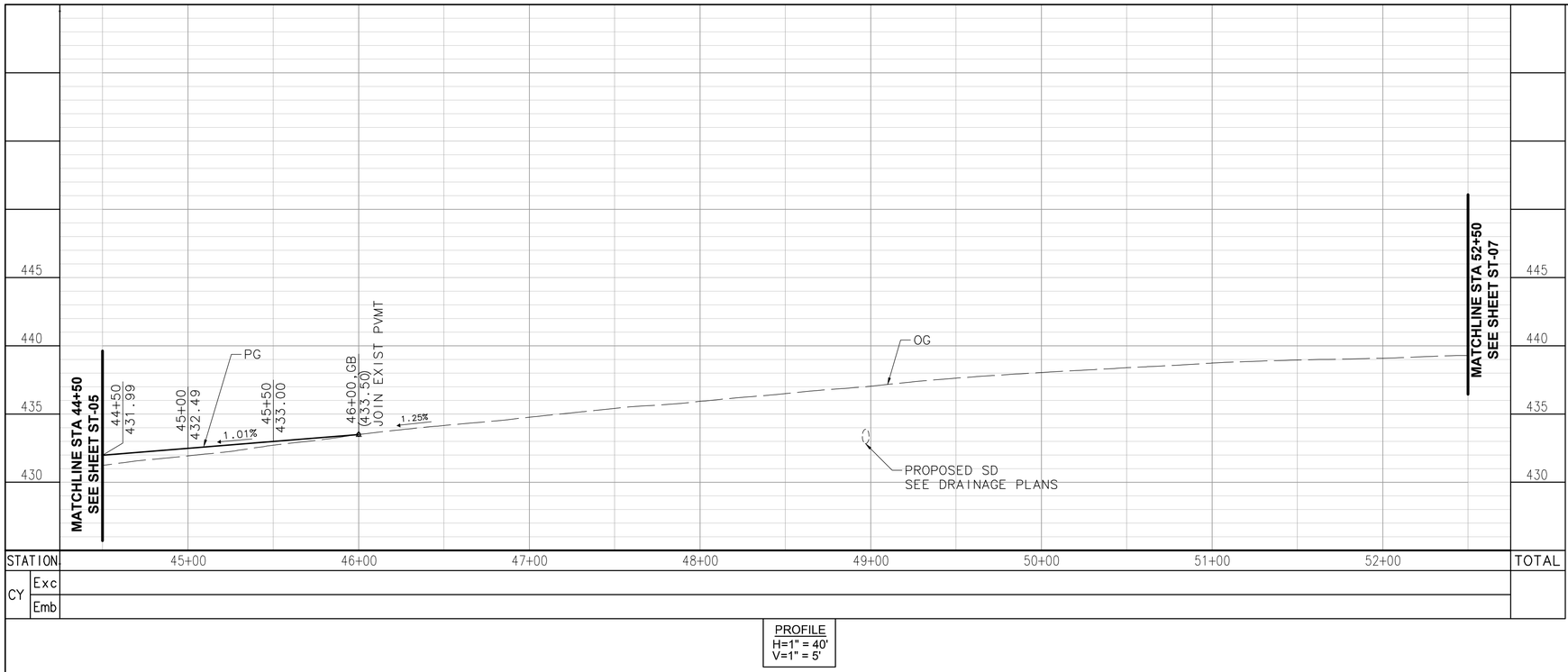
County of Orange
PublicWorks

PREPARED BY: MARK THOMAS

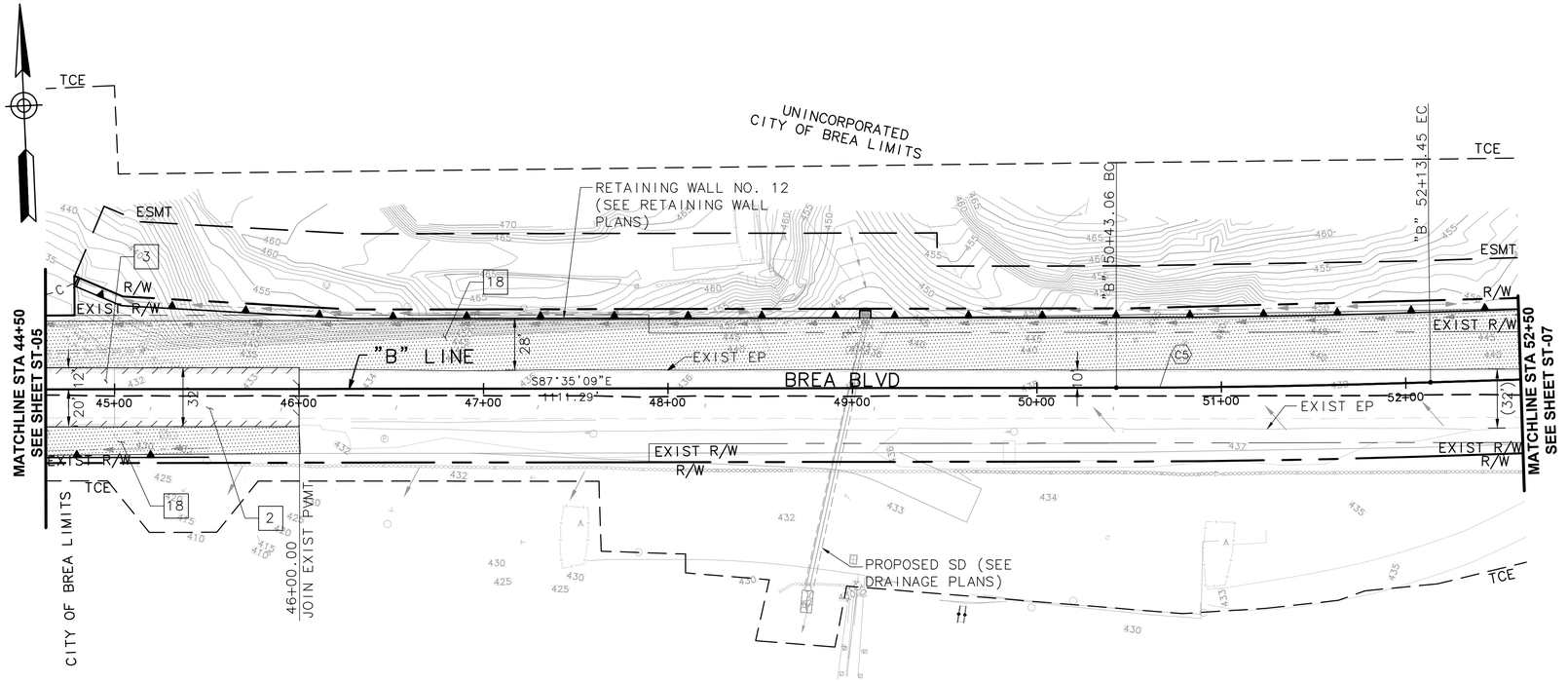
BREA BOULEVARD WIDENING
PHASE 1
STA. 36+50 TO STA. 44+50
STREET IMPROVEMENT PLAN

SHEET
ST-05
18 OF 278

J:\Orange Co-IR-18112-Brea Canyon Road Widening\CADD_2018\Sheets\RD_ST-01-05_RdwyPln PH1.dwg

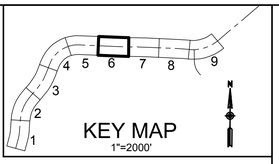


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.



CONSTRUCTION NOTES:

2 CONSTRUCT VARIABLE DEPTH WARM MIX AC OVERLAY.

3 CONSTRUCT 0.90' WARM MIX AC.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- CUT LINE
- FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C5	5550.00'	1°45'32"	85.20'	170.38'

100% SUBMITTAL
NOT FOR CONSTRUCTION

10 30 60 120
0 20 40 80 160
GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

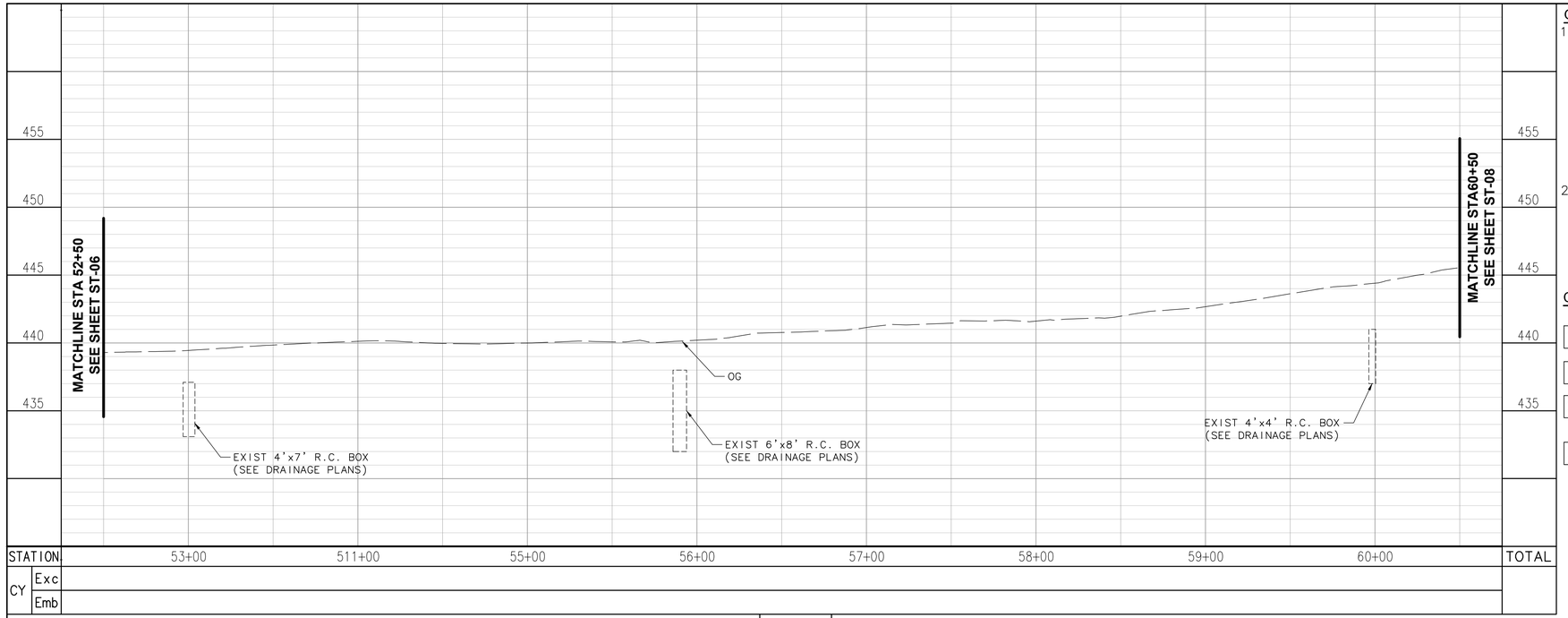
MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER
RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

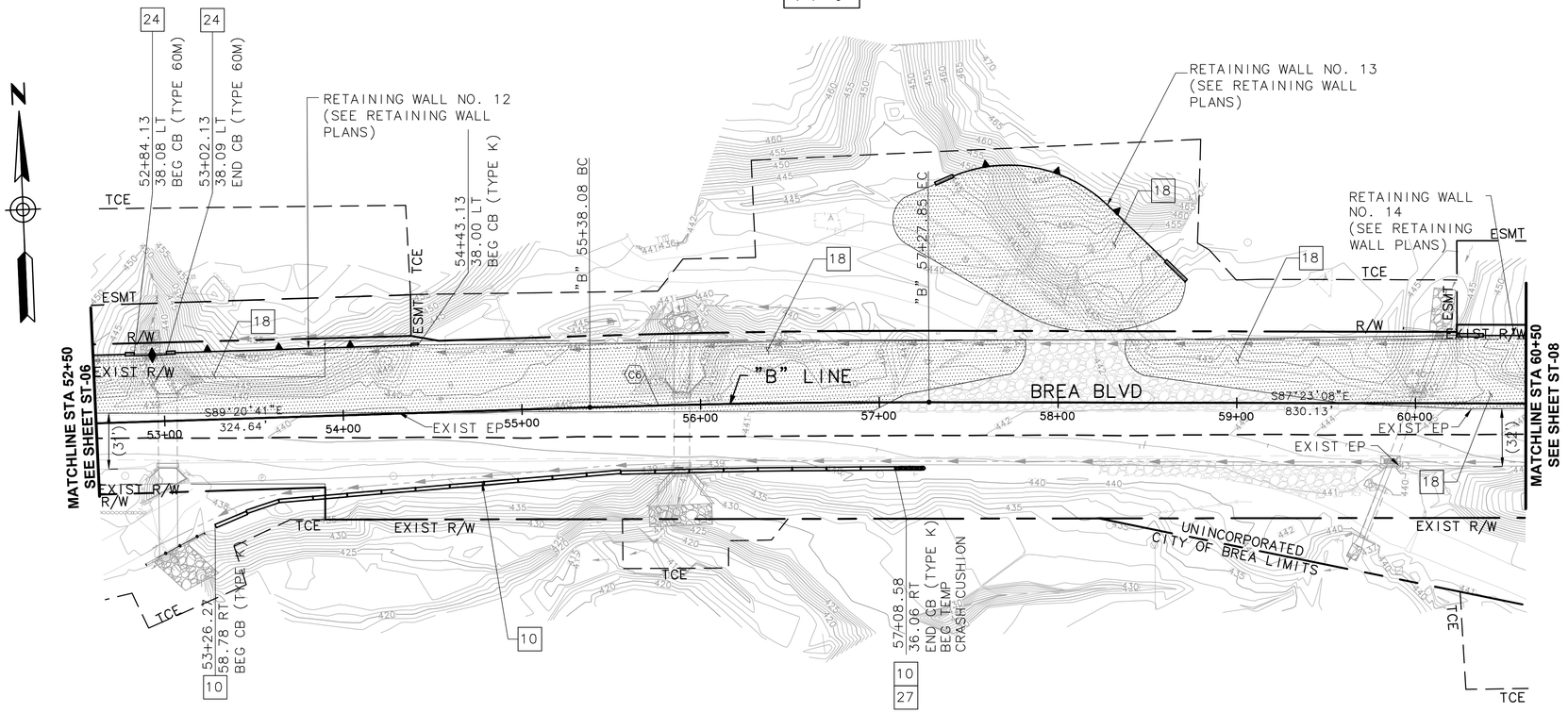
DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-06-08_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN
PREPARED BY:
County of Orange
OC PublicWorks
MARK THOMAS

BREA BOULEVARD WIDENING
PHASE 1
STA. 44+50 TO STA.52+50
STREET IMPROVEMENT PLAN

SHEET
ST-06

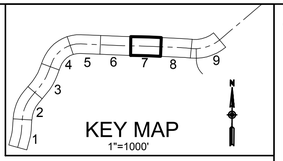


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.



CONSTRUCTION NOTES:

10 INSTALL CONCRETE BARRIER (TYPE K) PER CALTRANS PLANS T3A.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS

24 CONSTRUCT CONCRETE BARRIER (TYPE 60M) PER CALTRANS STD. PLAN A76A AND A76B.

27 INSTALL TEMPORARY CRASH CUSHION ARRAY 'TS11' PER CALTRANS STD. PLAN T2.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C CUT LINE
- F FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C6	5550.00'	1°57'33"	94.89'	189.76'

100% SUBMITTAL NOT FOR CONSTRUCTION

GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:

RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

10-15-21
DATE

RAVI SHAH, P.E.

DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-06-08_80scyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

PREPARED BY:

County of Orange
PublicWorks

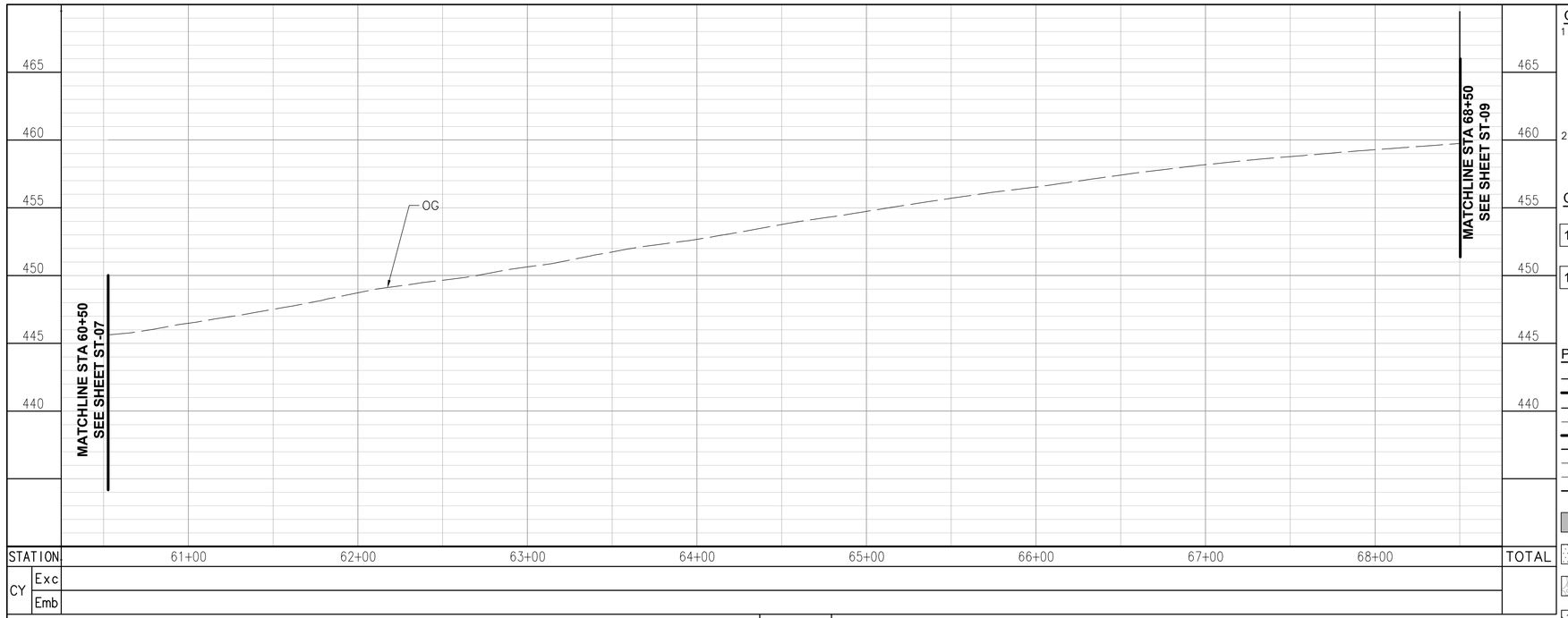
MARK THOMAS

BREA BOULEVARD WIDENING
PHASE 1
STA. 51+50 TO STA. 60+50

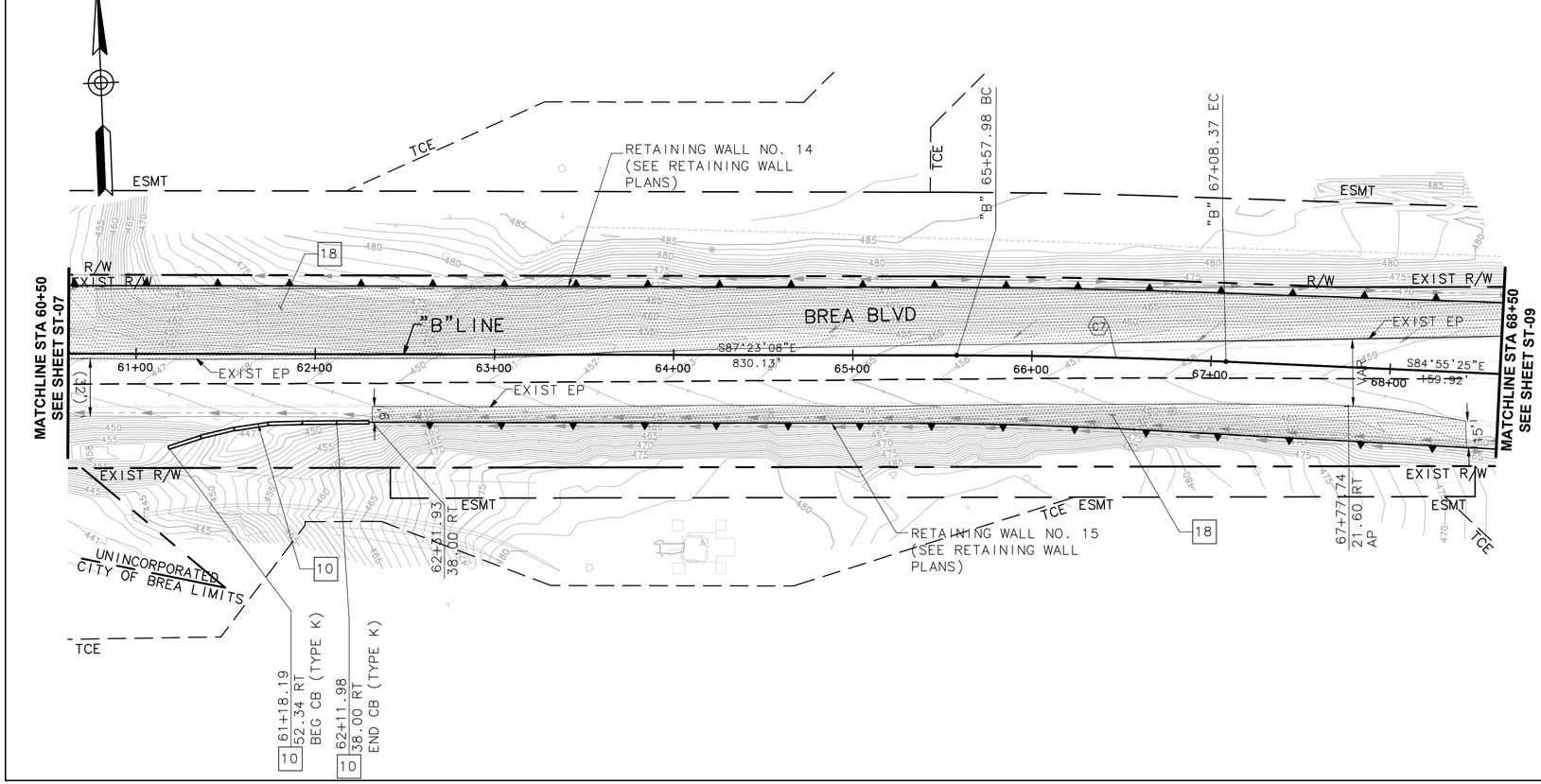
STREET IMPROVEMENT PLAN

SHEET

ST-07

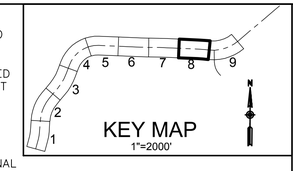


PROFILE
H=1" = 40'
V=1" = 5'



GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.



CONSTRUCTION NOTES:

10 INSTALL CONCRETE BARRIER (TYPE K) PER CALTRANS PLANS T3A.

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS

PAVING LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- CUT LINE
- FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- GRAVEL ROAD
- AC OVERLAY

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C7	3500.00'	2°27'43"	75.21'	150.40'

100% SUBMITTAL
NOT FOR CONSTRUCTION

0 10 20 30 40 60 80 120 160
GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

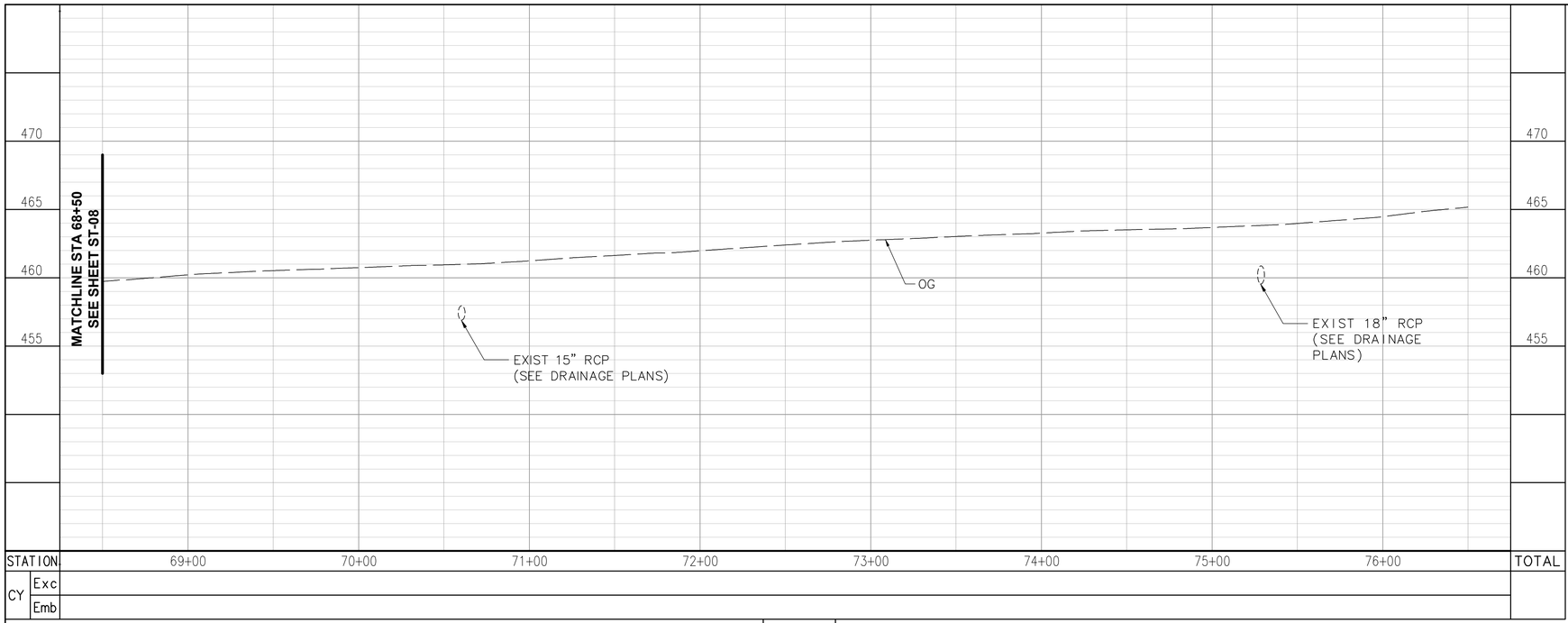
MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER
RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

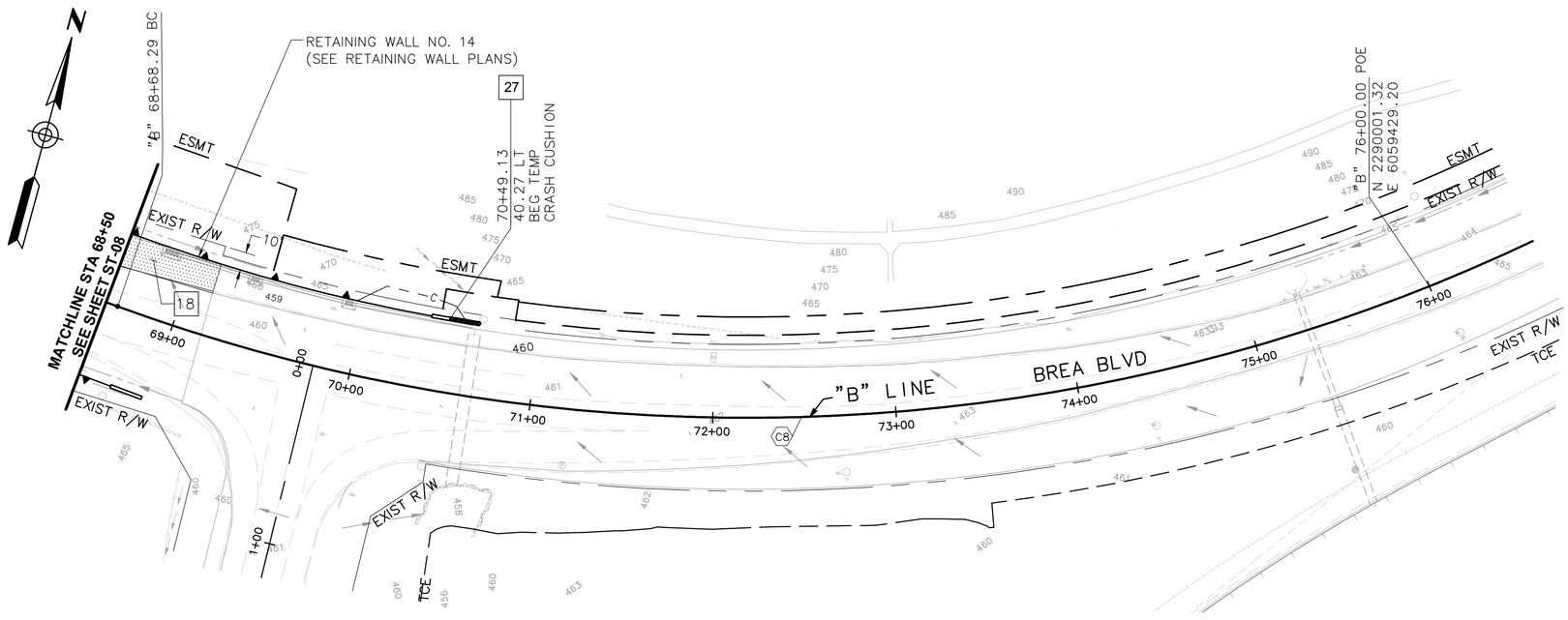
DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: FD
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-06-08_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN
PREPARED BY:
County of Orange
OC Public Works
MARK THOMAS

BREA BOULEVARD
WIDENING
PHASE 1
STA. 60+50 TO STA. 68+50
STREET IMPROVEMENT PLAN

SHEET
ST-08
21 OF 278



PROFILE
H=1" = 40'
V=1" = 5'

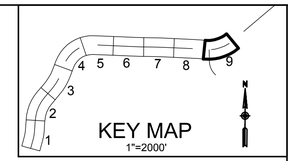


ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	DELTA	TANGENT	LENGTH
C8	1000.00'	45°36'03"	420.37'	795.88'

NO STREET IMPROVEMENTS FROM STA 76+50 TO STA 85+00

GENERAL NOTES:

1. ALL CONSTRUCTION ACTIVITES TO BE IN COMPLIANCE WITH ALL APPLICABLE REGULATION AND/OR MITIGATION MEASURES IDENTIFIED IN ENVIRONMENTAL IMPACT REPORT (EIR) 610 MITIGATION MONITORING AND REPORTING PROGRAM.
2. CONCEPT UTILITY RELOCATION PLANS SHOWN ON UT SHEETS. FINAL UTILITY RELOCATION PLANS WILL BE PROVIDED BY THE UTILITY OWNER.



CONSTRUCTION NOTES:

18 CONSTRUCT ROADWAY GRADING USING EXCAVATED MATERIALS

27 INSTALL TEMPORARY CRASH CUSHION ARRAY 'TS11' PER CALTRANS STD. PLAN T2.

LEGEND:

- CENTERLINE
- CITY LIMITS
- TCE
- EXIST R/W
- PROPOSED R/W
- EASEMENT
- C CUT LINE
- F FILL LINE
- RETAINING WALL
- CONSTRUCT PAVEMENT PER STRUCTURAL SECTION
- ROADWAY GRADING
- AC OVERLAY

100% SUBMITTAL
NOT FOR CONSTRUCTION

GRAPHIC SCALE
1" = 40'

COUNTY OF ORANGE CALIFORNIA

MARK	DESCRIPTION	DATE	APPR.

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER
RAVI SHAH
No. C79183
Exp. 3-31-22
CIVIL
STATE OF CALIFORNIA
10-15-21
DATE
RAVI SHAH, P.E.

DESIGNED BY: VG
DRAWN BY: PB
CHECKED BY: ED
DRAWING NO.: ViewTitle
FILE NAME: RD_ST-09_RdwyPln PH1.dwg
PLOT DATE: Tuesday, October 19, 2021
SCALE: AS SHOWN

County of Orange
PublicWorks

PREPARED BY: MARK THOMAS

BREA BOULEVARD
WIDENING
PHASE 1
STA. 68+50 TO STA. 76+50

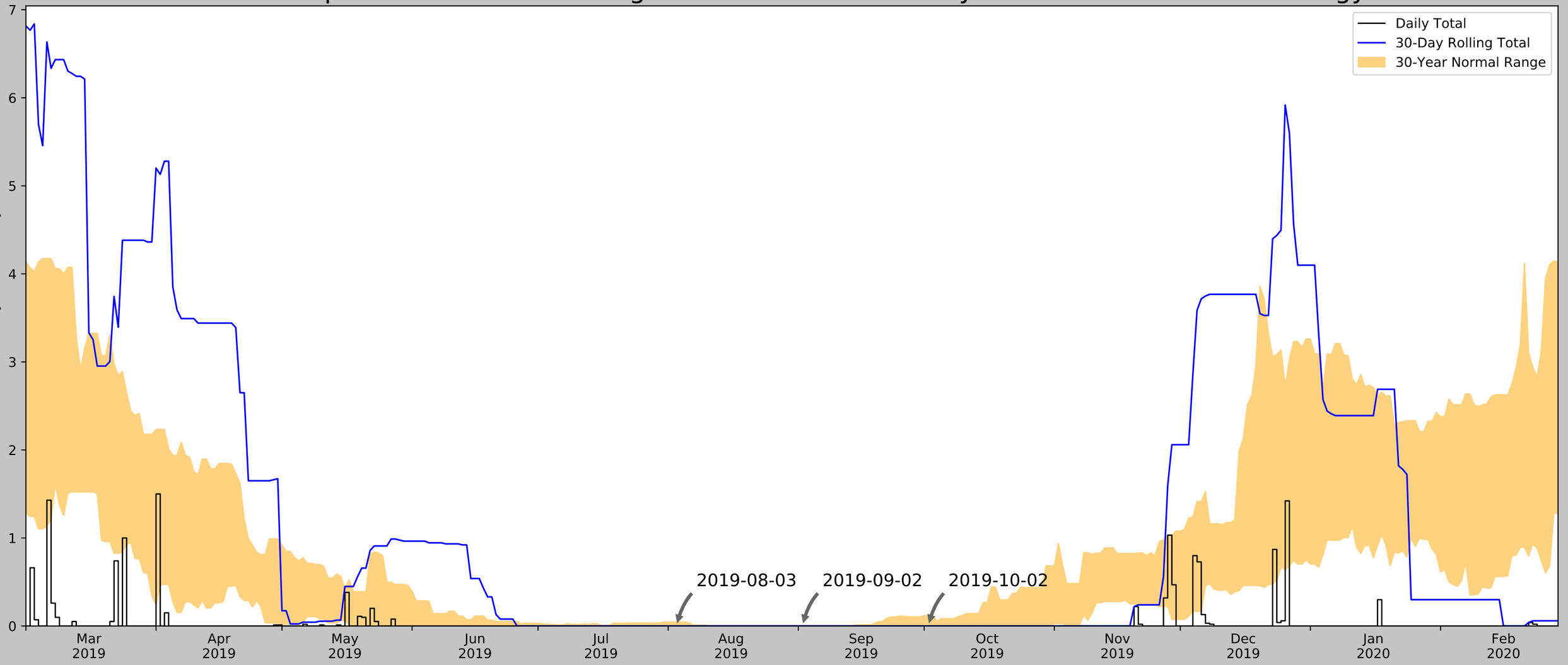
STREET IMPROVEMENT PLAN

SHEET

ST-09

22 OF 278

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.939891, -117.890554
Observation Date	2019-10-02
Elevation (ft)	403.53
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

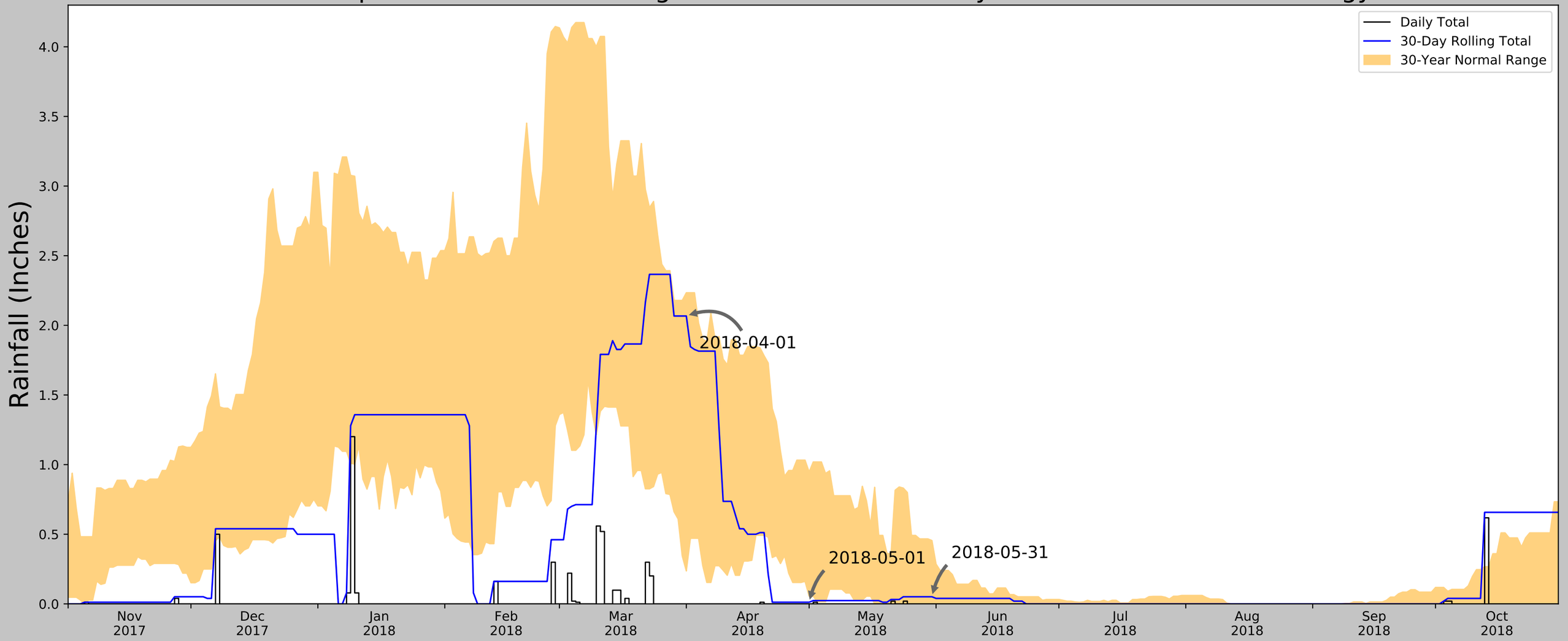
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2019-10-02	0.0	0.11811	0.0	Normal	2	3	6
2019-09-02	0.0	0.0	0.0	Normal	2	2	4
2019-08-03	0.0	0.045669	0.0	Normal	2	1	2
Result							Normal Conditions - 12

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
ANAHEIM	33.8647, -117.8425	234.908	5.881	168.622	3.638	10698	90
ORANGE CO RSVR	33.9378, -117.885	660.105	0.35	256.575	0.247	2	0
WALNUT NI FC102C	34.0017, -117.8658	487.861	4.5	84.331	2.404	278	0
YORBA LINDA	33.89, -117.8189	350.066	5.363	53.464	2.7	31	0
WHITTIER 3.6 ESE	33.9373, -117.9844	289.042	5.382	114.488	3.038	80	0
PLACENTIA 2.1 ESE	33.8685, -117.8218	255.906	6.315	147.624	3.774	8	0
WHITTIER CITY YARD FC106C	33.9758, -118.0222	445.866	7.942	42.336	3.91	226	0
ANAHEIM 4.9 E	33.847, -117.7871	374.016	8.741	29.514	4.191	4	0
ANAHEIM 4.9 ENE	33.8632, -117.7918	297.9	7.756	105.63	4.309	4	0
COVINA CITY YARD FC387B	34.0917, -117.88	606.955	10.506	203.425	6.865	2	0
SAN GABRIEL FIRE DEPT	34.0842, -118.1003	362.861	15.612	40.669	7.66	19	0

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.939891, -117.890554
Observation Date	2018-05-31
Elevation (ft)	403.53
Drought Index (PDSI)	Extreme drought
WebWIMP H_2O Balance	Dry Season

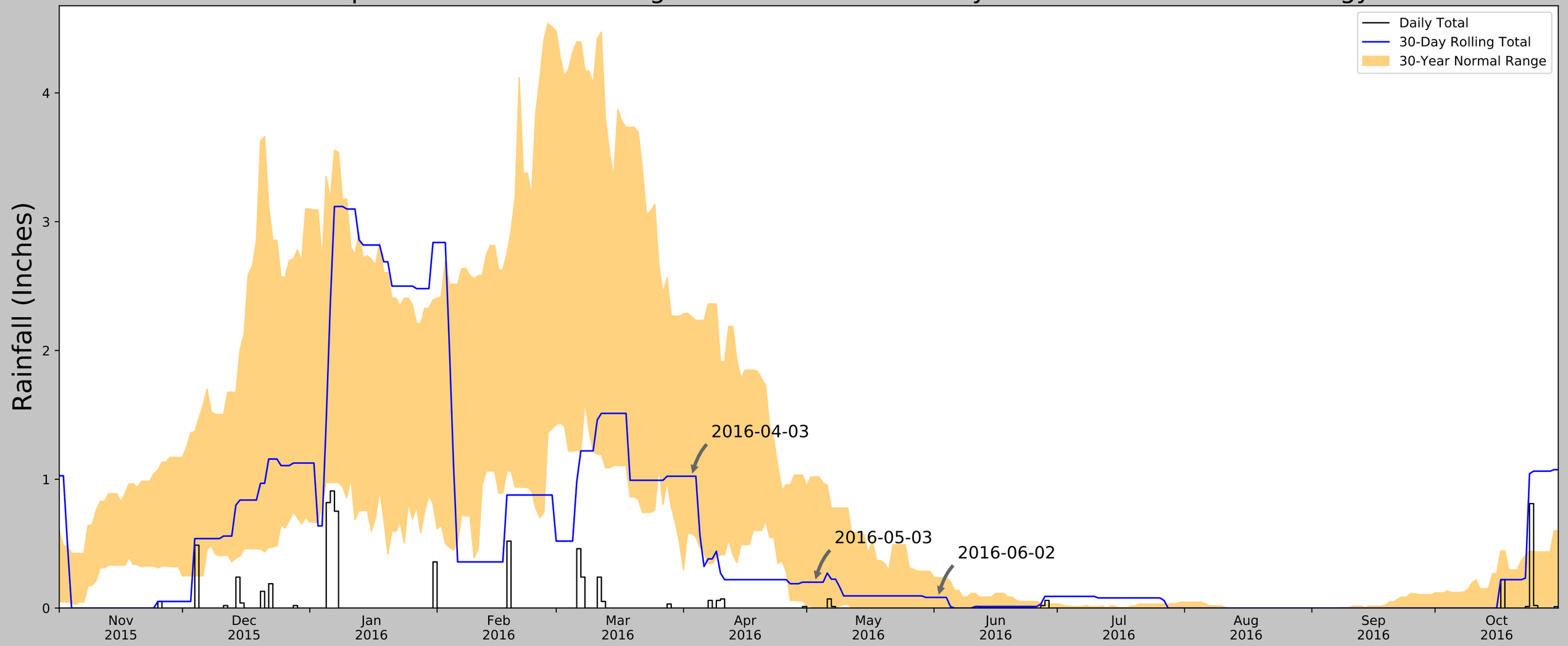
30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2018-05-31	0.0	0.455118	0.051181	Normal	2	3	6
2018-05-01	0.055512	0.947244	0.011811	Dry	1	2	2
2018-04-01	0.23622	2.234252	2.066929	Normal	2	1	2
Result							Normal Conditions - 10

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
ANAHEIM	33.8647, -117.8425	234.908	5.881	168.622	3.638	9968	90
ORANGE CO RSVR	33.9378, -117.885	660.105	0.35	256.575	0.247	2	0
WALNUT NI FC102C	34.0017, -117.8658	487.861	4.5	84.331	2.404	979	0
YORBA LINDA	33.89, -117.8189	350.066	5.363	53.464	2.7	31	0
WHITTIER 3.6 ESE	33.9373, -117.9844	289.042	5.382	114.488	3.038	80	0
PLACENTIA 2.1 ESE	33.8685, -117.8218	255.906	6.315	147.624	3.774	8	0
WHITTIER CITY YARD FC106C	33.9758, -118.0222	445.866	7.942	42.336	3.91	227	0
ANAHEIM 4.9 E	33.847, -117.7871	374.016	8.741	29.514	4.191	4	0
ANAHEIM 4.9 ENE	33.8632, -117.7918	297.9	7.756	105.63	4.309	4	0
COVINA CITY YARD FC387B	34.0917, -117.88	606.955	10.506	203.425	6.865	2	0
SAN GABRIEL FIRE DEPT	34.0842, -118.1003	362.861	15.612	40.669	7.66	47	0
MONTEBELLO	34.0192, -118.1053	246.063	13.469	157.467	8.182	1	0

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	33.939891, -117.890554
Observation Date	2016-06-02
Elevation (ft)	403.53
Drought Index (PDSI)	Extreme drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30^{th} %ile (in)	70^{th} %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2016-06-02	0.0	0.234646	0.082677	Normal	2	3	6
2016-05-03	0.0	1.019291	0.200787	Normal	2	2	4
2016-04-03	0.577953	2.261024	1.023622	Normal	2	1	2
Result							Normal Conditions - 12

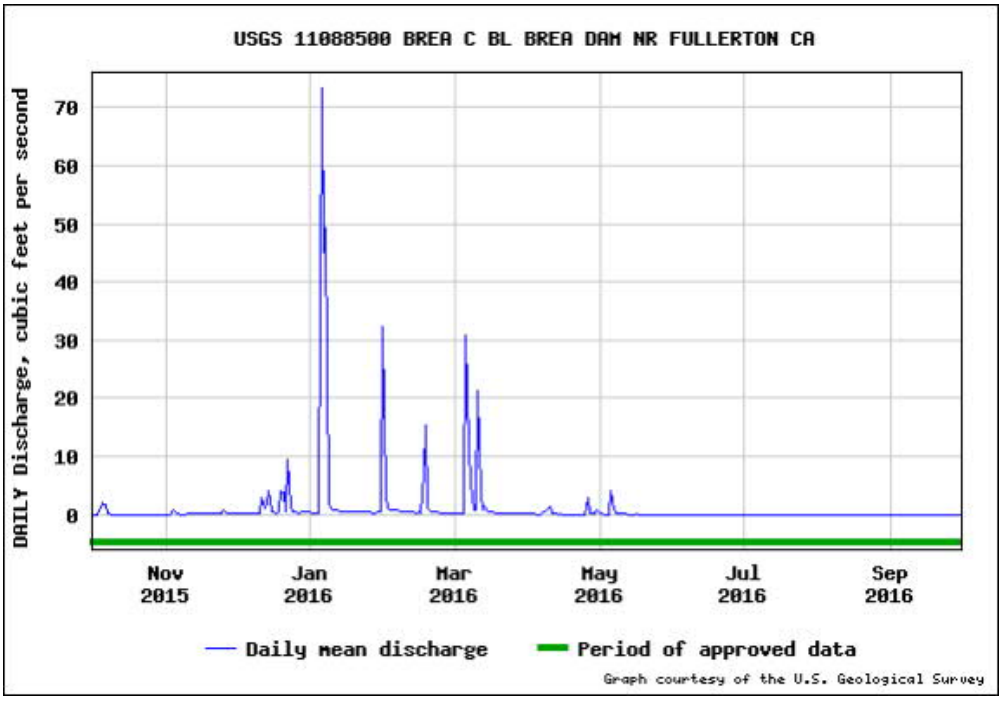
Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days (Normal)	Days (Antecedent)
ANAHEIM	33.8647, -117.8425	234.908	5.881	168.622	3.638	9237	90
ORANGE CO RSVR	33.9378, -117.885	660.105	0.35	256.575	0.247	2	0
WALNUT NI FC102C	34.0017, -117.8658	487.861	4.5	84.331	2.404	1709	0
YORBA LINDA	33.89, -117.8189	350.066	5.363	53.464	2.7	31	0
WHITTIER 3.6 ESE	33.9373, -117.9844	289.042	5.382	114.488	3.038	80	0
PLACENTIA 2.1 ESE	33.8685, -117.8218	255.906	6.315	147.624	3.774	8	0
WHITTIER CITY YARD FC106C	33.9758, -118.0222	445.866	7.942	42.336	3.91	227	0
ANAHEIM 4.9 E	33.847, -117.7871	374.016	8.741	29.514	4.191	4	0
ANAHEIM 4.9 ENE	33.8632, -117.7918	297.9	7.756	105.63	4.309	4	0
COVINA CITY YARD FC387B	34.0917, -117.88	606.955	10.506	203.425	6.865	2	0
SAN GABRIEL FIRE DEPT	34.0842, -118.1003	362.861	15.612	40.669	7.66	47	0
MONTEBELLO	34.0192, -118.1053	246.063	13.469	157.467	8.182	1	0

Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

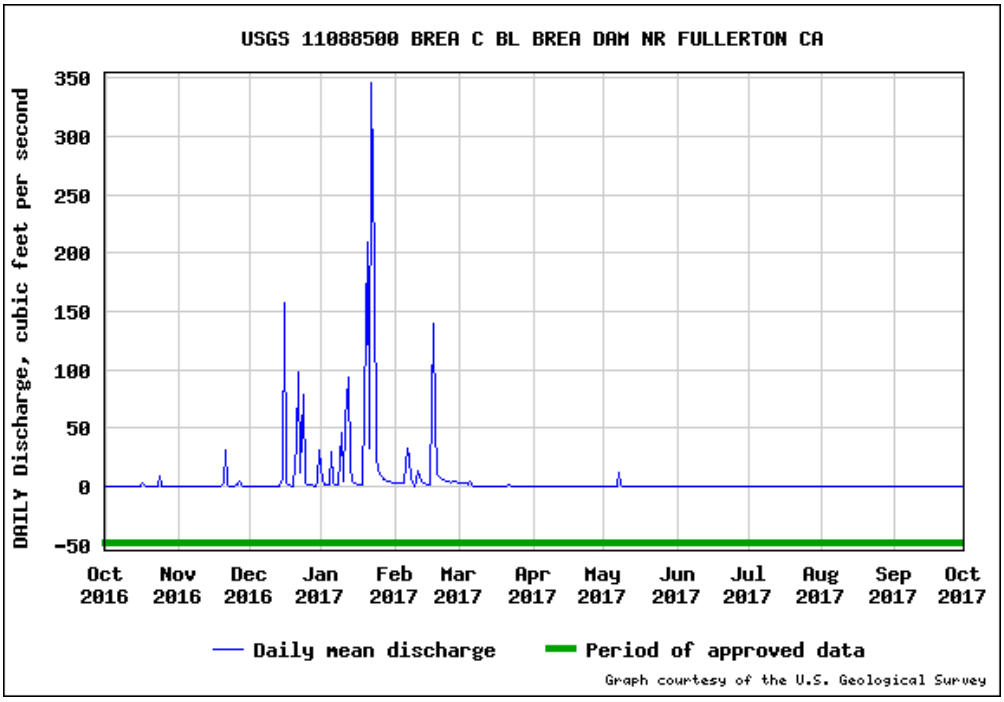
Written by Jason Deters
U.S. Army Corps of Engineers

Graphic C-1. Daily Mean Discharge, Showing Peak Flows During Water Year;
(a) 2016, (b) 2017, (c) 2018, (d) 2019.

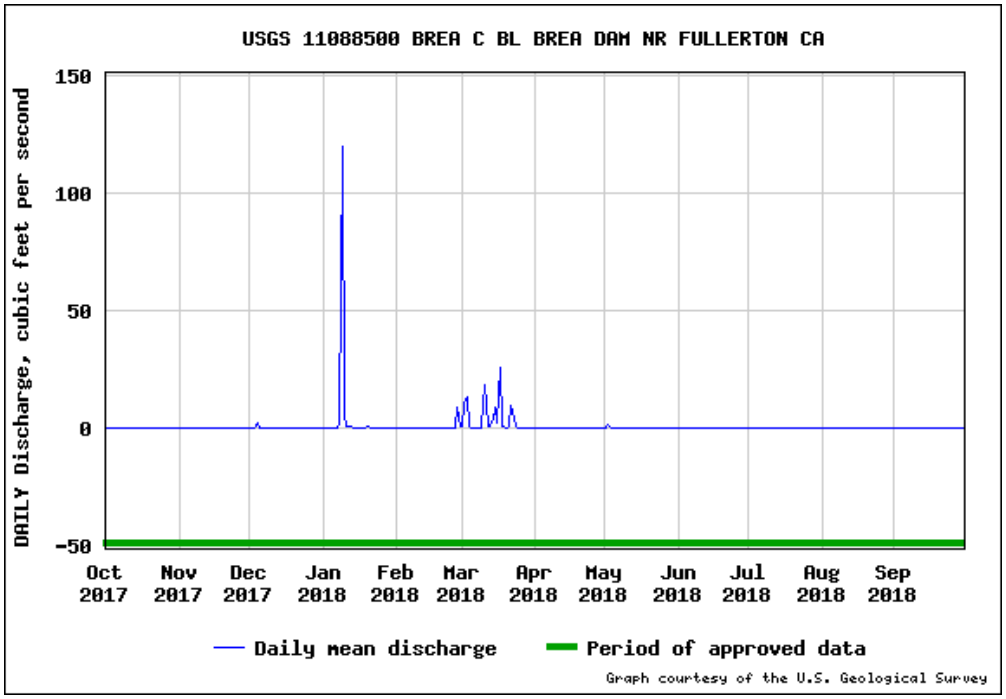
(a)



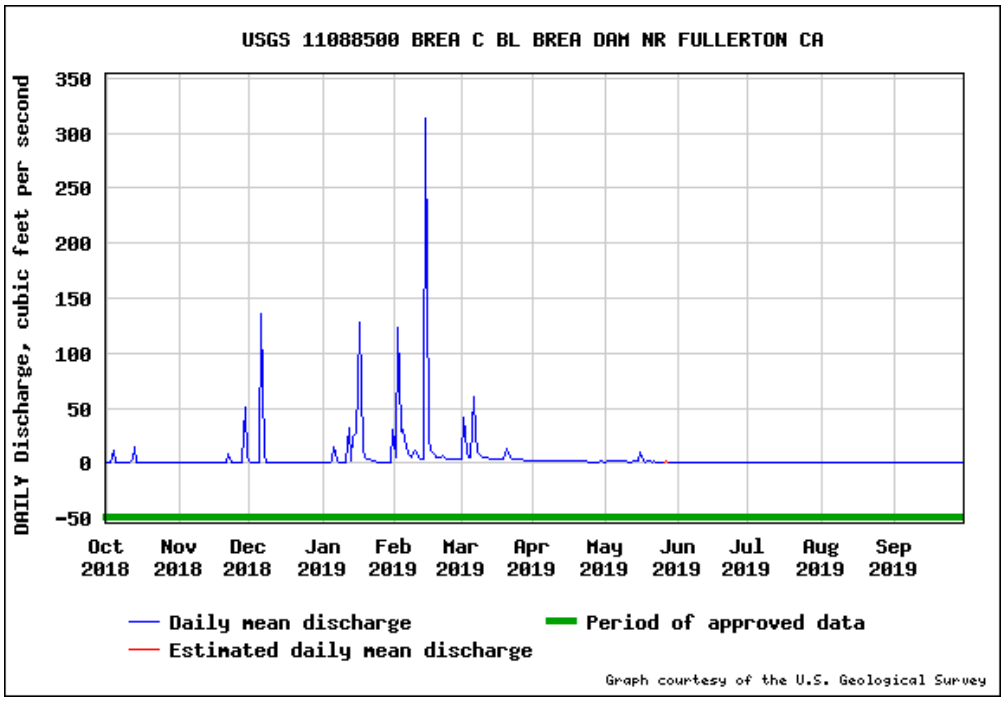
(b)



(c)


USGS 11088500 BREA C BL BREA DAM NR FULLERTON CA
DAILY Discharge, cubic feet per second
150
100
50
0
-50
Oct 2017
Nov 2017
Dec 2017
Jan 2018
Feb 2018
Mar 2018
Apr 2018
May 2018
Jun 2018
Jul 2018
Aug 2018
Sep 2018
Daily mean discharge
Period of approved data
Graph courtesy of the U.S. Geological Survey

(d)


USGS 11088500 BREA C BL BREA DAM NR FULLERTON CA
DAILY Discharge, cubic feet per second
350
300
250
200
150
100
50
0
-50
Oct 2018
Nov 2018
Dec 2018
Jan 2019
Feb 2019
Mar 2019
Apr 2019
May 2019
Jun 2019
Jul 2019
Aug 2019
Sep 2019
Daily mean discharge
Period of approved data
Estimated daily mean discharge
Graph courtesy of the U.S. Geological Survey

APPENDIX D

WETLAND DATASHEETS & PRELIMINARY JD FORMS

Brea Boulevard Corridor Improvement Project

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: Approx. 1490 Brea Blvd, Brea, CA 92821 (Street Address)
  City/Township/Parish: Brea (and Uninc. County) County: Orange State: CA
  Acreage of Parcel/Review Area for JD: 300 acres
  Section: 2, 12; Township: 3 S, 2 S Range: 10 W, 9 W (La Habra & Yorba Linda Quads)
  Latitude (decimal degrees): 33.9402712 Longitude (decimal degrees): -117.88524047
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ☐ I currently own this property. ___ I plan to purchase this property.
  ☑ I am an agent/consultant acting on behalf of the requestor.
  ☐ Other (please explain): _____.
- Reason for request: (check as many as applicable)
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ☐ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ☐ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ☑ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ☐ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ☐ A Corps JD is required in order to obtain my local/state authorization.
  ☐ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ☐ I believe that the site may be comprised entirely of dry land.
  ☐ Other: _____
- Type of determination being requested:
  ☐ I am requesting an approved JD.
  ☑ I am requesting a preliminary JD.
  ☐ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
  ☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: Larsen, Erik Digitally signed by Larsen, Erik DN: cn=Larsen, Erik, ou=USORA1 Date: 2020.07.16 14:10:20 -0700' Date: 16July2020

- Typed or printed name: Erik Larsen, D.Env.

Company name: AECOM

Address: 999 Town & Country Road

Orange, CA 92868

Daytime phone no.: 714.648.2043

Email address: erik.larsen@aecom.com

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: July 16, 2020

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: OC Public Works (Consultant: Erik Larsen, AECOM)

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: LAD; File Number: _____

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: CA County/parish/borough: Orange City: Brea (and Unincorporated County)

Center coordinates of site (lat/long in degree decimal format):

Lat.: 33.94027120 Long.: -117.88524047

Universal Transverse Mercator: n/a

Name of nearest waterbody: Coyote Creek; San Gabriel River; Pacific Ocean

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

■ Office (Desk) Determination. Date: Oct. 2, 2019

■ Field Determination. Date(s): May 31, June 2, Dec 29, 2016; May 29, 31, 2018; Oct 1, 2, 2019

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION.

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)
1	33.94027120	-117.88524047	1.89	Wetland WoUS	Section 404
2	33.94027120	-117.88524047	2.28	Non-Wetland WoUS	Section 404
3a	33.93898476	-117.87793267	0.07	Non-Wetland WoUS	Section 404
3b	33.94118	-117.87593	1.52	Non-Wetland WoUS	Section 404
3c	33.935129	-117.89436	0.60	Non-Wetland WoUS	Section 404
4	33.94092046	-117.88135274	0.16	Non-Wetland WoUS	Section 404

1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.
2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

Brea Boulevard Corridor Improvement Project

SUPPORTING DATA. Data reviewed for PJD (check all that apply)

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- [x] Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
  Map: JD Report Figures.
- [x] Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - [ ] Office concurs with data sheets/delineation report.
  - [ ] Office does not concur with data sheets/delineation report. Rationale: _____.
- [ ] Data sheets prepared by the Corps: _____.
- [ ] Corps navigable waters' study: _____.
- [x] U.S. Geological Survey Hydrologic Atlas: JD Report Figures 1 - 14.
  - [x] USGS NHD data.
  - [x] USGS 8 and 12 digit HUC maps.
- [ ] U.S. Geological Survey map(s). Cite scale & quad name: _____.
- [x] Natural Resources Conservation Service Soil Survey. Citation: JD Report Figures and Tables.
- [x] National wetlands inventory map(s). Cite name: JD Report Figures.
- [ ] State/local wetland inventory map(s): _____.
- [ ] FEMA/FIRM maps: _____.
- [ ] 100-year Floodplain Elevation is: _____.(National Geodetic Vertical Datum of 1929)
- [x] Photographs: [x] Aerial (Name & Date): Figures.
  or [x] Other (Name & Date): Various; 2016, 2018, 2019.
- [ ] Previous determination(s). File no. and date of response letter: _____.
- [ ] Other information (please specify): _____.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

_____
Signature and date of
Regulatory staff member
completing PJD

Larsen, Erik Digitally signed by Larsen, Erik
DN: cn=Larsen, Erik, ou=USORA1
Date: 2020.07.16 14:08:57 -07'00'
Signature and date of
person requesting PJD
(REQUIRED, unless obtaining
the signature is impracticable)[1]

[1] Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

Brea Boulevard Corridor Improvement Project

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
1 - Wetlands along Main Channel	CALIFORNIA	PFO	RIVERINE	Area	1.89	ACRE	DELINEATE	33.94027120	-117.88524047	Brea Canyon Creek (A04)
2 - Non-Wetland WoUS, Open Water	CALIFORNIA	R3UB	RIVERINE	Area	2.28	ACRE	DELINEATE	33.94027120	-117.88524047	Brea Canyon Creek (A04)
3a - Under Bridges 1-3, Concrete Box Channel	CALIFORNIA	R3	RIVERINE	Area	0.07	ACRE	DELINEATE	33.93898476	-117.87793267	Brea Canyon Creek (A04)
3b - Open Concrete Box Channel	CALIFORNIA	R3	RIVERINE	Area	1.52	ACRE	DELINEATE	33.94118000	-117.87593000	Brea Canyon Creek (A04)
3c - Rip rap - lined Trapazoidal Channel	CALIFORNIA	R3	RIVERINE	Area	0.6	ACRE	DELINEATE	33.93512900	-117.89436000	Brea Canyon Creek (A04)
4 -Non-Wetland WoUS, Ephemeral Drainages	CALIFORNIA	R6	RIVERINE	Area	0.16	ACRE	DELINEATE	33.94092046	-117.88135274	Brea Canyon Creek (A04)

This page intentionally left blank.

APPENDIX H
WILDLIFE MOVEMENT STUDY

WILDLIFE MOVEMENT STUDY

BREA BOULEVARD CORRIDOR IMPROVEMENT PROJECT

Prepared for:

Orange County Public Works
601 North Ross Street
Santa Ana, CA 92701

Contact:

Austin Morgan, P.E.

Prepared by:

AECOM
401 West A Street, Suite 1200
San Diego, CA 92101
Contact: Andrew Fisher

July 2021

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

Figure **Page**

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

Brea Boulevard Corridor	1.7-mile road segment to be upgraded, of which 1.5 miles to be widened
CPW	Colorado Parks and Wildlife
GLMM	generalized linear mixed model
MPAH	Master Plan of Arterial Highways
MPH	miles per hour
OC Public Works	Orange County Public Works
OCTA	Orange County Transportation Authority
O&M	operations & maintenance
Project	Brea Boulevard Corridor Improvement Project
RA	relative activity
REC	Road Ecology Center
R/W	right-of-way
SR	State Route
Study	Wildlife Movement Study
WVC	wildlife vehicle conflict

EXECUTIVE SUMMARY

Orange County Public Works (OC Public Works) has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). The Brea Boulevard Corridor Improvement Project ("Project") is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route 57 (SR-57) southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor). The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the Brea Boulevard Corridor (approximately 1.5-miles), replacing and widening three functionally obsolete bridges, installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge west of the intersection of Tonner Canyon Road and Brea Boulevard, adding open graded asphalt concrete paving at the southern end of the Brea Boulevard Corridor, and providing striping and installing new signage.

Regionally, Brea Boulevard is located along the southern edge of an important wildlife movement corridor known as the Puente–Chino Hills Wildlife Corridor (Spencer 2005). This wildlife movement corridor of relatively undeveloped native habitat stretches from the Santa Ana Mountains and Chino Hills in the east to the Whittier Hills in the west. While some of the habitat within the Puente–Chino Hills Wildlife Corridor is conserved, the middle portion of the Puente–Chino Hills Wildlife Corridor known as the "Missing Middle", where the northern part of the Project is located, is not conserved or protected.

In support of the Project's Environmental Impact Report, and to understand potential impacts of the Project on local wildlife and regional wildlife connectivity, a Wildlife Movement Study (Study) was conducted between January 2020 and February 2021. Objectives of this Study include the following.

- Determine baseline conditions of wildlife movement along Brea Boulevard Corridor to serve as 1) the foundation of an impact analysis, and 2) future comparison against a post-construction study.
- Assess potential impacts to wildlife movement from the Project.

- Recommend design features for incorporation into the Project to improve the permeability of Brea Boulevard for wildlife movement along Brea Creek. This will improve the connectivity across the Puente-Chino Hills Wildlife Corridor, particularly within the "Missing Middle" portion.

This Study used wildlife camera surveys and roadkill surveys to understand baseline wildlife movement patterns prior to construction of the Project. Wildlife camera surveys were conducted to assess wildlife presence, use, and movement patterns within the Brea Boulevard Corridor. Roadkill surveys were conducted to identify locations where wildlife mortality is concentrated, which may be indicative of current road design features that impede wildlife movement.

Initial selection of focal species for this Study consisted of two size classes of mammals including five large mammals (mule deer, *Odocoileus hemionus*; mountain lion, *Puma concolor*; coyote, *Canis latrans*; gray fox*, Urocyon cinereoargenteus*; and bobcat, *Lynx rufus*), and four medium mammals (raccoon, *Procyon lotor*; striped skunk, *Mephitis mephitis*; Virginia opossum, *Didelphis virginiana*; and desert cottontail, *Sylvilagus audubonii*). These species have the potential to occur within the Brea Boulevard Corridor and should serve as broad and representative indicators of how Brea Boulevard currently influences wildlife movement.

To gather baseline wildlife activity data, six month-long wildlife camera surveys were conducted every other month for one year beginning in March 2020 into February 2021. Sixteen wildlife cameras were deployed across 12 sample locations within the Brea Boulevard Corridor, spread among three crossing types (bridges, culverts, at grade): ten cameras were placed at existing bridges and culverts, and six cameras were placed along the Brea Boulevard road edge to document wildlife use and potential crossing attempts at the current road grade. During periods when cameras were operational (i.e. turned on and able to capture images), roadkill surveys were conducted at weekly intervals along both sides of Brea Boulevard. Roadkill surveys were conducted in conjunction with wildlife camera surveys to link wildlife activity patterns with rates of roadkill during the same period. This would help inform potential relationships between wildlife movement and mortality as they pertain to the permeability of Brea Boulevard and its potential to act as a barrier to wildlife movement.

During March, May, July, September, November 2020, and January/February 2021, wildlife cameras were placed along Brea Boulevard at the start of each month, checked at weekly intervals, and then removed at the end of the month. Roadkill surveys were conducted during each camera check, including when cameras were installed and taken down at the beginning and end of each month. Wildlife camera photos were downloaded, photographs reviewed, and data was stored and

sorted using Colorado Parks and Wildlife Photo Warehouse software. Roadkill was recorded using an electronic data collection form that included the species, global positioning system coordinates of the roadkill and other pertinent data. Once the data had been gathered, they were processed to address the objectives of the Study.

Wildlife camera data was analyzed to evaluate wildlife activity levels at the 12 sample locations. One sample location was omitted from the analyses due to limitations with camera placement which resulted in too few photographs to sufficiently analyze. A relative activity (RA) value was calculated for each species or species size class (medium vs large mammals), for every location included in the analysis and during each survey month. RA values are proportions ranging from 0.0 to 1.0, calculated as the number of days (full or partial) a species was detected by a camera at a location, divided by the number of days (full or partial) cameras were operational (i.e. turned on and able to capture images) at the location. Factors influencing spatial and temporal variation in RA values were statistically evaluated using general linear mixed models, and patterns were presented in tables, maps, and graphs. Roadkill survey data were summarized in tables and maps but were not analyzed statistically due to small sample sizes of mortality incidents.

Results indicate that the Brea Boulevard Corridor is regularly used by the focal species, including large mammals (mule deer, coyotes, and bobcats), medium mammals (raccoons, striped skunks, Virginia opossums, and desert cottontail), and a variety of other wildlife, including small mammals, birds, and domestic species. Although mountain lions and gray foxes have a potential to use the Brea Boulevard Corridor, they were not detected in either the camera surveys or roadkill surveys, and thus were not able to be included in the analysis. The most commonly detected large mammals were coyotes, while racoons were the most commonly detected medium mammals. All focal species were observed at all crossing types, including bridges, culverts (except mule deer), and at grade, but the extent of use varied between focal species size classes and among crossing types. Medium mammal activity was higher at bridges, compared to culverts or at grade, while large mammal activity did not vary significantly among the three crossing types. Among the five at grade sample locations, six of the seven species of large and medium mammals exhibited the highest levels of activity at sample location 11 in the eastern portion of the Brea Boulevard Corridor where bridges are absent as undercrossings.

A total of nine roadkill incidents were documented during roadkill surveys (conducted concurrently with wildlife camera checks), including incidents involving raccoons, striped skunks, and Virginia opossums. No mule deer, coyote, or bobcat mortalities were detected, despite photographs of them crossing the road at grade. In general, mortality detections in roadkill surveys were very low and homogenous and did not allow for quantitative spatial analysis of roadkill

hotspots. Incidental roadkill mortality within the Brea Boulevard Corridor documented by other sources (i.e., UC Davis Road Ecology Center and Orange County Animal Control) included two mule deer and one coyote. Otherwise the incidental roadkill data was qualitatively similar to the roadkill observations from regularly scheduled searches in this Study.

Overall, the analysis of mammal activity and roadkill patterns within the Brea Boulevard Corridor suggest that focal wildlife species are able to use existing undercrossings available along the Brea Boulevard Corridor, but that crossing at grade occurs, and results in some level of baseline mortality, which appears to be relatively low. The current configuration of bridges and culverts across Brea Boulevard allows for both large and medium mammals to safely pass under the road in the eastern and western portions of the project area, with the exception of mule deer, which cannot use the culverts in the eastern end because they are too small. Additionally, sample location 11 at the eastern end of the Brea Boulevard Corridor had the highest levels of at grade activity for all focal species, except striped skunks, which exhibited slightly higher activity levels at sample location 1. The presence of a land bridge in the eastern end of the Brea Boulevard Corridor would therefore be especially beneficial to mule deer and potentially other focal species attempting to cross Brea Boulevard. Furthermore, the three bridges over Brea Creek and the land bridge would be large enough to allow mountain lions, gray foxes, and other species to cross Brea Boulevard.

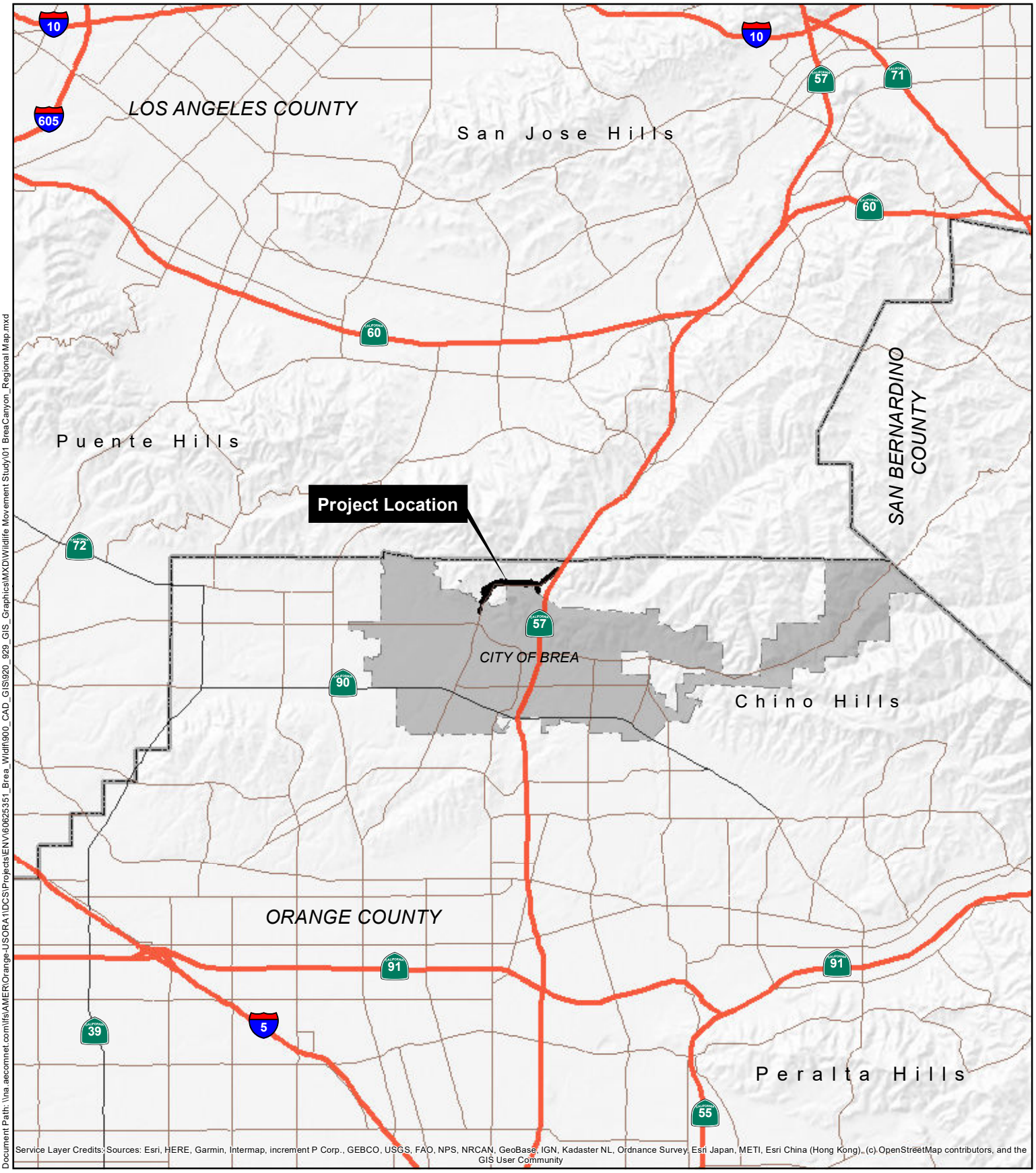
Based on the findings of this Study, recommendations to minimize Project impacts on wildlife movement and improve landscape connectivity for wildlife within the Brea Boulevard Corridor include: implementation of the design recommendations detailed in AZTEC Engineering Group's *Wildlife Connectivity Strategy Scoping Report for the Brea Boulevard Corridor Improvements Project* (AZTEC 2021) (e.g., installment of fencing to direct wildlife to safe crossing locations [proposed improved undercrossings and the proposed land bridge], with jump-out locations [i.e. wildlife escape ramps] positioned within the fencing to allow wildlife safe egress from the roadway, details of lateral access driveway gates or grates to prevent wildlife ingress onto the road, etc.); expansion of Culvert 3 to at least maintain its current openness ratio, with wildlife fencing placed on both sides to direct wildlife to the undercrossing; and installation of wildlife ledges (non-slip surface, approximately 3 feet above the ground, with small ramp at both ends) under both sides of Bridges 2 and 3. Additionally, recommendations to improve the long-term use of the wildlife bridge include: planting of native vegetation at the approach to and across the bridge, minimize impacts of ambient light and traffic noise on wildlife use of the overpass, and exclude regular use by humans. Finally, post-construction monitoring is recommended to document roadkill patterns and wildlife use of the crossings, relative to baseline conditions, and ensure human use of the undercrossings and land bridge are minimized.

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

Orange County Public Works (OC Public Works) has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). The Brea Boulevard Corridor Improvement Project ("Project") is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route 57 (SR-57) southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor). The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the Brea Boulevard Corridor (approximately 1.5-miles), replacing and widening three functionally obsolete bridges (referred to as Bridges 1, 2, and 3), installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge west of the intersection of Tonner Canyon Road and Brea Boulevard, adding open graded asphalt concrete paving at the southern end of the Brea Boulevard Corridor, and providing striping and installing new signage (Figures 1 and 2a). It should be noted the Project would also result in the installation of a new roadway median of varying height and design.

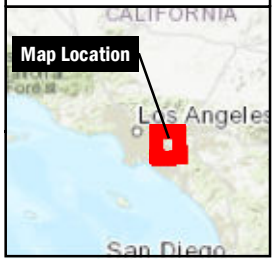
Implementation of the Project is intended to result in several roadway-related improvements within the Brea Boulevard Corridor. Roadway widening to match the OCTA MPAH designation for a Primary Arterial Highway would improve the ability of Brea Boulevard to accommodate average daily traffic volumes sufficient for the traffic volumes collected (November 2019) for the roadway. Bridges 1, 2, and 3 are functionally obsolete, meaning they have exceeded their design lives, do not have the adequate geometry to accommodate the proposed corridor improvements, and should be replaced. Replacing the bridges will present an opportunity to increase the flood conveyance under the bridges from Brea Creek to meet current design standards and avoid emergency response traffic delays during large storm events. The Project would provide enhanced vehicle safety by increasing the driver sight distance along Brea Boulevard. Multiple driveways along Brea Boulevard within the Brea Boulevard Corridor serve as access for adjacent oil field activities and need to be improved to enhance ingress and egress from Brea Boulevard to limit potential traffic delays. Finally, the intersection of Brea Boulevard and Tonner Canyon Road is an unsignalized, three-way t-intersection with stop control on Tonner Canyon Road. Motorists on Tonner Canyon Road suffer undue delays at Brea Boulevard, and traffic control features will be added to improve traffic flow at this intersection.



Document Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60625351_Brea_Wldlf\900_CAD_GIS\920_929_GIS_Graphics\MXD\Wildlife Movement Study\01 BreaCanyon_Regional Map.mxd

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

OVERVIEW MAP



City of Brea

County Boundary

0 10,000

Feet

Scale 1:126,720

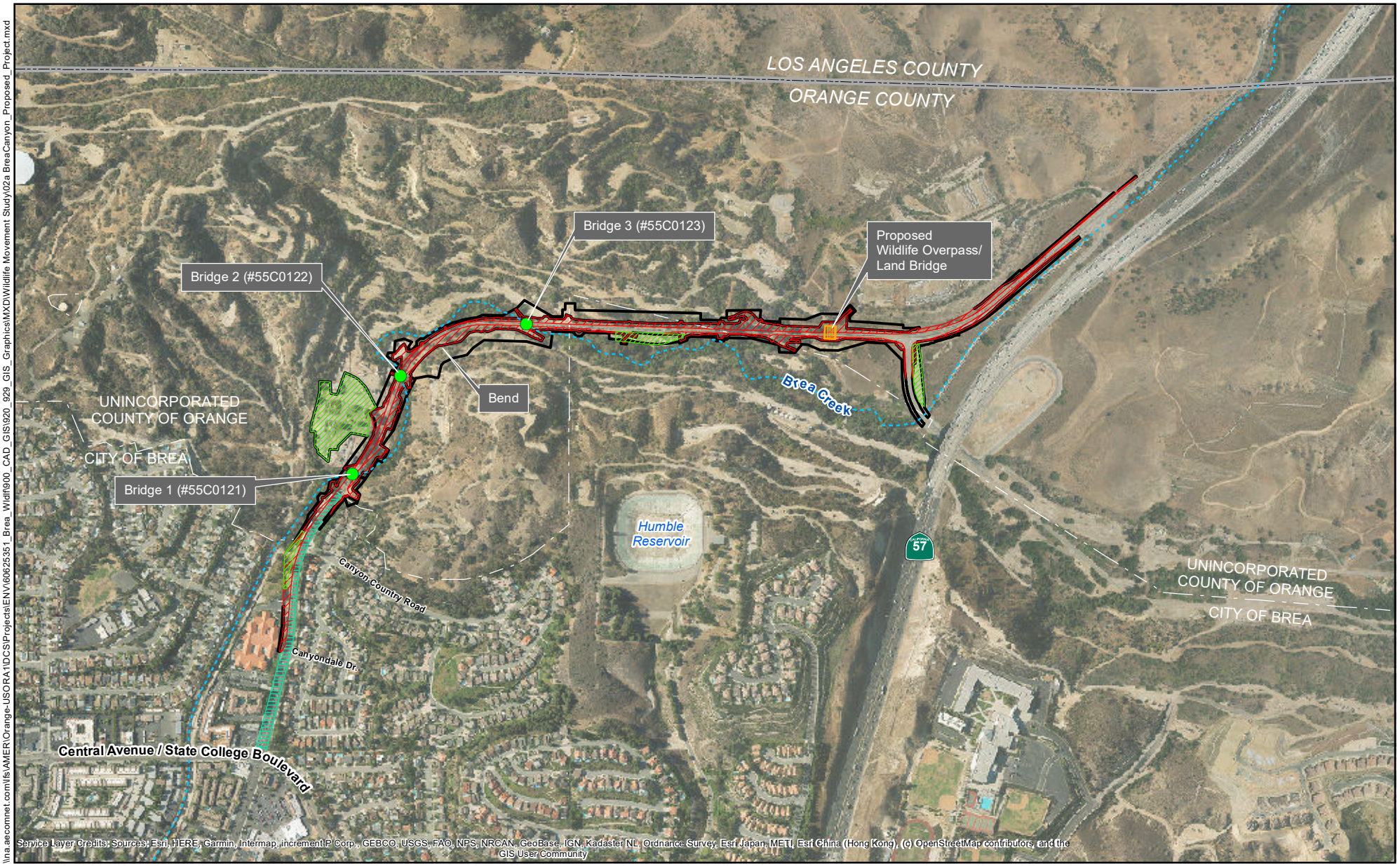
1 inch = 10,560 feet

NORTH

Regional Map

AECOM

Figure 1



\\na.aecomnet.com\fs\AMER\Orange-USORA1\DCS\Projects\ENV\60625351_Brea_Wildlf\900_CAD_GIS\920_929_GIS_Graphics\MXD\Wildlife Movement Study\02a BreaCanyon_Proposed_Project.mxd

OVERVIEW MAP

- Existing Bridge to be Replaced
- Brea Creek
- Proposed Wildlife Overpass/Land Bridge
- Construction Staging/Laydown Areas
- Open Graded Asphalt Concrete
- Permanent Disturbance
- Temporary Disturbance

0 1,000 Feet

NORTH

Scale 1:12,000

1 inch = 1,000 feet

Proposed Project

AECOM

Figure 2a

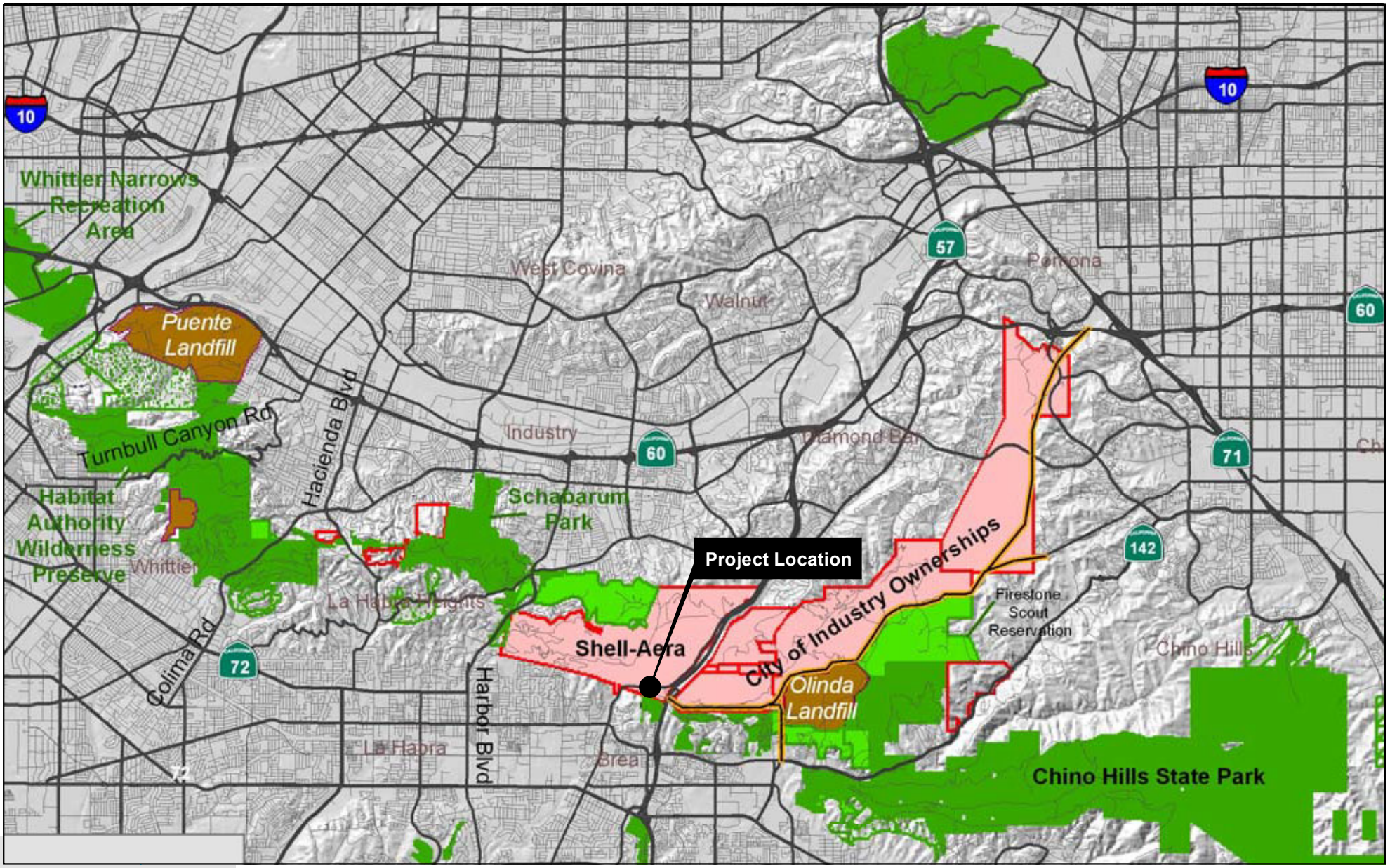
The Project is located within an important wildlife movement corridor, the Puente-Chino Hills Wildlife Corridor (Spencer 2005), that connects the Santa Ana Mountains from the southeast to the Whittier Hills area to the northwest. More specifically, the Brea Boulevard Corridor is located at the southern edge of an identified "Missing Middle" area of the Puente-Chino Hills Wildlife Corridor (Spencer 2005) (Figure 2b). This Missing Middle area is not currently preserved or conserved, but Spencer (2005) suggests its preservation or improvement would provide greater connectivity for wildlife. To enhance wildlife movement across Brea Boulevard between Bridge 1 and Tonner Canyon Road, the three existing bridges (and their undercrossings) will be enlarged/widened and a new wildlife overpass/land bridge would be constructed (Figure 2a). The existing bridge designs have two to three internal support walls that will be eliminated with the new bridge designs, resulting in a greatly improved openness ratio for use by wildlife. The proposed wildlife overpass/land bridge would be installed approximately 550 feet west of the Brea Boulevard/Tonner Canyon Road intersection and would be a single-span cast-in-place prestressed concrete box girder superstructure (AZTEC 2021). The structure will span the full width of the widened roadway, matching the existing top of ridge on either side of the roadway in this area with minimum vertical clearance of over 19 feet above the widened roadway. Wildlife fencing will be constructed on both sides of the widened roadway (where necessary) to funnel animals to the overpass/land bridge and/or through underpasses.

1.2 WILDLIFE MOVEMENT STUDY OBJECTIVES

OC Public Works determined that a wildlife movement study should be conducted prior to Project construction to determine if potential impacts would occur due to implementation of the Project. Therefore, the goal of this Study is to understand animal movement within the Brea Boulevard Corridor to evaluate potential impacts and identify possible project design features that would maximize the permeability of the road to wildlife while minimizing wildlife-traffic interactions. Increased permeability across the Brea Boulevard Corridor would improve connectivity between adjacent areas of wildlife habitat such as Tonner Canyon to the east and Powder Canyon/Schabarum Regional Park to the west (Spencer 2005).

Objectives of this Study include the following.

- Determine baseline conditions of wildlife movement along Brea Boulevard Corridor to serve as 1) the foundation of an impact analysis, and 2) future comparison against a post-construction study.
- Assess potential impacts to wildlife movement from the Project.



OVERVIEW MAP

Land Ownership/Protection Status

- Protected
- Private Open Space
- Threatened Parcels
- Missing Middle
- Landfill
- Golf Courses & Cemeteries
- Proposed Road Alignment
- Highways
- Major Roads
- Local Roads

Notes: Figure from Spencer 2005

0 2.0
Miles
1 inch = 2 miles

NORTH

The Missing Middle of the Puente-Chino Hills Wildlife Corridor

AECOM

Figure 2b

- Recommend design features for incorporation into the Project to improve the permeability of Brea Boulevard for wildlife movement along Brea Creek. This will improve the connectivity across the Puente-Chino Hills Wildlife Corridor, particularly within the "Missing Middle" portion (Figure 2b).

This Study is designed to be replicable and provide an assessment of potential impacts to the local wildlife in the immediate project vicinity by completing an assessment of wildlife movement and roadkill occurrence within the Brea Boulevard Corridor prior to Project construction. This assessment will describe baseline conditions and will identify limitations or constraints to wildlife movement if they exist. This information can help inform recommendations for project design features such as directional fencing, replacement bridge design elements, and could ultimately serve as the baseline dataset for comparison with a post-construction study to evaluate the realized impacts of the Project on wildlife movement patterns and connectivity.

1.3 DESCRIPTION OF BREA BOULEVARD CORRIDOR

1.3.1 Overview

The Project is located in northern Orange County near the Los Angeles County line at the base of the Puente-Chino Hills. It is located along the southern edge of a band of relatively undeveloped land separating the City of Brea with Roland Heights. North of the Brea Boulevard Corridor is generally an active oil field and natural open space within unincorporated Orange County. North of the eastern end of the Brea Boulevard Corridor on property owned by Cal Resources LLC is a commercial vehicle storage facility for several lessees. East of the Brea Boulevard Corridor is SR-57 and Tonner Canyon Road. South and west of the Brea Boulevard Corridor is the City of Brea and associated residential areas, with general commercial and public facility land uses. Immediately south of the middle stretch of the Brea Boulevard Corridor are steep slopes containing additional oil field activity and the Humble Reservoir. On both the north and south sides of Brea Boulevard, the terrain is relatively steep with multiple dirt roads crossing native vegetation where oil extraction is the dominant activity. A series of dirt access roads connect to Brea Boulevard which provide oil field operations and maintenance (O&M) access for Cal Resources LLC and Brea Hills LLC.

Topographically, the habitat is hilly with relatively steep slopes on the southern side of the road, and more gradual slopes on the north side. Brea Boulevard courses through a narrow valley following the path of Brea Creek with relatively mature, dense vegetation growing on both sides

of the road. The adjacent vegetation grows up to the road with little to no road shoulder along most of the road.

Brea Boulevard is a 30-foot-wide, two-lane, undivided highway (one lane in each direction) with portions of the roadway having no curb or gutter, and unpaved, earthen shoulders. Other portions of the roadway are improved with curb, gutter, and sidewalk. The posted speed limit is 55 miles per hour (MPH) in the unincorporated portion of the Brea Boulevard Corridor, and 45 MPH in the City of Brea at the southern end of the Brea Boulevard Corridor. Brea Boulevard has remained relatively unchanged since the roadway was realigned to its present configuration between 1928 and 1930 with right-of-way (R/W) width that varies between 60 to 100 feet.

There are three bridges that span Brea Creek within the Brea Boulevard Corridor (Figure 2a): a two-span reinforced concrete slab bridge constructed circa 1920 and widened circa 1929 (Bridge 1; the western-most bridge), a two-span reinforced concrete T-beam bridge constructed circa 1930 (Bridge 2; the middle), and a three-span reinforced concrete T-beam bridge constructed circa 1939 (Bridge 3; eastern-most bridge). In addition to the three bridges, there are approximately thirteen existing culvert crossings (for drainage or utilities or both). Many of the culverts are small, filled with pipes, sealed off, or filled with soil and other debris. Three culverts that may function as wildlife undercrossings were included in this Study.

Several drainages join and flow through the vicinity of the Brea Boulevard Corridor. Tonner Canyon Creek flows east to west underneath SR-57 and into Brea Creek (which flows south along the west side of SR-57) in the southeastern portion of the Brea Boulevard Corridor. As the Brea Creek flows west and south, it winds across Brea Boulevard three times (underneath Bridges 1, 2, and 3) before exiting the southwest corner of the Brea Boulevard Corridor (Figure 2a).

Vegetation within the vicinity of the Brea Boulevard Corridor includes a narrow band of riparian habitat along Brea Creek. Riparian habitat consists of a mix of native and non-native species, dominated by arroyo willow (*Salix lasiolepis*), Peruvian pepper (*Schinus molle*), eucalyptus (*Eucalyptus* spp.), and Mexican fan palm (*Washingtonia robusta*). Other species observed in this riparian habitat included southern California walnut (*Juglans californica*), laurel sumac (*Malosma laurina*), mulefat (*Baccharis salicifolia*), toyon (*Heteromeles arbutifolia*), goldenbush (*Isocoma menziesii*), black cottonwood (*Populus trichocarpa*), elderberry (*Sambucus nigra*), tree tobacco (*Nicotiana glauca*), castor bean (*Ricinus communis*), California grape (*Vitis girdiana*), and poison oak (*Toxicodendron diversilobum*). Adjacent to the riparian corridor is coast live oak (*Quercus agrifolia*) woodland, patches of nonnative vegetation, eucalyptus trees, coastal sage scrub, and

disturbed habitat among others. Disturbed and non-native scrub and grassland vegetation are predominant on the hillsides surrounding the roadway.

1.3.2 Barriers to Wildlife Movement

Currently there is limited resistance to wildlife movement across most of Brea Boulevard in the form of permanent structures. There are no road medians or concrete-reinforced slopes, walls, or other man-made features that preclude movement across most of Brea Boulevard. The urban development at the southern end of the corridor by Canyondale Drive and Canyon Country Road in the form of residential houses may discourage wildlife use of the area. The rows of houses along the east side of Brea Boulevard at the southern end may force wildlife to travel across the road further north near Bridge 1.

Several types of fences outside the road R/W on Cal Resources LLC and Brea Hills LLC property also restrict wildlife movement. There is 8-foot tall chain-link fencing along the north and west sides of Brea Boulevard from the intersection of Tonner Canyon west to Bridge 1; Figure 2a). The fencing is generally within 6 to 10 feet from the edge of the road shoulder, but up to 25 feet away in a few locations (primarily near bridges). Therefore, wildlife that cross Brea Boulevard at grade from the south are forced to go around the fence along the north side, unless they find a sufficiently large hole or gap in the fence. The condition of the existing chain-link fence was not inspected and hence it is unknown if there are holes in the fence or excavations under the fence to allow wildlife to pass through.

Along the south and east sides of Brea Boulevard, there is approximately 6-foot tall metal pipe fencing (with two lateral bars spaced two feet apart) that begins at the point where the road turns sharply to the east and continues east to Culvert 2 (Figure 2a). This metal pipe fencing is old, fragmented, missing sections, and does not appear to restrict wildlife movement. There is also partial and fragmented fencing on both sides of Tonner Canyon Road (within the Brea Boulevard Corridor) where it abuts Brea Boulevard, with 8-foot tall chain-link fencing on the east side (not permeable to wildlife) and wildlife permeable 6-foot tall metal pipe fencing on the west side.

The extent to which vehicular traffic acts as a barrier to wildlife movement across Brea Boulevard has not previously been examined and will be a focus of this Study. Traffic may act as a barrier by discouraging crossing at grade or below grade through bridges due to noise, or if animals are struck by vehicles and killed when attempting to cross. If traffic presents a barrier to wildlife movement, permeability of that barrier could be altered if suitable undercrossings are present and utilized by wildlife. Bridges and culverts within the Brea Boulevard Corridor vary in size and length, which

can influence the propensity for use by wildlife (Yanes et al. 1995). In particular, they vary in their "openness ratio," which is defined as the width of the undercrossing (horizontal distance between each wall) multiplied by the height, and divided by the length (distance an animal has to travel to pass through the undercrossing) (Yanes et al. 1995). This Study will evaluate wildlife movement patterns in relation to the openness ratio for each focal bridge and culvert in the Brea Boulevard Corridor to identify potential areas for improvement.

1.4 BACKGROUND AND LITERATURE REVIEW

The Brea Boulevard Corridor is located along the southern edge of the Puente-Chino Hills Wildlife Corridor (Figure 2b), which is connected with patches of habitat suitable for a variety of species, such as mule deer, mountain lion, coyote, gray fox, and bobcat among others. Roads can impact wildlife movement by acting as barriers, semi-permeable filters, or highly permeable filters (Spencer 2005) depending on road design, presence of undercrossings (e.g., bridge openings and culverts) and overpasses (e.g., land bridges), and traffic patterns. In the absence of suitable undercrossings or overpasses, wildlife may avoid crossing roads with heavy traffic or may be killed by collisions with moving vehicles, in either case effectively limiting movement. By improving undercrossings, creating a land bridge, and using fencing to guide animal movement, the Project has the potential to improve the permeability of Brea Boulevard (i.e., increase use of undercrossings or overpasses) for wildlife living within, and in particular, moving along the riparian corridor through the area. Wildlife corridors, such as the Puente-Chino Hills Wildlife Corridor, provide critical links for maintaining landscape connectivity, which is paramount to the long-term survival of wildlife species within fragmented landscapes. This landscape connectivity reduces in-breeding depression in isolated populations, which can lead to local extinctions (Hanski 1999), and facilitates the dispersal of young animals away from their natal areas into open habitat patches to further promote genetic diversity. Moreover, for species that migrate seasonally, or for species that require large home ranges for foraging (e.g., mountain lions), habitat connectivity is necessary for allowing animals to move among areas within their core areas.

The Puente-Chino Hills are connected to the Santa Ana Mountains to the east and extend into the Los Angeles basin as a peninsula of habitat surrounded by a matrix of roads and development. Several wildlife studies have been conducted within the region (Robertson et al. 1995, Noss et al. 1997, Haas and Crooks 1999, Haas 2000, Haas and Turschak 2002, Cooper 2000, PCR et al. 2000, Lyren 2001, Haas et al. 2002, PCR 2002, and others) to understand the impacts of increased fragmentation from roads (including highways and interstates), residential housing, commercial and industrial development on species that live in this area of Southern California. These studies looked at a range of species consisting of reptiles, amphibians, birds, and mammals. As

summarized in Spencer (2005), there is a gradient declining species diversity across the Puente-Chino Hills the from east to west. This may be attributed to higher mortality and increased edge effects in the more developed and fragmented western portions of the wildlife corridor, which tend to be smaller and are further removed from larger, more intact preserved lands to the east near the Santa Ana Mountains. Species abundance and diversity decline over space with increasing frequency of crossing barriers. This pattern has been documented across taxa but is especially prevalent for animals with large home ranges in which they routinely encounter barriers to movement, and semi-permeable filters such as busy roads (sensu Spencer 2005). For example, mountain lions within the Santa Ana Mountains, gene flow restriction due to barriers to movement, and high mortality (especially from vehicle collisions [Vickers et al. 2015]) threaten the population west of Interstate 15 with inbreeding depression and potential extirpation (Benson et al. 2019).

Specific to the Puente-Chino Hills, a species diversity gradient related to distance from connected source populations was confirmed by one of the initial studies (Haas 2000). Haas (2000) assessed the distribution and relative abundance of carnivores throughout the Puente-Chino Hills and evaluated roadway undercrossing behavior. Wildlife tracking (scat transects and track stations) and camera surveys were conducted by the author at multiple locations throughout the Puente-Chino Hills Wildlife Corridor (field work from the summer of 1997 through the winter of 1998) to determine associations between the distribution and relative abundance of mammals and several landscape variables (habitat fragmentation). The undercrossings along seven roadways were monitored to assess the probability of undercrossing usage and various landscape and undercrossing dimensions. Haas's study area was divided into seven sections based on major crossroads, in which the Brea Boulevard occurred in Section 3 of Haas's study (SR-57 to Harbor Boulevard). While there were no wildlife tracking or camera surveys conducted directly within the project corridor, one of Haas's study locations in Tonner Canyon (Tonner Canyon West) occurred directly south and close to the intersection of Brea Boulevard and Tonner Canyon Road. Haas (2000) conducted several tracking stations along with scat transects and one wildlife camera along Tonner Canyon Road that revealed a high level of wildlife activity under SR-57 along Tonner Canyon. Haas (2000) specifically highlighted the importance of the area for bobcat movement. In addition, the author found that the undercrossing dimensions were a determining factor in the probability of usage for gray fox and mule deer. Coyote, gray fox, and mule deer frequency of undercrossing usage increased at undercrossings with higher openness ratios, while greater density of natural cover surrounding the undercrossing entrances and farther distances from residential areas increased the probability and frequency of use by bobcats (Haas 2000).

Haas (2000) did not detect mountain lions using Tonner Canyon during the study period and he recorded a low index of gray fox (based on tracking stations) in the canyon. The author found that

coyote abundance was evenly distributed throughout the entire study area. Bobcat abundance peaked in both the eastern and western portions of the study area (and was relatively low in Section 3, which overlaps with the Brea Boulevard Corridor). He also found that long-tailed weasels (*Mustela frenata*) were only detected in the far eastern section and were not detected in the Brea Boulevard Corridor, or the entire middle of the Puente-Chino Hills. Haas's study confirmed the importance of the Tonner Canyon Bridge undercrossing as an important filter for wildlife movement in the area. Haas's study established that fragmentation has a negative impact on the distribution of carnivores, in particular bobcats and long-tailed weasels. As fragmentation increases and portions of the Puente-Chino Hills Wildlife Corridor become more restricted, there is a potential for isolation of bobcat populations at the western end of the Puente-Chino Hills.

Spencer (2005) conducted a meta-analysis of corridor function using existing scientific information on the movement and distribution patterns of wildlife in the Puente-Chino Hills Wildlife Corridor. A field reconnaissance was conducted and aerial and satellite imagery were examined to confirm on-the-ground observations and assess wildlife corridor function. The Brea Boulevard Corridor occurs in Spencer's Corridor Segment 3, which includes the Shell-Aera Property adjacent to and north of Brea Boulevard. This property is not conserved and at approximately 3,286 acres functions as important suitable habitat for a variety of species. This area is identified as the Missing Middle because it includes a large portion of habitat that is unprotected and essential to maintaining connectivity between the western and eastern patches of the Puente-Chino Hills Wildlife Corridor. The Missing Middle stretches from Tonner Canyon on the east, to Harbor Boulevard to the west. If this portion of the wildlife corridor were severed by barriers to wildlife movement, conservation areas further to the west (e.g., Habitat Authority Wilderness Preserve, Powder Canyon, and Schabarum Regional Park) could lose key species and suffer ecological degradation (Spencer 2005).

Spencer (2005) also defined target species that should be analyzed to reflect corridor function and serve as indicators of habitat fragments and movement constraints. For that study, target species that were analyzed include bobcats, coyotes, and mule deer. Bobcats are ideal indicators of functional landscape connections at the scale of the Puente-Chino Hills Wildlife Corridor due to their relatively small home range size (compared to larger predators like mountain lions), secretive behavior, tendency to avoid roads, and preference for high-quality road-crossing structures. Spencer (2005) also noted that coyotes tend to be more adaptable, abundant, and generally more capable of persisting in fragmented landscapes. However, they can be good indicators of road permeability as many are killed on roads and high levels of coyote activity can indicate potential crossing locations for other species. Finally, mule deer, which require relatively large habitat areas

to support their populations, are prone to roadkill and are highly selective of road-crossing structures.

Specific to the Brea Boulevard Corridor, Spencer (2005) underscored the need to maintain connectivity from Tonner Canyon to the east, under the SR-57 bridge, and through the Shell-Aera Property. To accomplish this, wildlife would need to pass through the project area and cross Brea Boulevard. Thus, the findings of the current Study will provide critical information to guide recommendations to maintain landscape connectivity for wildlife post-implementation of the Project.

2.0 METHODS

Wildlife movement and mortality data were collected throughout the Brea Boulevard Corridor using two methodologies: wildlife camera surveys and roadkill surveys. Wildlife camera surveys were used to evaluate wildlife activity at potential crossing locations at road grade or at undercrossings such as bridges and culverts below grade. Roadkill surveys were designed to document patterns of roadkill within the Brea Boulevard Corridor and potentially identify areas of high mortality. Wildlife camera surveys were conducted in conjunction with roadkill surveys to correlate wildlife at grade crossings of Brea Boulevard and roadkill patterns. Additionally, the openings and length of each bridge and culvert crossing were measured to determine the openness ratio. The Study schedule is presented below and is followed by subsections describing the methods used for wildlife camera surveys (Section 2.1), roadkill surveys (Section 2.1.2), and assessing undercrossing openness ratios (Section 2.1.3).

The schedule for roadkill surveys coincided with the schedule for placing, checking, and removing wildlife cameras and an overview of this schedule is provided below (Table 1). All field work was conducted between January 2020 and February 2021, beginning with an initial reconnaissance site visit conducted on January 17, 2020. Wildlife camera surveys were performed during the months of March, May, July, September, and November 2020 and January and February 2021 (Table 1). An additional week of wildlife camera surveys was performed from January 28-February 4 due to the loss of data from several cameras during the week of January 2021.

For the purpose of this study, to standardize data collection, roadkill surveys were conducted on the same days that cameras were set up at the beginning of each survey month, and weekly during each camera check. Table 1 details the roadkill survey schedule over the survey months between March 2020 and January 2021.

2.1 COLLECTION OF WILDLIFE MOVEMENT DATA

Wildlife movement data were collected at 12 locations along Brea Boulevard identified as potential wildlife crossings to evaluate levels of wildlife movement and crossing activity within the Brea Boulevard Corridor. This section describes the site selection process, positioning of wildlife cameras, camera settings, and survey schedule for this aspect of the Study.

Table 1. Wildlife Camera and Roadkill Survey Schedule

Survey Number (Month)	Activity	Date
1 (March)	camera set-up and roadkill survey	March 3, 2020
	weekly camera check and roadkill survey	March 10, 2020
	weekly camera check and roadkill survey	March 17, 2020
	weekly camera check and roadkill survey	March 24, 2020
	camera take-down and roadkill survey	March 31, 2020
2 (May)	camera set-up and roadkill survey	April 28, 2020
	weekly camera check and roadkill survey	May 5, 2020
	weekly camera check and roadkill survey	May 12, 2020
	weekly camera check and roadkill survey	May 19, 2020
	camera take-down and roadkill survey	May 27, 2020
3 (July)	camera set-up and roadkill survey	June 30, 2020
	weekly camera check and roadkill survey	July 7, 2020
	weekly camera check and roadkill survey	July 14, 2020
	weekly camera check and roadkill survey	July 21, 2020
	camera take-down and roadkill survey	July 28, 2020
4 (September)	camera set-up and roadkill survey	August 31, 2020
	weekly camera check and roadkill survey	September 8, 2020
	weekly camera check and roadkill survey	September 15, 2020
	weekly camera check and roadkill survey	September 22, 2020
	camera take-down and roadkill survey	September 29, 2020
5 (November)	camera set-up and roadkill survey	November 3, 2020
	weekly camera check and roadkill survey	November 10, 2020
	weekly camera check and roadkill survey	November 17, 2020
	weekly camera check and roadkill survey	November 24, 2020
	camera take-down and roadkill survey	December 1, 2020
6 (January)	camera set-up and roadkill survey	December 29, 2020
	weekly camera check and roadkill survey	January 5, 2021
	weekly camera check and roadkill survey	January 12, 2021
	weekly camera check and roadkill survey	January 19, 2021
	camera take-down and roadkill survey	January 26, 2021
	camera set-up[1]	January 28, 2021
	camera take-down[1]	February 4, 2021

[1] Supplementary January wildlife movement data collected from cameras 14, 15, and 16

2.1.1 Wildlife Camera Surveys

To determine the ideal placement and number of wildlife cameras necessary to document wildlife crossing activity within the Brea Boulevard Corridor, a reconnaissance visit was conducted on January 17, 2020 when two AECOM biologists walked and drove the entire Brea Boulevard Corridor to look for wildlife trails, topographical features that might funnel wildlife, riparian wildlife corridors, and locations where wildlife might cross Brea Boulevard. Three types of potential wildlife crossings were evaluated, including "at grade" (at the level of the road grade), bridge, and culvert locations.

Following an iterative process with OC Public Works to define camera locations that were feasible, likely to capture wildlife using the selected crossings, and were within the road R/W along Brea Boulevard, 12 potential crossing locations (hereafter "sample locations") were selected for camera surveys: three bridges, four culverts, and five at grade locations (Table 2). Biologists discussed placing cameras along the historical transect in Brea Creek and under Tonner Bridge where Haas (2000) surveyed during the spring and fall months of 1997 and 1998. However, all of Haas's survey locations were outside of the road R/W on oil field lands where access was denied and therefore not included in this Study.

Table 2. Wildlife Camera Sample Locations and Attributes

Sample Location	Camera Number	Crossing Type	Existing Crossing Structure
1	1	At Grade	None (adjacent to Culvert 1)
2	2, 3	Bridge	Bridge 1
3	4, 5, 6	Bridge	Bridge 2
4	7	At Grade	None
5	8	At Grade	None
6	9, 10	Bridge	Bridge 3
7	11	At Grade	None
8	12	Culvert	Culvert 2
9	13	Culvert	Culvert 3
10	14	At Grade	None
11	15	At Grade	None
12	16	At Grade	None (above Culvert 4)

Sixteen wildlife cameras were installed across the Brea Boulevard Corridor at the 12 sample locations (Table 2; Figures 3a and 3b). Cameras were installed within the road R/W along Brea Boulevard. Multiple cameras were placed at bridges to monitor activity at the various spans and where feasible, cameras were placed at both openings of bridges and culverts. The lack of substrates within the right-of-way to which cameras could be securely attached limited the extent to which this could be achieved.

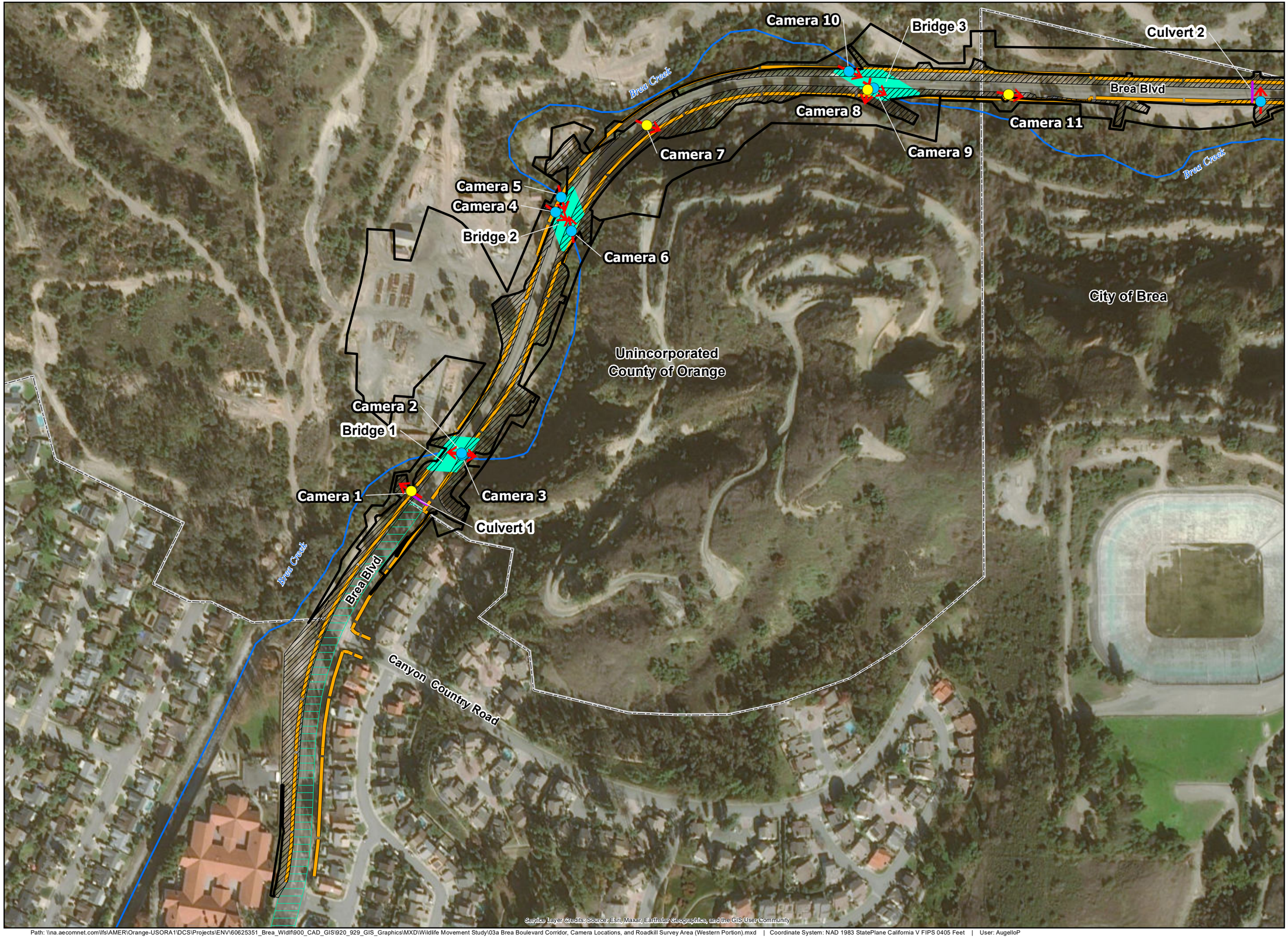
Complete descriptions of the 12 sample locations and the cameras included at each location, are provided below (Section 2.1.1.1). Browning Spec Ops Advantage wildlife cameras were installed in one of two ways at each camera location: (1) in a metal security box internally bolted to a steel post cemented into the ground; or (2) in a metal security box chained to a tree. Security boxes were

locked with cut-resistant locks to reduce the potential for cutting with bolt cutters. Tall vegetation was trimmed in the viewshed of the camera to minimize false triggers. Each camera was angled so that the camera's field-of-view was maximized to capture the greatest viewshed of each undercrossing or at grade location. Settings were consistent between cameras (except Camera 14) at 1 photo per trigger event with a 1 second delay between triggers and a 0.4 second trigger speed based on the fastest settings available for Browning Spec Ops Advantage cameras. These settings were selected to maximize the potential for capturing images of wildlife. Settings on Camera 14 were adjusted to 1 photo per trigger event with a 5 second delay between triggers to take photos less frequently due to an excessive amount of vehicle traffic using the dirt access road for O&M of the adjacent oil field.

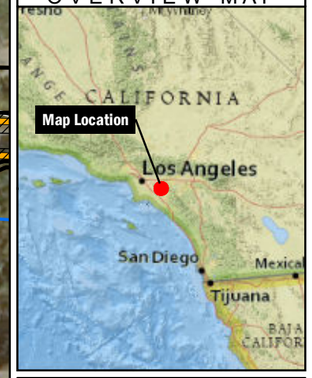
A team of two biologists installed the cameras at the beginning of each survey month and then checked them weekly for four weeks (Table 2). During each weekly check the memory cards were swapped, battery life was checked, and any necessary vegetation trimming (to minimize false triggers) was conducted. At the end of each survey month, cameras were removed from the field. Security boxes were left locked in place between survey periods.

2.1.1.1 Description of Sample Locations

To capture wildlife movement, wildlife cameras were placed in areas where wildlife may potentially cross the road either at the current road grade, or below through undercrossings such as a bridge or concrete culvert. Wildlife cameras were placed under all three bridges and at three concrete culverts that had the potential to be used by wildlife and are discussed in the following section. A laminated sign was secured next to each camera to educate the public on the Study and attempt to deter theft and vandalism. Each post was cemented in the ground and located at grade near Brea Boulevard, and had alternating red and white reflective tape placed around the post to increase visibility to traffic. Camera locations are shown in Figures 3a and 3b along with Bridges 1, 2, and 3, and culvert locations. The direction each camera was positioned (camera orientation) is also shown in the figures as an arrow. Furthermore, the 16 cameras are symbolized on Figures 3a and 3b as either at grade (along a dirt road or road shoulder), or below grade (under a bridge or culvert). Photographs of each camera are provided in Appendix A.



OVERVIEW MAP



Roadkill Survey Area Boundary
Creek/Stream
Open Graded Asphalt Concrete
Culverts
Bridges
Permanent Disturbance
Temporary Disturbance
City Boundary

Camera Locations

At-Grade Camera Location
Below-Grade Camera Location

0 250
Feet

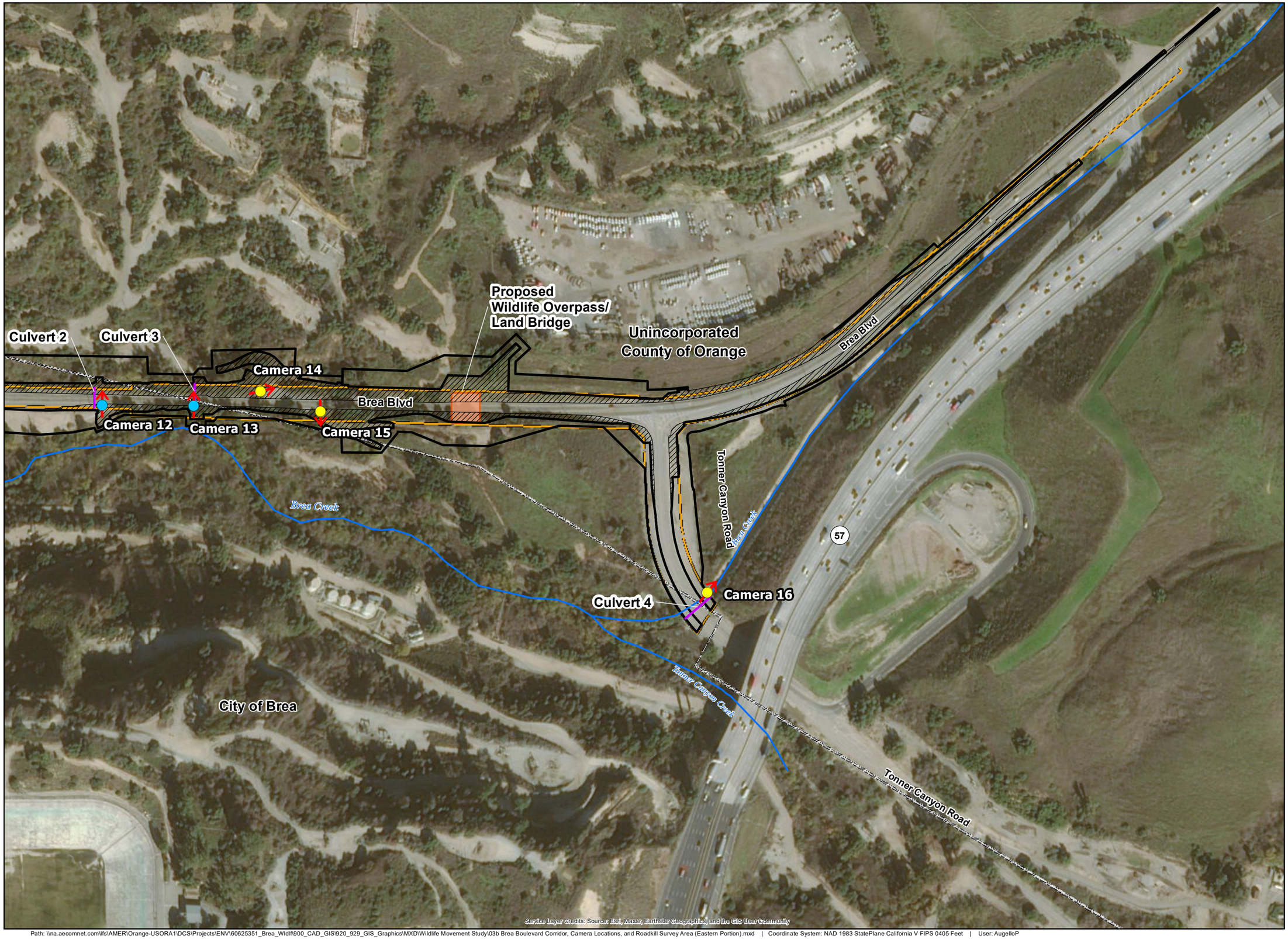
NORTH

Scale 1:3,200
1 inch = 267 feet

Brea Boulevard Corridor, Camera Locations, and Roadkill Survey Area (Western Portion)

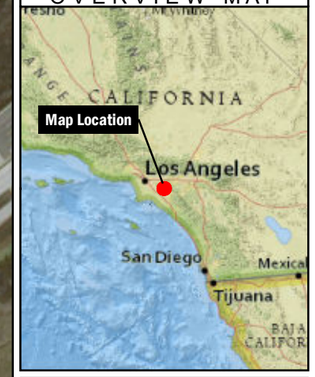
AECOM

Figure 3a



Service layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

OVERVIEW MAP



- Roadkill Survey Area Boundary
- Creek/Stream
- Culverts
- Bridges
- Proposed Wildlife Overpass/ Land Bridge
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Camera Locations

- At-Grade Camera Location
- Below-Grade Camera Location

0 250

Feet

Scale 1:3,200

1 inch = 267 feet

NORTH

Brea Boulevard Corridor, Camera Locations, and Roadkill Survey Area (Eastern Portion)

AECOM

Figure 3b

Sample Location 1 (Camera 1; At Grade): This camera was placed on the west side of Brea Boulevard near the road edge to capture wildlife crossing at grade and potentially using a small narrow culvert (labeled as Culvert 1) under Brea Boulevard (Figure 3a). The east side of Culvert 1 has a metal grate over it with narrow slits allowing only small wildlife (such as rodents and squirrels) to pass through. The camera was oriented northwest so the field of view included a dirt access road for Cal Resources LLC. The camera was placed on a steel pole cemented in the ground near the opening to Culvert 1.

Sample Location 2 (Cameras 2 and 3; Bridge 1): These two cameras were located on opposite sides of a palm tree on the east side of Bridge 1 (Figure 3a). Bridge 1 has two spans, with the southern span filled with deep water from Brea Creek. The northern span has a sandy bottom allowing wildlife to move through. Camera 2 was placed on the west side of the palm tree facing into the northern span of Bridge 1, while Camera 3 was placed on the east side of the tree facing east towards Brea Creek. Wildlife move along a narrow trail on the north side of Brea Creek through the north span of Bridge 1, which funnels them directly past Cameras 2 and 3.

Sample Location 3 (Cameras 4, 5, and 6; Bridge 2): These three cameras were placed under Bridge 2 and oriented to photograph wildlife moving under the bridge (Figure 3a). Camera 4 was located on the northwest side of Bridge 2 and angled to capture wildlife moving under the southern span of the bridge. Camera 5 was located on the same northwest side of Bridge 2 and angled to capture wildlife using the northern span of the bridge. Camera 6 was placed on the southeast side of Bridge 2 and was angled to capture both spans of Bridge 2. All three cameras were mounted to poles cemented in the ground. For the duration of the Study, both spans of Bridge 2 had a low volume flow of water from Brea Creek passing through them with little to no dry ground underneath the bridge. The water depth averaged several inches deep with a few small sections of deeper pooled water and large rocks scattered throughout the bottom of the bridge.

Sample Location 4 (Camera 7; At Grade): This camera was placed on the southeast side of Brea Boulevard with the viewshed oriented southeast at grade across an open area that resembles an old access road (Figure 3a). The camera was mounted to a pole cemented in the ground with a relatively narrow field of view oriented toward the nearby hillside.

Sample Location 5 (Camera 8; At Grade): Camera 8 was mounted to a steel pole cemented in the ground adjacent to Bridge 3, with a south-facing viewshed looking down a dirt access road at grade (Figure 3a).

Sample Location 6 (Cameras 9 and 10; Bridge 3): These cameras were placed around the opening to Bridge 3, with Camera 9 located on the south side of Brea Boulevard and Camera 10 on the north side (Figure 3a). Camera 9 was mounted to a steel pole cemented in the ground placed above Brea Creek and oriented down and to the southeast to capture wildlife moving under Bridge 3. Camera 10 was chained to a large coast live oak that leans out over Brea Creek as it flows underneath Bridge 3. Camera 10 was oriented southeast to capture wildlife moving under Bridge 3, but due to the location of the oak tree and its height above the creek, the entire bridge bottom was not visible within the camera viewshed.

Sample Location 7 (Camera 11; At Grade): This camera was mounted to a steel pole cemented in the ground at road grade on the south side of Brea Boulevard with a viewshed facing east down the southern road shoulder of Brea Boulevard (Figure 3a). The camera was angled to avoid capturing traffic along Brea Boulevard, but any vehicles that pulled off to the south side of Brea Boulevard were within the viewshed. The camera was oriented to capture wildlife attempting to cross Brea Boulevard at grade from the south.

Sample Location 8 (Camera 12; Culvert 2): This camera was mounted to a steel pole cemented in the ground below road grade and placed at the southern end of a narrow box culvert (labeled Culvert 2) that passes underneath Brea Boulevard (Figure 3b). The camera was angled with a northwest facing viewshed to capture wildlife moving through the narrow culvert underneath the road. Culver 2 was heavily silted in with a low ceiling and dry sandy bottom.

Sample Location 9 (Camera 13; Culvert 3): This camera was chained to a large coast live oak tree below road grade on the south side of Brea Boulevard and was angled to look north into a box culvert (labeled Culvert 3; Figure 3b). Culvert 3 had a sandy bottom and is located in an incised drainage that periodically conveys water south into Brea Creek.

Sample Location 10 (Camera 14; At Grade): This camera was chained to the base of a large eucalyptus at road grade and oriented northeast to capture wildlife activity in the vicinity of two dirt access roads that join on the north side of Brea Boulevard (Figure 3b). There is also a small hill between the roads that wildlife may be using. One of the roads that the camera's viewshed captured serves as a major entrance to Cal Resources LLC's existing oil facilities.

Sample Location 11 (Camera 15; At Grade): This camera was mounted to a steel pole cemented in the ground at grade on the south side of Brea Boulevard and oriented south with a view across a dirt access road used for O&M of existing oil facilities (Figure 3b).

Sample Location 12 (Camera 16; Culvert): This camera was chained to a metal fencepole on the east side of Tonner Canyon Road overlooking the opening to the Brea Creek drainage (Culvert 4) that flows under Tonner Canyon Road (Figure 3b). The camera was positioned to capture movement in Culvert 4 that periodically conveys water down Brea Creek under Tonner Canyon Road into Tonner Canyon Creek. Culvert 4 is a triple span culvert with a cement bottom, steep sides, and little to no vegetation on the east side of the culvert.

2.1.1.2 Wildlife Camera Data Processing

During each weekly camera check and at the end of each survey month, photographs were downloaded to a secure server and backed up on an external hard drive. Photographs were saved in folders by camera location and survey period. Data processing included an initial download of photographs taken from each card into a camera- and date-specific folder. After an initial copy of "raw" photographs (which included photographs along with false triggers caused by moving vegetation or other factors), photos with wildlife, humans (including vehicles and bicycles), and dogs were copied into a "processed" folder. Although human and dog activity were not a focus of this Study and are not analyzed with wildlife data, the data were recorded and are presented herein to establish baseline data for potential comparison with post-construction activity.

Next, processed photos were uploaded and cataloged by species using the Colorado Parks and Wildlife (CPW) Photo Warehouse software program (Newkirk 2016). This is a Microsoft Access-based program that catalogs photographs, stores metadata, and can generate queries for data processing. Processed images of wildlife were uploaded into the CPW Photo Warehouse.

Then, as photographs were reviewed in CPW Photo Warehouse, a biologist identified the wildlife species (when feasible), number of individuals, direction of travel, and if the species was observed going through an undercrossing or across the road. Video footage was not recorded (due to file size and SD card limitations). As a result, the designation of whether an animal was crossing or not was somewhat subjective, and based on the biologist's familiarity with species' behaviors, review of the photograph time stamps, and the location of the cameras. For example, wildlife at undercrossings were more likely to be photographed heading directly into, or coming out of a crossing, while it was more difficult to discern whether wildlife photographed at grade were attempting to cross the road, especially since cameras were angled to not capture any of Brea Boulevard's road surface.

Lastly, after photographs were entered into CPW Photo Warehouse, separate export files were created for camera and photograph data. The camera data file included the locations (coordinates

in latitude/longitude) and starting and ending dates and times of operation for each camera. The photograph data file included a record for each processed photograph, with the following information: Image ID, Image Date/Time, Camera Number (1-16), Common Name (of species observed), Number of Individuals, and Crossing ("yes" if the species was observed going through crossing or across road at grade).

2.1.2 Roadkill Surveys

Roadkill surveys were conducted along the Brea Boulevard Corridor (approximately 1.5 miles) to identify (if possible) areas of concentrated wildlife mortality ("hot spots"), which may be correlated to dangerous sections of roadway (from features such as blind curves), lack of viable crossing structures, natural funnels in the landscape based on topography and riparian habitat, and/or barriers such as existing fencing.

To determine an appropriate roadkill survey frequency, several variables were considered including probable carcass persistence times and detection rates for focal species, and the wildlife camera survey schedule. Based on regional knowledge from other wildlife movement studies conducted by AECOM in Southern California (AECOM 2009, 2015, and 2020a), weekly roadkill surveys were proposed that coincided with wildlife camera checks. Santos et al. (2015) evaluated how roadkill sampling frequency affected the accuracy of hotspot identification using a year of vertebrate roadkill data across a stretch of road in southern Portugal. The study occurred in a region with a Mediterranean climate, along two-lane roads primarily without central barriers in oak woodland habitat, similar to conditions at Brea Boulevard. The study found that the accuracy of hotspot estimates declined rapidly with declining sampling frequency due to a progressively larger number of mortality events missed with increased time between consecutive surveys. Santos et al. (2015) found that when focal species are primarily carnivores and other large-bodied species, data generated from weekly surveys may be sufficient to guide mitigation measures.

In a previous study, Santos et al. (2011) assessed carcass persistence probability over time for wildlife of various sizes. The authors found that most animal carcasses on roads were quickly dismembered by passing vehicles, eaten or removed by scavengers or predators, or reduced to few remains by ants and other decomposers. The authors identified 50 percent as an acceptable target persistence probability. Their study indicated that large mammals persisted longer than smaller mammals and their results indicated that carcasses of mammalian carnivores (averaging about 9 pounds; range 0.2 to 16 pounds) had a persistence probability of 54.3 percent over a 7-day survey interval. Since the primary focal species for the current Study were medium- to large-bodied animals (especially carnivores), a weekly survey interval was determined to provide an adequate

sampling frequency to detect major roadkill hotspots (if present) and inform mitigation measures, if necessary.

Each roadkill survey was conducted by two biologists. One biologist walked on the shoulder of Brea Boulevard and the other biologist drove slowly behind the biologist on foot, with vehicle hazard lights and a flashing safety strobe light on the field vehicle. The biologist walking along the road edge wore a highly reflective safety vest. Surveys were conducted by the biologist walking down one side of Brea Boulevard and then back on the opposite side of the road. The biologists also walked the short stretch of Tonner Canyon Road within the Brea Boulevard Corridor to look for roadkill during each survey. For safety reasons, roadkill surveys avoided periods of peak traffic rush hours. When roadkill was encountered, the biologists would stop to record data which included the kill location (east or west-bound highway lane or road shoulder); kill age (fresh [1–2 days old], week old, or month old), age (if possible), sex (if possible), and number of roadkill individual(s) for each observation. Data were recorded on electronic data collection forms and locations were recorded via global positioning system. If roadkill was in the roadway lanes, binoculars were used to aid in species identification in place of biologists walking onto the highway. Roadkill individuals were identified to species level or the most specific taxonomic group feasible. Roadkill were sprayed with non-toxic spray paint to prevent double counting on subsequent surveys. Roadkill were not moved from where they were detected, and representative photographs were taken if safe to do so (Appendix B).

2.1.3 Undercrossing Openness Ratios

The height and width of the openings of all bridges and culverts in the Brea Boulevard Corridor were measured by a biologist in the field. The length of each undercrossing was estimated using a linear distance measuring tool on Google Earth. The openness ratio (see Section 1.3.2) was then calculated as the height multiplied by the width divided by the length of the undercrossing (sensu, Yanes et al. 1995). For bridges comprising multiple spans, the openness ratio was calculated using the measurements for one individual span. Measurements were taken for whichever span was easiest to measure at each bridge because the spans at each bridge were roughly the same size and usually one of the spans had water flowing through it.

2.2 DATA ANALYSIS

Data analyses included two main types of assessments that utilized survey data in combination with GIS mapping and statistical analyses. First, spatial and temporal variation in levels of crossing activity by focal wildlife were evaluated using data from wildlife camera surveys. Second, patterns of roadkill occurrence along the Brea Boulevard Corridor were examined using data from roadkill

surveys and other sources of roadkill data. The methods used in these analyses are described in Sections 2.2.1 and 2.2.2.

Based on the anticipated localized scale of impacts from the Project and existing information available for the Puente-Chino Hills Wildlife Corridor, analyses were limited to a subset of species found in the area (focal species) that should be broadly representative of wildlife movement patterns in the project area. The initial group of focal species for this Study consisted of two size classes of mammals including five large mammal species: mule deer, mountain lion, bobcat, coyote, gray fox; and four medium mammals: raccoon, striped skunk, Virginia opossum, and desert cottontail (Table 3). The initial list of focal species was selected based on species that are good predictors of habitat connectivity and wildlife movement across the landscape (such as mountain lions and mule deer) and then refined down based on species that were likely to occur within the area. Species were also selected based on a review of historical wildlife in the region from previous studies (Haas 2000). Mountain lion and gray fox were initially included as focal species; however, because neither species was detected during wildlife camera surveys or roadkill surveys associated with this Study, they were excluded as focal species. This does not mean that these species were excluded from considerations of road permeability and recommendations for ensuring wildlife connectivity, rather, no statistical analysis could be conducted based on roadkill or camera data for mountain lion and gray fox. Furthermore, Haas (2000) had no mountain lion detections under the Tonner Canyon Bridge (the portion of his study area that overlapped with Brea Boulevard) and very low detections of gray foxes in the same area indicating that these species are not good predictors of movement patterns for statistical purposes. Smaller species were not selected as focal species because they generally have smaller ranges and thus should be less affected by barriers. Additionally, adaptive management measures designed to direct wildlife to undercrossings or overpasses, such as directional fencing, work more effectively on medium to large mammals. The focal species listed below in Table 3 will thus serve as broad indicators of the existing functionality of Brea Boulevard for wildlife movement.

Table 3. Classification of Focal Wildlife Species Included in Analyses

Size Class	Common Name	Ecosystem Role
Large Mammal	Mule Deer	Large Herbivore
	Coyote	Top Predator
	Bobcat	Top Predator
Medium Mammal	Desert Cottontail	Small Herbivore
	Striped Skunk	Meso-predator
	Raccoon	Meso-predator
	Virginia Opossum	Meso-predator

As appropriate, data for other species (e.g., human, dog, smaller vertebrates) are presented for potential comparison with post-construction survey data but were not analyzed herein. A complete list of wildlife species detected during wildlife camera and roadkill surveys is provided in Appendix C.

2.2.1 Wildlife Crossing Activity

This section first describes the process of synthesizing and summarizing wildlife camera data for use in analysis (Section 2.2.1.1), then describes how the data were analyzed to statistically evaluate spatial and temporal variation in wildlife activity in the Brea Boulevard Corridor (Section 2.2.1.2).

2.2.1.1 Data Synthesis and Summarization

This component of the analysis evaluated wildlife camera survey data to identify patterns of spatial and temporal variation in crossing activity of focal wildlife along the Brea Boulevard Corridor. The analysis was also designed to evaluate several factors as potential predictors of variation in crossing activity, as described herein. Due to constraints on camera placement locations arising from the narrow road R/W along the Brea Boulevard Corridor and dense vegetation, it was not possible to effectively monitor openings on both sides of each crossing. For this reason, it is assumed herein that the presence of wildlife at potential crossing locations is correlated with the actual crossing rate.

Data from sample location 12 near Culvert 4 were omitted from all data synthesis and analyses because it became evident after viewing images and summarizing data that the camera most likely under-reported wildlife occurrence within the intended viewshed. This was decided after looking at the high number of wildlife tracks in the mud under Culvert 4 and comparing that with the low number of wildlife images captured on Camera 16. Additional information is included in Section 4.2, Study Limitations.

To compare wildlife activity among sample locations, months and size classes and species of wildlife, a relative activity (RA) index was calculated for each species as follows:

$RA = v/n$

v = number of days (including partial days) species was detected by one or more cameras at a sample location during a given survey month

n = number of days (including partial days) cameras were in operation at a sample location during a given survey month (equal to 29 days for all cameras during all months)

RA values thus range from 0 to 1, with a value of 1 indicating a species was detected on every day cameras were operational, and a value of 0.5 indicating the species was detected one-half of the days. RA values were generated for individual species as described above, and subsequently for each mammal size class. The RA value for each size class of mammals at a specific location during a given month is based "v" calculated as the number of days *at least one* of the species included in that size class was detected by one or more cameras at that sample location in that month. Thus, the overall RA value for one size class of mammals does not necessarily equal the sum or the average of RA values for the species that comprise that size class.

2.2.1.2 Analysis of Wildlife Relative Activity Values

Generalized linear mixed models (GLMMs) were used to evaluate the importance of key factors in predicting spatial and temporal variation in wildlife activity along the Brea Boulevard Corridor (RA values) at the level of focal species size class. GLMMs provide the opportunity to evaluate a combination of categorical and continuous variables as fixed or random factors, which was appropriate for the questions addressed in this Study. The models were run using the lme4 package (Bates et al. 2015) in R (R Core Team 2020), with a Poisson error distribution and log-link function. RA values were highly left-skewed, which necessitated using a Poisson error distribution. To accommodate a Poisson distribution, RA values were replaced with the actual number of detection days (per 29-day sampling period) for use as the dependent variable in the models. These values were converted back to RA values (i.e., proportions) for graphical presentation in the results. Despite this conversion process, the term "RA value" is used herein to refer interchangeably to the number of detection days (used in modeling) and the proportion of days detected (used in the presentation of virtually all results).

Prior to running any analyses, levels of covariance among the putative independent variables were examined, which included: sample location (1-11, from west to east along the Brea Boulevard Corridor; Table 1; Figures 3a and 3b), wildlife crossing type (bridge, culvert, at grade; Table 1), focal species size class (large versus medium mammals), survey month (March, May, July, September, November, and January), and the number of cameras at each sample location (range: 1-3 cameras; Table 1). The number of cameras and wildlife crossing type strongly covaried, as the three bridges were the only sites with multiple cameras. Wildlife crossing type had a slightly stronger effect on detections than the number of cameras, so wildlife crossing type was retained as

a covariate for evaluation in the models and number of cameras was removed. Additionally, sample location and wildlife crossing type were not independent. Therefore, separate GLMMs were used to evaluate variation in wildlife activity with regard to these two variables, each model including one variable as a fixed effect and the other as a random effect. Specifically, variation in wildlife activity by sample location was evaluated using a GLMM with sample location, focal species size class, month, and the interaction between sample location and focal species size class included as independent variables, wildlife crossing type as a random effect, and number of detection days as the dependent variable. To assess variation in wildlife activity by wildlife crossing type, a GLMM was run with wildlife crossing type, focal species size class, month, and the interaction between wildlife crossing type and focal species size class included as independent variables, sample location as a random effect, and number of detection days as the dependent variable.

2.2.2 Roadkill Occurrence

Roadkill occurrence was originally designed to evaluate wildlife mortality data collected during standardized roadkill surveys to identify patterns of spatial and temporal variation in roadkill along the Brea Boulevard Corridor. Due to the low levels of focal species mortality documented during standardized weekly roadkill surveys, there were insufficient data to perform traditional "hotspot" or cluster analyses with a sufficient level of statistical confidence. This is discussed further in Section 4.2 under survey limitations.

In lieu of performing statistical analyses on the roadkill results, the raw data are presented in data tables and figures to display the observed variation in mortality through time and space. Although statistical analyses were not performed on the roadkill data, mortality rates observed among different groups are interpreted and discussed in relation to information provided by other studies about carcass persistence and detection probabilities (Sections 4.1.1 and 4.1.2).

2.2.2.1 Incidental Roadkill Data

In addition to the roadkill occurrences documented through standardized roadkill surveys, additional incidental information about roadkill in the vicinity of the Brea Boulevard Corridor were obtained from the following sources:

- **Initial Site Visit (this Study):** Roadkill occurrences documented within the Brea Boulevard Corridor on January 17, 2020 during an initial reconnaissance site visit.

- **UC Davis Road Ecology Center (REC):** Roadkill occurrences documented between 2009-2020 within the Brea Boulevard Corridor, provided from the UC Davis REC roadkill database (F. Shilling pers. comm. 2020).
- **Orange County Animal Control (OC Anim. Control):** Roadkill occurrences documented from 2016 through 2020 in the vicinity of the Brea Boulevard Corridor. Location information was available only to the nearest cross-street. Focal species mortality events found on Brea Boulevard and associated with the cross streets State College Boulevard or Central Avenue were included.

Data from these sources were collated and presented in conjunction with results from standardized carcass surveys conducted as part of this Study to provide supplementary information about roadkill occurrence within the Brea Boulevard Corridor.

3.0 RESULTS

This section describes the results from the Study, including summaries and various analyses of wildlife camera survey data to address wildlife crossing activity (Section 3.1), the results from roadkill surveys (Section 3.2), and the results from undercrossing openness ratio assessment (Section 3.3). Representative photos of wildlife captured during camera surveys are available in Appendix B.

3.1 WILDLIFE CROSSING ACTIVITY RESULTS

Wildlife camera survey data were used to evaluate patterns in wildlife activity within the Brea Boulevard Corridor. Within this section, a broad overview of RA values is provided (Section 3.1.1), followed by the results of statistical models designed to assess variation in RA values among sample locations and crossing types (Section 3.1.2). Finally, variation in RA values among species are discussed (Section 3.1.3).

As discussed in Section 2.2.1.1, data from sample location 12 were omitted from data synthesis and analysis. Therefore, the results presented herein are for the remaining 11 sample locations.

3.1.1 Summary of Variation in Relative Activity Values

This section provides an overview of variation in RA scores among survey months, sample locations, crossing type, individual wildlife species and mammal size classes. More detailed comparisons among these groups, including statistical and graphical comparisons where appropriate, are presented in Subsection 3.1.2, which focuses on variation among mammal size classes, and 3.1.3, which focuses on variation among individual species.

In general, RA values for individual species and for large and medium mammal groups overall showed relatively low variation across the six survey months of the Study (Table 4). The overall average RA score for individual species ranged from 0.01 for mule deer to 0.215 for coyote. The two species with the highest overall averages were coyotes (among large mammals), and raccoons (among medium mammals). Species with higher overall average RA values consistently had the highest average during each month as well, and the same was true for species with the lowest overall averages. Human and dog detections were not a focus of this Study but were tabulated as described in Section 2.2.1.3 and are presented below (Tables 4 and 5) for potential comparison with post-construction survey data.

Table 4. Focal Wildlife Species Relative Activity by Study Month

		Month of Wildlife Camera Study[1]						
Mammal Size Class	**Mammal Species**	**Mar. 2020**	**May 2020**	**Jul. 2020**	**Sep. 2020**	**Nov. 2020**	**Jan. 2021[4]**	**Overall Avg.[5]**
Large	Mule Deer	0.003	0.013	0.038	0.009	0.000	0.000	**0.010**
	Coyote	0.138	0.248	0.182	0.229	0.254	0.241	**0.215**
	Bobcat	0.038	0.044	0.050	0.047	0.044	0.066	**0.048**
	Overall[3]	0.172	0.288	0.254	0.279	0.285	0.279	**0.260**
Medium	Desert Cottontail	0.103	0.091	0.091	0.038	0.078	0.009	**0.068**
	Striped Skunk	0.022	0.066	0.013	0.028	0.038	0.056	**0.037**
	Raccoon	0.266	0.257	0.154	0.238	0.094	0.107	**0.186**
	Virginia Opossum	0.022	0.009	0.034	0.009	0.003	0.031	**0.018**
	Overall[3]	0.351	0.361	0.245	0.295	0.182	0.188	**0.270**
Other[2]	Human	0.335	0.361	0.317	0.313	0.288	0.288	**0.317**
	Dog	0.016	0.016	0.009	0.000	0.000	0.000	**0.007**

[1] Values represent the average of the RA values across the 11 camera sample locations surveyed during the indicated month.
[2] Human and dog observations were excluded from analyses and are presented here for potential comparison with post-construction survey data.
[3] Overall RA is the proportion of camera days that *at least* one of the species in a size class was detected.
[4] Three cameras (14, 15, 16) malfunctioned for one week in January 2021, so an additional week of data was collected from January 28 through February 4, 2021.
[5] Values for each species represent the average of the RA values across the 6 months camera surveys were conducted.

Table 5. Relative Activity of Focal Wildlife Species by Camera Sample Location

Mammal Size Class	Mammal Species	Sample Location[1] (Crossing Type[2])											Overall Avg.[5]
		1	2	3	4	5	6	7	8	9	10	11	
		(@)	(B)	(B)	(@)	(@)	(B)	(@)	(C)	(C)	(@)	(@)	
Large	Mule Deer	0.000	0.000	0.046	0.023	0.000	0.006	0.000	0.000	0.000	0.006	0.034	**0.010**
	Coyote	0.316	0.034	0.207	0.040	0.178	0.385	0.172	0.000	0.259	0.121	0.655	**0.215**
	Bobcat	0.006	0.092	0.000	0.006	0.000	0.006	0.000	0.057	0.270	0.011	0.080	**0.048**
	Overall[4]	0.316	0.121	0.253	0.069	0.178	0.391	0.172	0.057	0.460	0.126	0.713	**0.260**
Medium	Desert Cottontail	0.207	0.109	0.000	0.000	0.069	0.017	0.029	0.006	0.017	0.075	0.224	**0.068**
	Striped Skunk	0.052	0.155	0.017	0.000	0.017	0.006	0.006	0.029	0.069	0.017	0.040	**0.037**
	Raccoon	0.034	0.701	0.690	0.000	0.006	0.276	0.063	0.098	0.098	0.006	0.075	**0.186**
	Virginia Opossum	0.011	0.103	0.011	0.006	0.006	0.000	0.000	0.000	0.052	0.000	0.011	**0.018**
	Overall[4]	0.287	0.741	0.701	0.006	0.098	0.287	0.098	0.132	0.207	0.092	0.322	**0.270**
Other[3]	Human	0.644	0.011	0.080	0.132	0.115	0.069	0.977	0.011	0.017	0.954	0.477	**0.317**
	Dog	0.069	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	**0.007**

[1] Values represent the average of the RA values across six months surveyed at the indicated sample location.
[2] Crossing types: @=at grade, B=bridge, C=culvert
[3] Human and dog observations were excluded from analyses and are presented here for potential comparison with post-construction survey data.
[4] Overall RA is the proportion of camera days that *at least* one of the species in a size class was detected.
[5] Values for each species represent the average of the RA values across the 11 camera sample locations where surveys were conducted.

RA values varied more widely across sample locations for each species and mammal size class (Table 5) than across survey months. The average RA scores for individual species and size classes ("Overall Avg." column) are the same in Tables 4 and 5. Although coyotes and raccoons were the most frequently observed large and medium mammal species (respectively) on average, they were not the most frequently observed at every location. For example, bobcats were the most frequently observed large mammal at sample locations 2, 8, and 9, and desert cottontail were the most frequently observed medium mammal at sample locations 1, 5, 10 and 11.

3.1.2 Wildlife Crossing Activity Model Results

This section presents the results of statistical models designed to assess variation in RA values among sample locations (Section 3.1.2.1) and among crossing types (Section 3.1.2.2).

3.1.2.1 Variation in RA Values Among Sample Locations

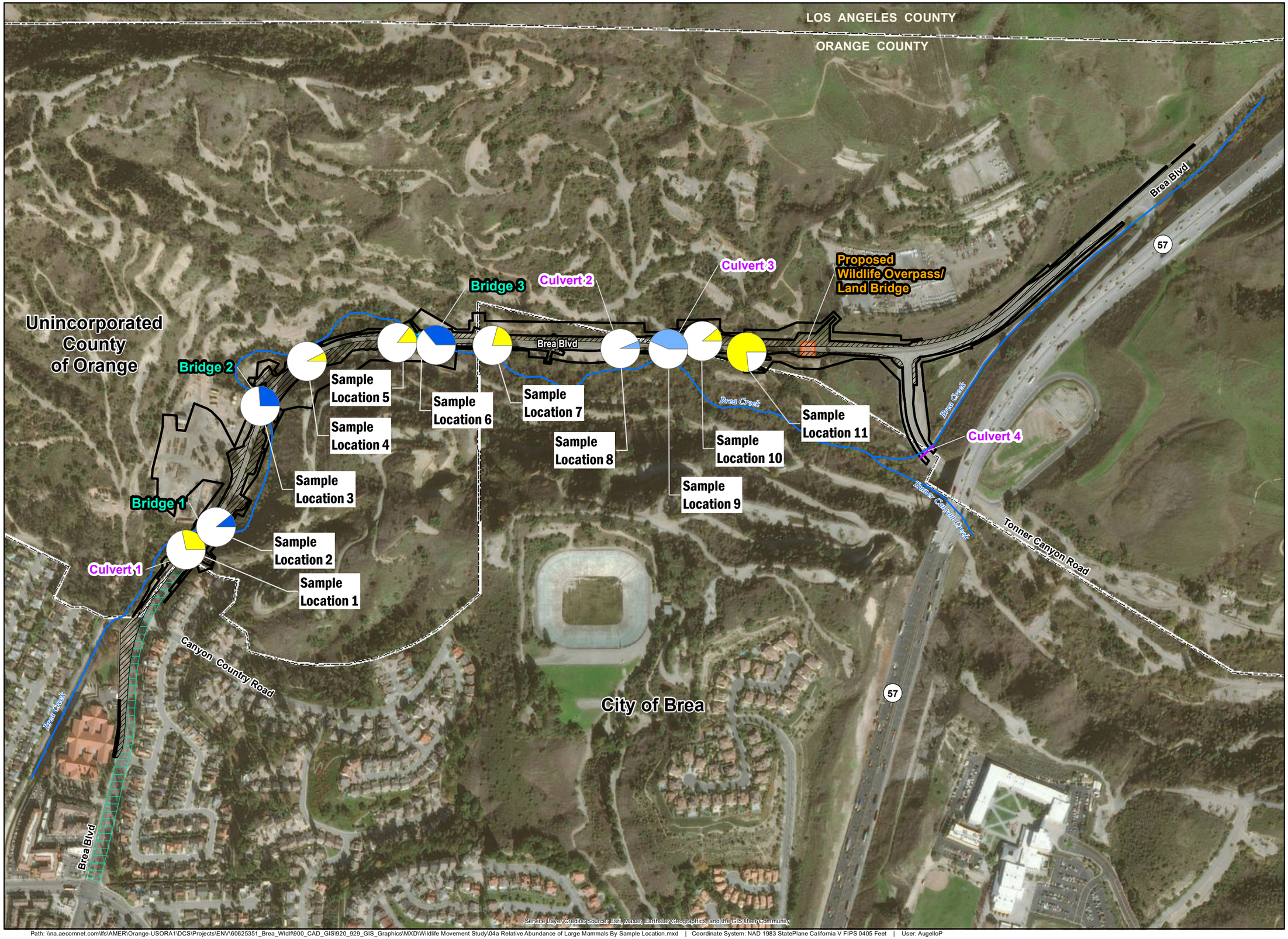
The fixed effects for the GLMM examining variation in large and medium mammal RA values among the 11 sample locations model are provided below with the statistical significance of each variable (Table 6). RA scores varied significantly among sample locations ($p<0.001$), size class ($p=<0.001$), and survey months ($p=0.004$). In addition, there was a strong interaction effect between sample location and mammal size class ($p<0.001$; Table 6), indicating that the RA values of large mammals and medium mammals varied in different ways among sample locations.

Table 6. Model Output from GLMM Examining Variation in Wildlife Activity Levels Among Sample Locations

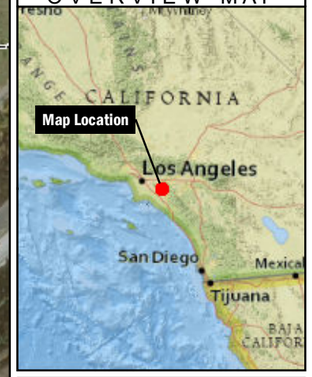
Model Parameter	Chi-square	Degrees of Freedom (Df)	p-value[1]
Sample Location	426.594	10	<0.001
Size Class	19.596	1	<0.001
Survey Month	17.376	5	0.004
Sample Location*Size Class[2]	191.224	10	<0.001

[1] A p-value less than 0.05 indicates the factor was statistically significant in the model.
[2] Interaction term to evaluate whether relationship between RA values and sample location differs among size classes.

Variation in RA values of large mammals across the 11 sample locations are displayed as pie diagrams overlaid with a map of the Brea Boulevard Corridor in Figure 4a. Large mammal activity tended to be higher at the eastern end of the Brea Boulevard Corridor where large mammal RA values were 0.713 at sample location 11 (at grade) and 0.460 at sample location 9 (Culvert 3). By comparison, in the western portion of the Brea Boulevard Corridor, the highest RA values for large mammals were 0.316 and 0.391 at sample locations 1 (at grade) and 6 (Bridge 3), respectively.



OVERVIEW MAP



Culverts
Creek/Stream
Bridges
Proposed Wildlife Overpass/ Land Bridge
Open Graded Asphalt Concrete
Permanent Disturbance
Temporary Disturbance
City Boundary

Relative Abundance of Large Mammals
(proportion of camera days detected)

At-Grade

Below grade – Bridge

Below grade – Culvert

0 500
Feet
Scale 1:6,235
1 inch = 520 feet

Relative Abundance of Large Mammals By Sample Location

AECOM

Figure 4a

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Path: \\na.aecomnet.com\lfs\AMER\Orange-USORA1\DCS\Projects\ENV\60625351_Brea_Wldlf\900_CAD_GIS\920_929_GIS_Graphics\MXD\Wildlife Movement Study\04a Relative Abundance of Large Mammals By Sample Location.mxd | Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet | User: AugelloP

LOS ANGELES COUNTY

ORANGE COUNTY

Unincorporated
County of Orange

City of Brea

Bridge 1
Bridge 2
Bridge 3

Culvert 1
Culvert 2
Culvert 3
Culvert 4

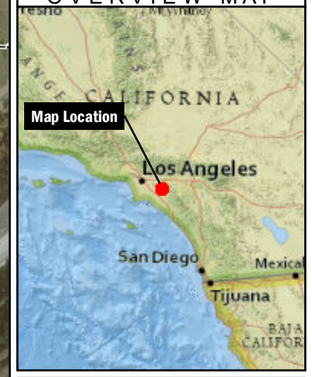
Proposed
Wildlife Overpass/
Land Bridge

Sample Location 1
Sample Location 2
Sample Location 3
Sample Location 4
Sample Location 5
Sample Location 6
Sample Location 7
Sample Location 8
Sample Location 9
Sample Location 10
Sample Location 11

Brea Blvd
Canyon Country Road
Tonner Canyon Road
Brea Creek
Tonner Canyon Creek
57

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

OVERVIEW MAP



- Creek/Stream
- Culverts
- Bridges
- Proposed Wildlife Overpass/ Land Bridge
- Open Graded Asphalt Concrete
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Relative Abundance of Medium Mammals
(proportion of camera days detected)

At-Grade

Below grade – Bridge

Below grade – Culvert

0 500 Feet

NORTH

Scale 1:6,235

1 inch = 520 feet

Relative Abundance of Medium Mammals By Sample Location

AECOM

Figure 4b

Unlike large mammals, medium mammal RA values were higher toward the western end of the Brea Boulevard Corridor (Figure 4b) with the highest levels of activity at sample locations 2 (Bridge 1) and 3 (Bridge 2) where RA values were 0.741 and 0.701, respectively. The sample locations with the next three highest RA values (ranging from 0.287 to 0.322) were distributed across the length of the Brea Boulevard Corridor at sample locations 1 (at grade), 6 (Bridge 3), and 11 (at grade). RA values were likely higher toward the western end primarily because Bridge 1 was heavily used by medium mammals, but rarely used by large mammals.

3.1.2.2 Variation in RA Values Among Crossing Types

The fixed effects for the GLMM examining variation in large and medium mammal RA values among the three crossing types (at grade, bridges, and culverts) are provided below with the statistical significance of each variable (Table 7). RA scores varied significantly among focal species size class (p=0.002) and survey months (p=0.003).

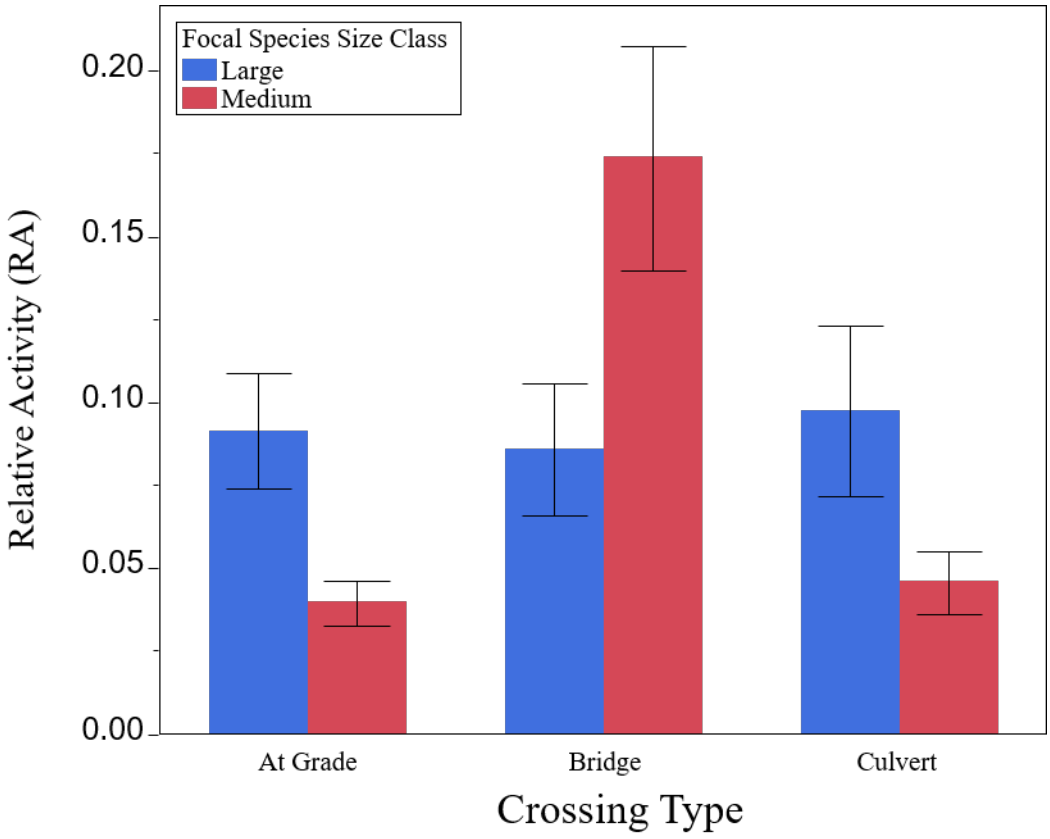
Table 7. Model Output from GLMM Examining Variation in Wildlife Activity Levels Among Crossing Types

Model Parameter	Chi-square	Degrees of Freedom (Df)	p-value[1]
Crossing Type	5.420	2	0.066
Size Class	9.816	1	0.002
Survey Month	17.456	5	0.003
Crossing Type*Size Class[2]	5.420	2	<0.001

[1] A p-value less than 0.05 indicates the factor was statistically significant in the model.
[2] Interaction term to evaluate whether relationship between RA values and crossing type differs among size classes.

Although RA values did not vary significantly among crossing types in this model (p=0.066), the significant interaction term between crossing type and size class (p<0.001) indicates that the RA values of large mammals and medium mammals varied in different ways among crossing types. Large mammals exhibited little variation in RA values among crossing types, while medium mammal RA values were significantly higher at bridges, compared to culverts or at grade (Figure 5). Similarly, medium mammals were detected at bridges more often than large mammals, while the opposite pattern was observed at culverts and at grade with large mammals exhibiting higher levels of activity than medium mammals (Figure 5).

Figure 5 Relative Activity of Large versus Medium Mammals by Crossing Type



3.1.3 Patterns of Relative Activity Levels Among Species

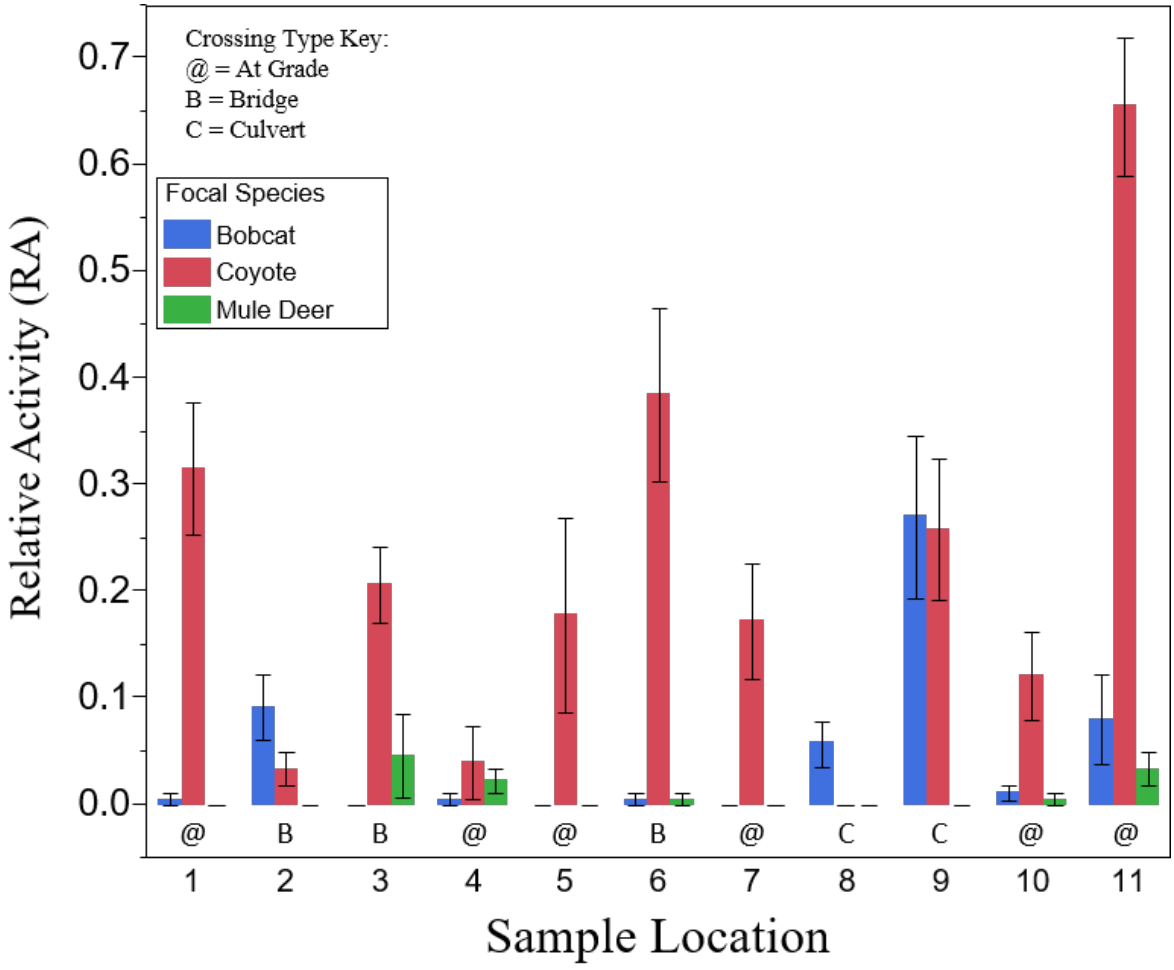
The modeling results presented above in Section 3.1.2 focus on variation in RA values exhibited by large versus medium mammals. This section describes patterns of variation among species within these size classes, first addressing large mammals (Section 3.1.3.1) and then species comprising medium mammals (Section 3.1.3.2).

3.1.3.1 Variation in RA Values Among Species of Large Mammals

Overall patterns in large mammal activity described in Section 3.1.2.1 are driven predominantly by coyote activity because coyotes had the highest overall average RA value (0.210) compared to mule deer (0.013) and bobcat (0.045). However, several trends become evident when variation in RA values for different species of large mammals are evaluated among sample locations and crossing types.

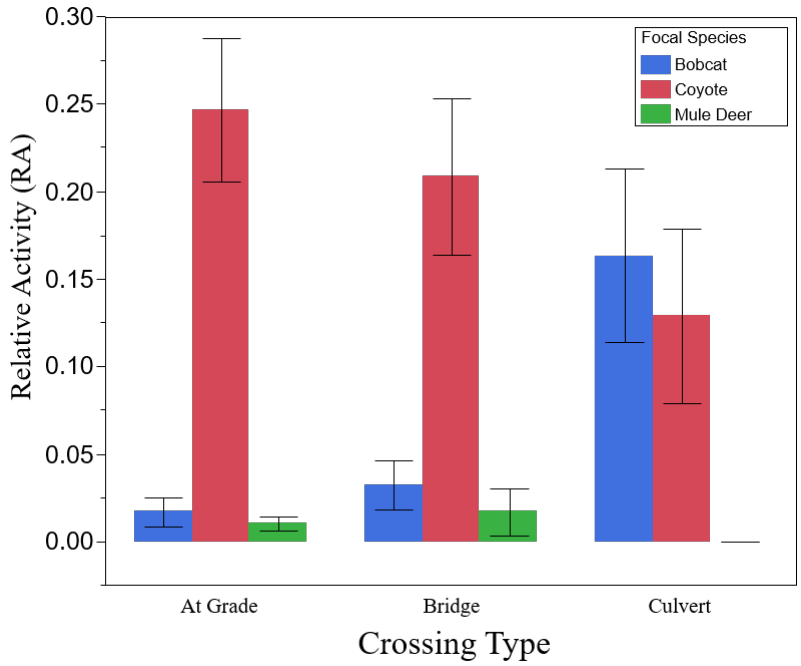
RA values for species of large mammals varied widely across sampling locations in the Brea Boulevard Corridor (Figure 6a). Mule deer were detected at sample locations 3 (Bridge 2), 4 (at grade), 6 (Bridge 3), 10 (at grade), and 11 (at grade). Coyotes had the highest RA values at 8 sample locations, while bobcats were more commonly detected at sample locations 2 (Bridge 1), 8 (Culvert 2), and 9 (Culvert 3). Bobcats were predominantly found in the eastern half of the Brea Boulevard Corridor, where they were detected at sampling locations 8 and 9 (both culverts) and at sample locations 10 and 11 (at grade). Among the bridge locations, bobcats were observed at the highest rate at Bridge 1, which is also the bridge where coyotes were detected least. With the exception of sample location 9, where both species were detected at approximately similar levels, bobcats were generally detected at sample locations where coyotes were infrequently detected (i.e., sample locations 2 and 8).

Figure 6a Relative Activity of Large Mammal Focal Species by Sample Location



Overall, individual species of large mammals exhibited different patterns of use among different crossing types (Figure 6b). Coyotes were detected at grade more often than at bridges or culverts. Coyotes were also detected far more often than other species at grade and at bridges. Bobcats on the other hand were detected more often at culverts than at bridges or at grade (Figure 6b). Deer were never observed at culverts but were detected occasionally at grade (sample locations 4 and 11) and at Bridges 2 and 3.

Figure 6b Relative Activity of Large Mammal Focal Species by Crossing Type



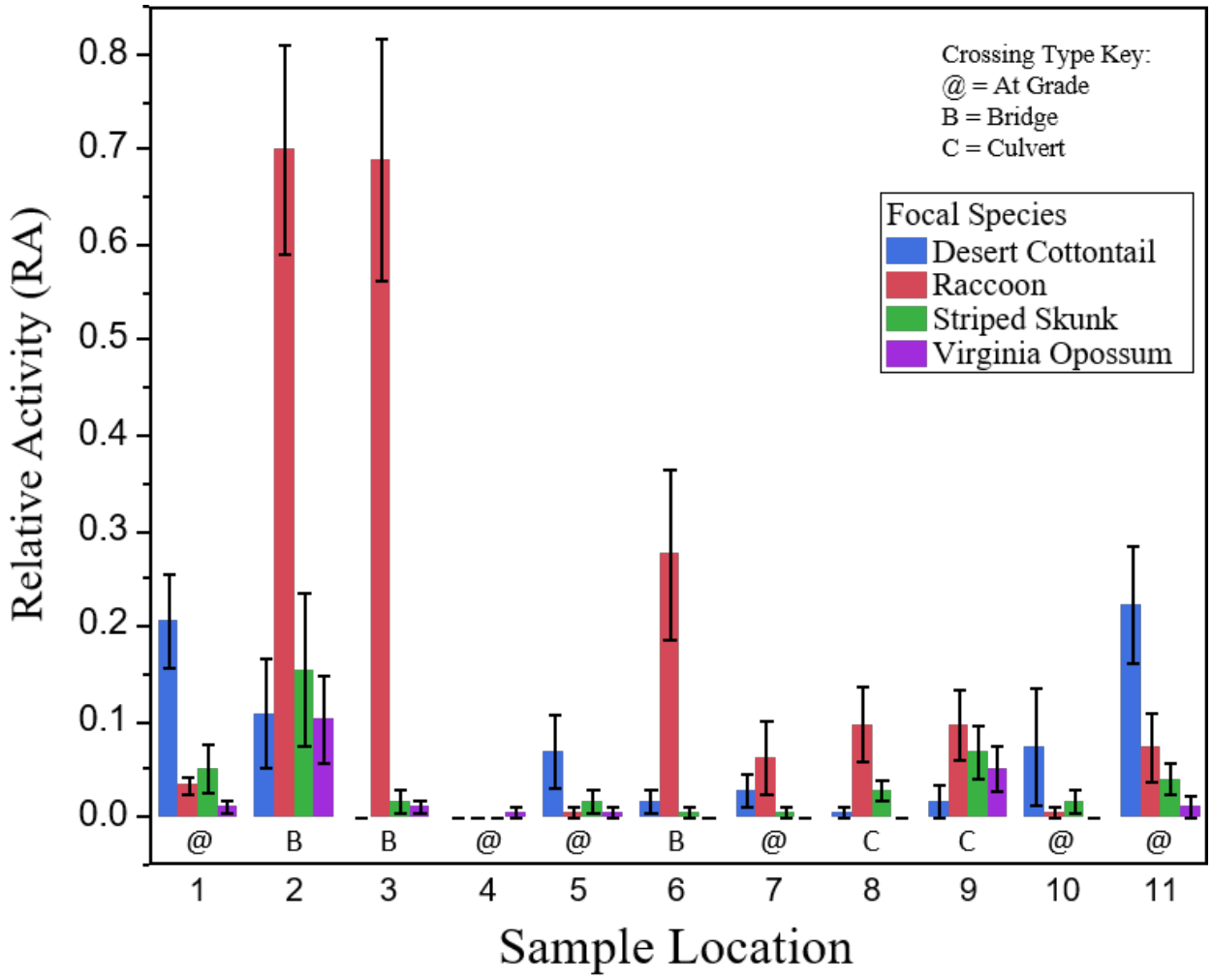
3.1.3.2 Variation in RA Values Among Species of Medium Mammals

Patterns in medium mammal activity described in Section 3.1.2.2 were largely driven by raccoon activity because raccoons had the highest overall average RA value (0.186) compared to desert cottontail (0.068), striped skunk (0.037), and Virginia opossum (0.018). However, several trends became evident when variation in RA values for different species of medium mammals were evaluated among sample locations and crossing types.

RA values for individual species of medium mammals varied considerably across sampling locations in the Project corridor (Figure 7a). Raccoon activity was extremely high in the western

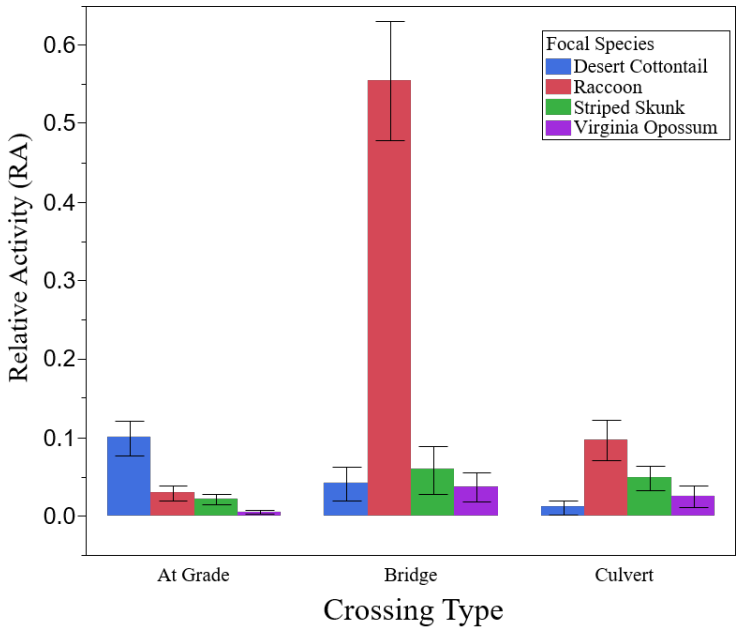
portion of the corridor due to their very high RA values at sample locations 2 and 3 (Bridges 1 and 2). Desert cottontails exhibited their greatest abundance on the two ends of the Brea Boulevard Corridor, at sample locations 1 and 11 (both at grade). Otherwise variation in activity among species of small mammals along the corridor were relatively minor, except that very little activity was detected by any species (except desert cottontails) at sample locations 4 and 5 (both at grade).

Figure 7a Relative Activity of Medium Mammal Focal Species by Sample Location



Overall, individual species of medium mammals exhibited different patterns of use among different crossing types (Figure 7b). Raccoons, striped skunks, and Virginia opossum all had higher RA values at bridges, compared to sample locations at grade or at culverts. Desert cottontails exhibited a different pattern, in that they were most frequently observed at grade, followed by at bridges, and finally at culverts.

Figure 7b Relative Activity of Medium Mammal Focal Species by Crossing Type



3.2 ROADKILL OCCURRENCE RESULTS

3.2.1 Summary of Wildlife Roadkill Occurrence Observations

Roadkill data compiled from this Study and other sources are presented below (Table 8). In total, nine roadkill occurrences of focal species were documented during standardized roadkill surveys performed as part of this Study, comprising all four species of medium mammals in relatively even proportions. No large mammal roadkill incidents were documented during this Study.

An additional 29 roadkill incidents were documented in the vicinity of the Brea Boulevard Corridor from other sources, including three observed during an initial site visit to the Brea Boulevard Corridor on January 17, 2020, one record provided by the UC Davis REC, and 25 records provided by the Orange County Animal Control. These incidental records included five records of large mammal roadkill, including two mule deer and three coyotes.

Records from Orange County Animal Control did not have specific location information, but the locations of the 13 incidents documented through standardized surveys and incidental data are presented in Figure 8. Given the low number of mortalities, statistically meaningful patterns cannot

Table 8. Roadkill Occurrences Documented in the Project Vicinity

Source	Common Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Standardized Roadkill Surveys														
This Study (Mar 2020 - Jan 2021)	Desert Cottontail	-	-	-	-	1	-	-	-	1	-	-	-	2
	Raccoon	-	-	1	-	-	-	1	-	-	-	-	-	2
	Striped Skunk	-	-	2	-	-	-	-	-	-	-	-	-	2
	Virginia Opossum	-	-	1	-	-	-	1	-	-	-	1	-	3
	Total	**-**	**-**	**4**	**-**	**1**	**-**	**2**	**-**	**1**	**-**	**1**	**-**	**9**
Incidental Roadkill Data														
This Study – Initial Site Visit (Jan 17, 2020)	Striped Skunk	1	-	-	-	-	-	-	-	-	-	-	-	1
	Virginia Opossum	2	-	-	-	-	-	-	-	-	-	-	-	2
UC Davis REC (2009-2020)	Mule Deer	-	-	-	-	-	-	-	-	-	1	-	-	1
OC Animal Control (2016-2020)	Mule Deer	-	-	-	-	-	1	-	-	-	-	-	-	1
	Coyote	-	-	-	2	-	-	-	-	1	-	-	-	3
	Raccoon	-	-	1	-	1	-	1	1	-	-	-	2	6
	Unidentified Skunk	1	1	-	-	2	1	1	1	-	-	-	2	9
	Virginia Opossum	-	-	1	1	-	1	-	-	-	1	1	-	5
	Unidentified Rabbit	-	-	-	-	-	1	-	-	-	-	-	-	1
	Total Incidental	4	1	2	3	3	4	2	2	1	2	1	4	29
Standardized Search and Incidental Data Combined														
All Sources	Total Large Mammal	-	-	-	2	-	1	-	-	1	1	-	-	5
	Total Medium Mammal	4	1	6	1	4	3	4	2	1	1	2	4	33
	GRAND TOTAL	**4**	**1**	**6**	**3**	**4**	**4**	**4**	**2**	**2**	**2**	**2**	**4**	**38**

be discerned from these data. Nonetheless, mortality was observed relatively evenly across the project area. It is notable, perhaps, that three roadkill incidents (all opossum) were documented directly above Culvert 3, and that the only location where mule deer mortality was documented was at the junction of Brea Boulevard and Tonner Canyon Road.

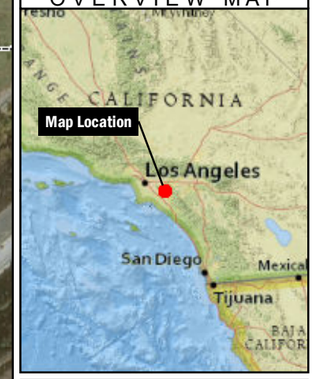
3.3 UNDERCROSSING OPENNESS RATIOS

Openness ratios for each bridge and culvert considered suitable as wildlife undercrossings are presented below (Table 9). Statistical analyses were not performed with these data, but the results are discussed in relation to wildlife moment results and proposed changes to the undercrossings in Section 4.1.3.

Table 9. Wildlife Undercrossing Dimensions

Existing Bridge/ Culvert Location	Height (meters)	Width (per span in meters)	Length (meters)	Openness Ratio (meters)
Culvert 1 (1 span)	0.39	1.22	21.03	0.02
Bridge 1 (2 spans)	3.66	3.35	24.38	0.50
Bridge 2 (2 spans)	6.09	5.18	13.72	2.30
Bridge 3 (3 spans)	5.48	2.64	21.95	0.66
Culvert 2 (1 span)	0.82	2.13	12.80	0.14
Culvert 3 (1 span)	2.13	1.07	12.19	0.19
Culvert 4 (3 spans)	3.05	3.66	34.14	0.33

OVERVIEW MAP



- Roadkill Survey Area Boundary
- Culverts
- Creek/Stream
- Bridges
- Proposed Wildlife Overpass/ Land Bridge
- Open Graded Asphalt Concrete
- Permanent Disturbance
- Temporary Disturbance
- City Boundary

Roadkill Occurrences

Brea Canyon Wildlife Movement Study – Systematic Searches (Mar. 2020 – Jan. 2021)

- Desert Cottontail
- Raccoon
- Striped Skunk
- Virginia Opossum

Brea Canyon Wildlife Movement Study – Initial Site Visit (17 Jan. 2020)

- Striped Skunk
- Virginia Opossum

UC Davis REC (2009-2020)

- Mule Deer

0 500

Feet

Scale 1:6,235

1 inch = 520 feet

NORTH

Roadkill Occurrences in the Brea Boulevard Corridor

AECOM

Figure 8

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

This page intentionally left blank.

4.0 DISCUSSION

This section provides an interpretation and discussion of the wildlife crossing and roadkill results. First, the patterns of wildlife movement and roadkill are discussed and summarized in the context of the potential Project impacts on wildlife movement within the Brea Boulevard Corridor and population connectively at the regional scale (Section 4.1). This is followed by discussion of Study limitations (Section 4.2), and finally, and recommendations are outlined as relevant to the Study (Section 4.3).

4.1 PATTERNS OF ANIMAL MOVEMENT AND ROADKILL WITHIN THE BREA BOULEVARD CORRIDOR

In general, there were large differences in wildlife activity levels (RA) between and within the focal species size classes, as well as among the sample locations and crossing types. There was minimal roadkill data, which limited the ability to draw broad inferences about wildlife mortality in the Brea Boulevard Corridor.

In the following subsections, patterns of wildlife activity and roadkill are discussed for large mammals (Section 4.1.1) and medium mammals (Section 4.1.2). The openness ratio of current undercrossings and the proposed improvements to those undercrossings is then discussed (Section 4.1.3), followed by a summary integrating the wildlife movement results and openness ratio findings in the context of understanding the impact of the road on wildlife movement in the Brea Boulevard Corridor (4.1.4).

4.1.1 Large Mammals

Large mammals were represented by three species in this Study: mule deer, coyotes, and bobcat. Coyotes were the most commonly detected large mammal, and many of the patterns discussed below were driven by coyote activity. One important result from this Study was that large mammals were equally likely to be detected at each of the three crossing types. They were generally detected at higher levels in the eastern end of the Brea Boulevard Corridor, which could be due to higher levels of development and habitat fragmentation at the western end of the Brea Boulevard Corridor.

No instances of large mammal roadkill mortality were documented during standardized roadkill surveys for this Study. Some number of large mammal roadkill incidents could have occurred in

the Brea Boulevard Corridor during the six months of roadkill surveys but gone undetected. However, the relatively high probability of persistence of mammalian carnivore carcasses reported by Santos et al. (2011) (54.3% after 7 days), and the high probability of detecting large mammal roadkill, together provide reasonable assurance that this number was not very high. Five incidental large mammal roadkill incidents were documented from other sources, including two mule deer and three coyotes. Unfortunately, the exact location within the Brea Boulevard Corridor of only one of these incidents was available. One of the mule deer was found dead in the road near the intersection of Tonner Canyon Road and Brea Boulevard, near the east end of the Brea Boulevard Corridor.

4.1.1.1 Mule Deer

Because of their large size and sensitivity/reluctance to use narrow undercrossings, the openness ratio of undercrossings is especially important for mule deer. Currently the culverts appear unsuitable for below grade road crossings for mule deer and thus do not function in promoting permeability across Brea Boulevard. The results from this Study reflect this, as mule deer were detected at the highest levels at Bridge 2, which has a large openness ratio (2.3), and at grade. They were rarely detected at Bridge 3 (openness ratio 0.66), and never detected at Bridge 1 (openness ratio 0.5) or near culverts. Reed et al. (1975) recommended that the openness ratio for an undercrossing exceed 0.6 meter for use by mule deer. Gordon and Anderson (2003) reported that underpasses with openness ratios less than 0.8 were marginal for mule deer. Ng et al. (2004) confirmed that mule deer crossings in Southern California occurred at spanning bridge undercrossings with large cross-sectional areas and deer were more likely to occur at undercrossings surrounded largely with native vegetation. Mule deer are reluctant to enter and use undercrossing that they cannot clearly see through to ensure they would not be ambushed by predators. Hence it is critical for this species to have large enough undercrossings that they are comfortable using to maintain connectivity within the Puente-Chino Hills Wildlife Corridor.

Mule deer comprised two of the three large mammal roadkill documented incidentally in the Brea Boulevard Corridor, but only the location of one animal was known, and that was towards the eastern end of the Brea Boulevard Corridor. There are currently no suitable undercrossings for mule deer in the eastern end of the Brea Boulevard Corridor, which makes the proposed land bridge an important addition to improving road permeability for this species.

4.1.1.2 Coyote

Unlike deer or bobcats, coyotes were detected most frequently at grade, compared to at bridges or culverts. Nonetheless, they were present at all three crossing types at relatively high rates. Coyotes were the most common large mammal at 8 of the 11 sample locations and they were observed crossing the road at most at grade sample locations. Similar to findings from Ng et al. (2004), coyotes were found crossing many of the at grade locations that had a high degree of human activity. The highest levels of coyote activity were at sample location 11 at the eastern end of the project area, with an RA value of approximately 0.65. Otherwise, they were detected at relatively similar levels across the Brea Boulevard Corridor.

Despite their overall abundance and propensity for activity at grade, coyote mortality was not detected during standardized roadkill surveys for this Study and only three instances of coyote mortality were documented incidentally from other sources (Section 3.2.1, Table 8).

4.1.1.3 Bobcat

Bobcats differed from coyotes and mule deer, in that they were detected most frequently at culverts, compared to at grade or at bridges. Increased bobcat activity was generally correlated with lower levels of coyote activity (i.e., sample locations 2 and 8), with the exception of sample location 9, wherein the two both exhibited relatively high levels of activity. Bobcat activity also appeared to be negatively associated with bridges where there was permanent surface water that spanned the entire crossing, such as at Bridges 2 and 3. Bobcats are reluctant to use undercrossing that contain water across the entire bottom of the crossing and hence having portions of dry ground in the undercrossing for them to use is essential.

Bobcat mortality was not documented in the roadkill surveys as part of this Study or in the incidental roadkill mortality data obtained from other sources for the area.

4.1.2 Medium Mammals

Medium mammals in this Study were composed of four species: raccoon, Virginia opossum, striped skunk, and desert cottontail. The first three species are considered meso-predators (i.e., predators that occupy the middle positions of their food web, preying on smaller animals), and in general, they exhibited similar patterns of activity among crossing types. Activity levels for all three species were highest at bridges, followed by culverts, and then at grade. This suggests these species are effectively utilizing the undercrossings in the Brea Boulevard Corridor. Desert

cottontails, in contrast, are herbivores, and they differed from other medium mammals in that they were observed most frequently at grade, followed by bridges, and finally at culverts. Overall, medium mammal activity patterns were driven mainly by raccoons, and raccoon activity was very high at the three bridge locations in the western portion of the Brea Boulevard Corridor. Nonetheless, among at grade locations, most medium mammal activity occurred in the eastern portion of the Brea Boulevard Corridor. Notably, the highest RA values for both raccoons and desert cottontail at grade sample locations occurred at sample location 11 at the eastern end of the Brea Boulevard Corridor.

All nine mortality incidents documented as part of the standardized roadkill surveys were of medium mammals, with each species represented in roughly equal proportions (Table 8). In a study of roadkill carcass persistence times, Santos et al. (2011) reported persistence probabilities of 54.3% after 7 days for mammalian carnivores similar in size to raccoons, striped skunks, and opossums, suggesting the actual number of roadkill incidents for these species could be at least twice as high as the numbers documented. Santos et al. (2011) reported a persistence probability of 7.7% after 7 days for lagomorphs (rabbits), which suggests desert cottontail mortality could be at least 13 times higher than the two incidents detected during standardized roadkill surveys, or approximately 26 mortalities over the Study period.

4.1.2.1 Raccoon

Raccoons were the most commonly detected medium mammal, with the highest levels of detection in the western end of the Brea Boulevard Corridor. Similar to results from Ng et al. (2004), raccoons were common at bridge locations and their high prevalence was due in part to their use of bridges and undercrossings as foraging habitat and not necessarily as movement corridors. Raccoons were closely associated with bridges and culverts that had water, especially at Bridge 2 where they were photographed foraging as family groups in the water. Four raccoons were detected as roadkill, although there were no apparent patterns of mortality associated with crossing type or location along the Brea Boulevard Corridor.

4.1.2.2 Virginia Opossum

Virginia opossums were detected at relatively low rates overall, but when they were detected, it was most frequently at Bridge 1. Otherwise, they were relatively evenly distributed across the Brea Boulevard Corridor, and between at grade and culverts. Of note, three of the five opossum roadkill incidents were found above Culvert 3 (Sample Location 9), which also had the second high RA levels for opossums. Culvert 3 has a relatively small openness ratio of 0.19, although it

is unclear if the mortality was related to this factor. Despite the fact that they were rarely detected at grade, and that they were detected at relatively low rates overall, they had the highest number of roadkill incidents documented in standardized roadkill surveys at three. Opossum are slow moving scavengers known to forage on roadkill and are primarily active at night, which together may make them highly susceptible to being hit by vehicles. The proposed land bridge and increased openness of culverts may help reduce rates of roadkill mortality for this species.

4.1.2.3 Striped Skunk

Similar to opossums, striped skunks were detected at relatively low levels. Most detections of this species were at bridges (especially Bridge 1) and culverts. They were rarely detected at grade. However, despite their low overall detection rate, and low detection rate at grade, striped skunk mortality was documented twice during standardized roadkill surveys. Like opossums, skunks are relatively slow moving and primarily nocturnal, which may make them susceptible to being hit by vehicles. Their propensity for using bridges and culverts suggests that improvements to openness ratios may reduce roadkill rates.

4.1.2.4 Desert Cottontail

Desert cottontail were detected at moderately high rates across the Brea Boulevard Corridor and were most likely to be detected at grade. Unlike the other medium mammal species, cottontails are herbivores, and they may actively forage along the margins of the road. Despite the species' greater propensity to be detected at grade, desert cottontail mortality was not higher than that of other species. Rabbits have relatively small home ranges, and typically do not need to travel far to find food. Their low levels of movement across the landscape could therefore be reflected in a relatively low incidence of roadkill, although caution should be exercised when drawing conclusions due to the roadkill sample sizes in this Study.

4.1.3 Other Wildlife Species

In addition to the previously mentioned large and medium mammals, there are other wildlife species that benefit from connectivity across Brea Boulevard. This includes small mammals (pocket mice, heteromyids, woodrats, etc.), reptiles, amphibians, invertebrates, and some avian species (e.g. greater roadrunner [*Geococcyx californicus*]), among others. Some of these smaller wildlife species are considered species of special concern by the California Department of Fish and Wildlife. Within the Brea Boulevard Corridor wildlife species that were not necessarily captured on cameras or detected as roadkill, but are known to occur based on the Project *Draft*

Biological Technical Report Brea Boulevard Corridor Improvement Project (AECOM 2021) include western pond turtle (*Actinemys pallida*) within Brea Creek, coastal whiptail (*Aspidoscelis tigris stejnegeri*) and other reptile species, and greater roadrunners that benefit from connected landscapes. Haas et al. (2002) assessed the reptile and amphibian distribution and diversity across the Puente-Chino Hills Wildlife Corridor and showed that diversity decreased from east to west. Hence having multiple wildlife undercrossing along with a potential land bridge would help maintain connectivity for smaller wildlife species across Brea Boulevard and allow for gene flow and movement between sink and source populations of species.

4.1.4 Crossing Openness Ratios

This Study documented the existing rates of wildlife activity at undercrossing structures (bridges and culverts) and wildlife crossings at grade. Since the Project will expand the width of the road and replace the three existing outdated bridges, there is a potential for the new bridge dimensions to impact future wildlife permeability within the Brea Boulevard Corridor. Current openness ratios and proposed openness ratios for each bridge and culvert considered suitable as wildlife undercrossings are presented in Table 10.

Proposed post-construction openness ratios for Bridges 1, 2, and 3 (Table 10) are as calculated in AZTEC Engineering Group's *Wildlife Connectivity Strategy Scoping Report for the Brea Boulevard Corridor Improvements Project, Orange County, California* (AZTEC 2021). All three bridges will be substantially enlarged, expanded, and have their openness ratios increased. Since the three bridges have two to three support walls inside of them, their openness ratios were calculated based on the number of internal supporting walls. In addition to the new bridges being wider to accommodate increased water flow through Brea Creek, the new bridge designs eliminate these internal walls. Hence the openness ratio post-construction will be greatly improved for Bridges 1, 2, and 3.

Culvert 1 is not included in Table 10 as it does not currently support safe passage under Brea Boulevard for any focal species because it is silted in and has a grate covering the east end. It would be extended in line with road widening for the Project and is unlikely to contribute to road permeability post-construction.

Table 10. Proposed Improvements to Undercrossings

Existing Bridge/Culvert Location	Current Openness Ratio (meters)	Proposed Openness Ratio Post-Construction	Impact on Wildlife Movement
Bridge 1 (2 spans)	0.50	3.9	Increased openness may permit additional movement and movement of new species at this location (i.e., mule deer)
Bridge 2 (2 spans)	2.30	4.5	Increased openness likely to facilitate improved permeability for wildlife movement
Bridge 3 (3 spans)	0.66	5.4	Increased openness likely to facilitate improved permeability for wildlife movement
Culvert 2 (1 span)	0.14	Not applicable	Culvert 2 is proposed to have a grate covering the north end and a 2.4-meter drop down to the bottom of the storm drain. This will prevent it from being used as an undercrossing.
Culvert 3 (1 span)	0.19	0.12	The north end will be angled upwards at a steep slope which will prevent wildlife from having a clear line of sight to pass through the undercrossing. This will result in reduced connectivity due to a smaller openness ratio and inability to clearly see through the undercrossing.
Culvert 4 (3 spans)	0.33	0.33	No change proposed

Based on current Project designs, Culvert 2 opening is proposed to be changed because the road is widened towards an existing hillside making it infeasible to implement a culvert opening similar to the existing condition. The opening will instead be a storm drain that will not function as a wildlife undercrossing. The north side of the proposed storm drain will have a grate covering it and will have a vertical 2.4 meter drop down to the bottom of the drain. Wildlife will no longer be able to use Culvert 2 after it is converted to a storm drain.

Culvert 3 is proposed to have two different dimensions for the culvert openings with the north end dimensions (1.2 by 2.4 meters) being smaller than they are currently. The southern end of Culvert 3 will be slightly larger than the north end at 1.8 by 2.4 meters. The length of Culvert 3 will be extended to 24.4 meters with rip-rap placed at both ends. Since Culvert 3 is proposed to have two differently sized entrances, for the purpose of calculating the openness ratio, the smaller entrance on the north side was selected for the culvert's width and height (1.2 by 2.4 meters). By lengthening Culvert 3, the openness ratio will diminish from 0.19 down to 0.12. Furthermore, the north end of Culvert 3 is proposed to be angled upwards to match the grade of the topography which will

prevent wildlife from clearly seeing through the crossing. The proposed placement of rip-rap as an erosion control measure may reduce the effectiveness of the culvert as a crossing structure for a variety of wildlife species. Given the proposed changes to Culvert 3, it will decrease in value as a wildlife undercrossing structure for the focal species and may cease to be used by some species.

Culvert 4 is anticipated to have no structural changes, and hence the openness ratio will not change, and wildlife will be able to use it similar to current conditions.

4.1.5 Summary of Wildlife Activity Findings

The findings in this Study indicate that Brea Boulevard currently functions as either a semi-permeable or highly permeable filter for wildlife, allowing them to pass over the road at grade, or below grade using existing undercrossings (bridges/culverts). The number of mortalities detected during standardized roadkill surveys in this Study were insufficient to create a hotspot map and identify potential locations of increased roadkill. Nonetheless, general activity patterns of both large and medium wildlife indicate crossing activity at grade is higher in the eastern portion of the Brea Boulevard Corridor and that this may be due to a lack of suitable undercrossings there, relative to the western portion of the Brea Boulevard Corridor.

In absence of some of the Project components, the Project would likely impact existing conditions along the Brea Boulevard Corridor by increasing traffic flow and adding physical barriers in the form of concrete median barriers and retaining walls. Higher traffic volume may negatively impact wildlife movement by increasing rates of vehicle-wildlife strikes, discourage wildlife from approaching the road due to higher noise and light levels, and thereby increasing the road's barrier effect. Concrete barriers along the road shoulders (i.e. retaining walls) and in parts of the median may also negatively impact wildlife movement by physically impeding animals from crossing the road at grade, especially for smaller mammals like opossums, skunks, and rabbits that are unable to climb or jump over these barriers. These negative impacts can potentially be mitigated by Project components including directional fencing along the extent of the Brea Boulevard Corridor, proposed improvements to the bridges and culverts, and the land bridge in the eastern portion of the Brea Boulevard Corridor (detailed below in Section 4.3.1). These Project components are expected to inhibit, or greatly impede, the ability of wildlife to cross at grade, and instead should funnel them to safe undercrossings or the land bridge. Moreover, the addition of jump out/egress locations and escape ramps along the Brea Boulevard Corridor should provide wildlife a safe way to exit the road (AZTEC 2021). Based on experience with jump outs in southern California, there should be at least a 6-foot height difference between the top of the jump out and the bottom/ground level. Furthermore, the front face of the jump out should be constructed of a

non-grip material (such as flat metal instead of chain-link fence, brick/rock, or other climbable surface) to prevent wildlife from climbing up the front of the escape ramp.

In general, the greater the openness ratio of an undercrossing, the more likely it is to be used by a variety of species, especially large herbivores. This may be especially important for Bridge 1, where no mule deer were detected on cameras crossing under the current bridge. Bridge 1 has a current openness ratio of 0.5, compared to 2.3 and 0.66 for Bridges 2 and 3, respectively. Post-construction, Bridge 1 will have an openness ratio of 3.9, which may lead to increased use by mule deer. In the current Study, both large and medium mammals were detected at or near culverts and bridges, indicating that they do serve as important wildlife undercrossings. This is important for maintaining high levels of connectivity across the landscape, and especially for wildlife using the Puente-Chino Hills Wildlife Corridor.

While no mountain lions or gray foxes were detected during this Study, both species have a potential to occur because both species have been documented further west (Haas 2000, Spencer 2005). In particular, one or more mountain lions still hunt as far west as the Whittier Hills (Spencer 2005). While gray foxes were detected at low numbers around the Tonner Canyon Bridge (per Haas 2000), their relative abundance peaked at the eastern and western portions of the Puente-Chino Hills Wildlife Corridor. Both species benefit from underpasses with large size, and Haas (2000) found that gray fox showed a positive association with underpass size. While neither species was detected during this Study, the Project will provide suitable crossing locations (as either underpasses or via the proposed land bridge) for both species. Mountain lions prefer large, open crossing structures with an openness ratio of at least 0.75 and clear visibility to the other end of the crossing with minimal adjacent vegetation (Cavallaro et al. 2005, Clevenger and Waltho 2005). Gray foxes prefer culverts that have an openness ratio of at least 0.4, are easily accessible, and have clear visibility through to vegetation at the other end of the crossing (Cavallaro et al. 2005). The incorporation of ledges along existing culverts that are designed for drainage may facilitate gray fox movement when the culverts contain water. Given the proposed openness ratios detailed in Table 10, Bridges 1, 2, and 3 will meet the requirements for mountain lions and gray foxes. Finally, the proposed land bridge will provide an alternative crossing location on the east end of the Project where there are no other suitable crossing structures since Culverts 2, 3, and 4 are all too small for mountain lions and gray foxes.

Overall, the impacts of the components of the Project that impede wildlife movement (i.e., traffic and physical barriers) are expected to be offset by the Project components designed to mitigate those impacts. Indeed, the installment of wildlife fencing, in conjunction with proposed improvements to undercrossings (especially at Bridges 1, 2, and 3) and the addition of the proposed

land bridge, will likely provide a net benefit to wildlife movement in the vicinity of the Brea Boulevard Corridor. Maintaining the permeability of the Brea Boulevard Corridor is important to ensure continued wildlife movement along the southern portion of the Puente-Chino Hills Wildlife Corridor.

4.2 STUDY LIMITATIONS

This section details some of the main constraints and limitations associated with the Study including data collection and results.

4.2.1 COVID-19 Pandemic

While the official start of the data collection period for wildlife cameras and concurrent roadkill surveys began on March 3, 2020, on March 4, 2020 Governor Gavin Newsom proclaimed a State of Emergency as a result of the threat of COVID-19 (Executive Order N-33-20). Beginning on March 19, 2020, to protect public health, a state-wide stay-at-home order was issued (except as needed to maintain continuity for critical infrastructure). This caused an appreciable reduction in commuter traffic, and in subsequent weeks biologists noted a drop-off in traffic volumes on Brea Boulevard. To quantify the reduction in traffic, AECOM conducted traffic counts on Brea Boulevard over a 24-hour period on October 7, 2020. The total daily vehicle count (sum of both directions) for October 7, 2020 was 11,646, which represented a 30 percent decrease over the previous traffic collection period from the same location on September 10, 2019 (AECOM 2020b). While the daily traffic volumes on Brea Boulevard likely decreased to a greater degree at the start of the pandemic and stay-at-home order in March 2020, the traffic count in October 2020 provides a new baseline level that more accurately reflects current conditions throughout the Brea Boulevard Corridor.

While it is difficult to accurately predict what the roadkill levels would have been in the Brea Boulevard Corridor without the global Pandemic, the decrease in traffic volume may have resulted in fewer roadkill mortality events, but also a potential increase in wildlife activity near Brea Boulevard as a result of decreased traffic noise, vibration, light, etc. The decrease in traffic volume resulting in lower roadkill mortality events was evident across several states as documented in a recent paper by Nguyen et al. (2020). Using traffic and collision data from California, Nguyen and her colleagues determined that wildlife-vehicle conflict (WVC) declined by 21 percent in California following initial stay-at-home orders. They documented a 75 percent decline in vehicle miles traveled on all roads between early March and mid-April. The decline in WVC related to a 58 percent reduction in mortality on roads for mountain lions, and the

distribution of WVC did not generally change between the period before and after the stay-at-home orders. This confirms what AECOM biologists noted in the field with a decrease in traffic, which made conducting roadkill surveys easier and safer.

Because the COVID-19 pandemic spanned the majority of the Study duration, it is difficult to accurately determine the true baseline level of wildlife mortality within the Brea Boulevard Corridor. Seiler (2003) found that average daily traffic volumes in excess of 10,000 vehicles per day are considered a near-total barrier to at grade wildlife passage. Roadkill surveys were not conducted pre-COVID, therefore it is difficult to know what roadkill levels were like prior to the pandemic. However, during the COVID-19 pandemic, with a daily vehicle count around 11,646, observed roadkill levels were low.

One unknown variable is how the pandemic may have also shifted traffic volumes in a more permanent way as more people work remotely or from home. Time will tell how quickly the level of traffic returns to pre-COVID pandemic levels or remains at some reduced rate. Given that this was a known Study limitation from early on in the Study, roadkill data from Orange County Animal Control from 2016 through 2020 were incorporated into the analysis as reflected in Section 3.2.1 and Table 8. While these data are incidental and cannot be directly compared with the results of standardized roadkill survey results from the present Study, they do not qualitatively suggest there was a dramatically higher level of mortality or a different species composition of roadkill before the pandemic.

4.2.2 Ongoing Operations and Maintenance Oil Field Activities

By placing wildlife cameras with viewsheds that overlapped with oil field access roads (i.e., Cameras 8, 14, and 15), it was understood that many photos of O&M activities would be captured. This was especially evident for Camera 14. During the first few weeks of camera data collection in March 2020, the camera's memory card was quickly filled with photographs of oil field maintenance vehicles. Hence it was determined that expanding the interval between trigger events (when motion in front of the camera caused a photo to be taken) from 1 second to 5 seconds and eventually to 10 seconds between trigger events would greatly decrease the number of photographs taken of O&M vehicles. While this may have reduced the number of photographs taken of wildlife, it was determined that the presence of vehicles would have precluded wildlife from using the area while vehicles were passing by. Since wildlife were still captured on Camera 14 (particularly late at night when O&M activities were lowest), and the cameras had a fast trigger speed (0.4 second), it was deemed unlikely that substantial wildlife crossing events were missed.

4.2.3 Camera Placement

During the initial site visit in January 2020 and follow-up discussions with adjacent landowners and OC Public Works, it was concluded that all cameras must be placed within the road's R/W along Brea Boulevard. The distance from the road edge to the R/W edge varied throughout the length of the Brea Boulevard Corridor and was less than 10 feet in some locations to over 20 feet in other locations. Since all cameras had to be placed within the R/W, the ideal camera placement based on local topography, vegetation, bridge abutments, etc. was not always possible. Further considerations such as human trespass and vandalism were considered when selecting camera placement locations. This was especially evident for Camera 16 which had to be placed directly over the east edge of Culvert 4 on an existing fence line pole due to R/W limitations and excessive spray painting within the culvert. Biologists felt that placement of the camera within Culvert 4 would result in high levels of vandalism and there were no ideal locations within Culvert 4 that were also within the road's R/W. Since the camera had to be placed farther away from the opening to Culvert 4 and angled downwards, the ideal trigger location (i.e., location where an animal passing by would be detected) was farther away and hence the camera possibly missed wildlife crossing under Tonner Canyon Road through Culvert 4. Based on the low levels of wildlife detected on Camera 16 compared to the large volume of wildlife tracks (mostly raccoon and coyote) observed at the bottom of Culvert 4, data from Camera 16 were omitted from the analysis because the camera likely under-reported wildlife occurrence within the intended viewshed. Furthermore, no structural changes are anticipated at Culvert 4 from the Project (only restriping the portion of Tonner Canyon Road above Culvert 4), and hence the Project is anticipated to have no effect on wildlife movement through Culvert 4.

Cameras 9 and 10 located at Bridge 3 also had restricted viewsheds. The cameras were placed above Bridge 3 and angled downward (due to a steep concrete wall abutment that precluded placement of the camera at the base of the bridge), but the trigger location was farther away than desired and hence some wildlife (particularly small wildlife) may have been outside the cameras' detection range. Since the data from these two cameras were combined, biologists felt like they still captured adequate data to include in the Study.

4.3 RECOMMENDATIONS

The following list of recommendation is by no means an exhaustive list. Rather, it is a list of ways to improve wildlife connectivity through Brea Boulevard post-construction of the Project. These recommendations are specific to the road R/W and are generally grouped into Project design and construction recommendations, and monitoring recommendations.

4.3.1 Project Design and Construction Recommendations

Project design and construction recommendations are summarized in the AZTEC (2021) report and include directional wildlife fencing, jump-out/egress locations, escape ramps and a proposed land bridge. The AZTEC (2021) report provides detail regarding the benefits of directional wildlife fencing with regularly-spaced jump-out locations. This design provides at least two escape points (one on each side of the road) spaced along each 0.5 mile of Brea Boulevard where directional fencing and retaining walls are proposed. The report also contains details of lateral access driveway gates or grates to prevent wildlife ingress onto the road. Complete details along with figures and a description of each project design and construction recommendation to prevent wildlife from entering the road are provided in AZTEC (2021) and not repeated herein.

As detailed within the AZTEC (2021) report, Culvert 3 is proposed to be lengthened, but not expanded in height or width. Culvert 3 is an important wildlife undercrossing and currently has a restricted openness ratio at 0.19. It is used regularly by coyotes, bobcats, raccoons, opossums, and other wildlife. If Culvert 3 is lengthened, and the height and width are not expanded, the openness ratio will decrease to 0.12, and it will likely be avoided by wildlife species that require a greater openness ratio. In particular the Project design for Culvert 3 includes a sloped entrance on the north side of the culvert that prevents wildlife from being able to see directly through the culvert. Furthermore, the slope may make it difficult for some wildlife to climb up and out of the culvert. Since Culvert 3 is located where Brea Creek makes a bend to the north, is in close proximity to Brea Boulevard, and is surrounded by riparian vegetation, it is an important crossing for wildlife that prefer more dense cover and travel along riparian corridors. Even though the proposed land bridge would be located several hundred feet to the east, it would be elevated above the creek bed, and wildlife species that prefer dense cover along riparian corridors (such as raccoons and skunks) may be more hesitant to travel uphill outside of the riparian corridor to cross the land bridge. Hence, it is recommended that the height and/or width of Culvert 3 be expanded to at least maintain the current openness ratio. Furthermore, wildlife fencing should be placed on both sides of Culvert 3 to direct wildlife to the undercrossing and prevent them from accessing the south side of Brea Boulevard. If the proposed land bridge is not constructed, then Culvert 3 should have the height and width expanded to increase the openness ratio in line with widening the road. In particular, Culvert 3 should be enlarged enough to allow mule deer (and other wildlife species such as mountain lions) to be comfortable using it (with a targeted openness ratio of greater than 0.6 to 0.8). The sloped north end of Culvert 3 should be reconfigured to allow wildlife to clearly see through the undercrossing. Furthermore, the rip-rap proposed at both ends of Culverts 2 and 3 should be replaced with articulated concrete blocks, which would provide both erosion protection, and allow wildlife easier access to the undercrossings.

The Project would expand all three bridges in the Brea Boulevard Corridor which may potentially influence the level and amount of water in Brea Creek flowing under the bridges. Bobcats prefer to pass through an undercrossing/bridge on dry ground and will avoid areas inundated with water. Bobcats were rarely detected under Bridges 2 and 3, which contain flowing water in Brea Creek throughout most of the year. Since the Project will include wildlife fencing to prevent bobcats from crossing at grade and directing them towards the bridges, to ensure that there is a dry place that bobcats can use to pass under Bridges 2 and 3, it is recommended that a wildlife ledge be installed under both bridges. The wildlife ledge should be placed approximately 3 feet above the ground, above the ordinary high water mark of Brea Creek under both sides of Bridges 2 and 3. The wildlife ledge should be wide enough to accommodate a bobcat, include a non-slip surface, and have a small ramp at both ends to allow wildlife easy access to the ledge. It is recommended that the final design and height above the ground determined by bridge engineers in concert with a wildlife expert and hydrologist.

One major feature of the Project is the proposed land bridge located at the eastern end of the Brea Boulevard Corridor. The land bridge is proposed at approximately 75-feet wide and 85-feet long to span all four lanes of the expanded roadway. Recommendations to improve the potential long-term use of the proposed land bridge for wildlife include:

1. Planting of native vegetation at the ends of the bridge, the approach to the bridge, and across the bridge. Vegetation selection should match surrounding native vegetation communities and provide sufficient cover for wildlife while crossing the land bridge.

2. Measures should be implemented to ensure the land bridge is excluded from regular use by humans. A recently constructed land bridge in Utah that has seen success in facilitating wildlife movement has also documented hikers, bikers, runners, and other illegal human uses of the land bridge (TWS 2019). Human use of the land bridge may discourage wildlife use, and monitoring (detailed in the subsequent section) will evaluate if human use is negatively affecting wildlife use of the land bridge. Measures to reduce and prevent human trespass may include additional fencing, signage, or planting of undesirable native species (such as stinging nettle [*Urtica dioica*] and wild rose [*Rosa californica*]).

3. The land bridge design should minimize the potential for noise and light to deter wildlife from using the bridge. Shilling et al. (2020) studied traffic noise and light impacts on wildlife in the vicinity of the proposed Liberty Canyon wildlife over-crossing (over Highway 101, in Agoura Hills, Los Angeles County) and found that both high levels of light and noise may deter wildlife from using an over-crossing structure. Consultation with an expert on noise and light impacts at wildlife crossings is recommended to ensure light

and noise avoidance measures account for position of the land bridge relative to noise and light sources (e.g., vehicular traffic). For example, in locations where the R/W is narrow, construction of a wall may help facilitate a reduction in traffic noise and light in the approach to the crossing. The specific height of the wall should be developed based on a noise and light analysis. Hence, depending upon the traffic noise and light levels at the top of the proposed Project land bridge, it may be useful to construct a wall on each side of the land bridge to block vehicle lights from shining onto the land bridge and reduce the level of traffic noise. No lights should be placed on top of the land bridge and if any lights are attached to the land bridge for safety purposes, they should be shielded downward and directed away from the land bridge.

4.3.2 Post-Construction Monitoring Recommendations

The following recommendations are related to monitoring Brea Boulevard Corridor once construction of the Project is complete.

1. Conduct a post-construction wildlife movement study to determine impacts to wildlife after the Project is complete. This may include monitoring the three newly constructed bridges (and any other culverts that could be used) and land bridge to ensure they are effective at allowing wildlife to use them and cross without hindrance. Wildlife camera and roadkill surveys should be conducted in the same manner as this Study to allow for direct comparisons pre- to post-construction, including camera or other survey techniques at the base of jump-outs and escape ramps (if constructed) to document patterns of use. Roadkill monitoring should include the entire 1.5-mile alignment and be continued for 2 to 3 years post-construction to gather data over a longer period of time. In addition, noise and light-monitoring should be performed consistent with methods used to collect baseline data (Section 4.3.1, #3). Post-construction monitoring should consist of a multi-year study that accounts for interannual variation and provides meaningful trends and comparison to baseline data with respect to changes in wildlife movement patterns and use of crossings. According to Bissonnette and Cramer (2008), it may be necessary to monitor crossing use for at least 3 years after construction because wildlife can take at least 2 years to adapt, especially if they only seasonally use the area for migration. In addition, restoration of habitats adjacent to the roadway associated with project impacts may take a few years to start maturing. If wildlife are detected accessing the road by jumping up or climbing up the front of escape ramps (if constructed), then adaptive management techniques may need to be employed to retrofit the escape ramps to prevent further wildlife access to the roadway.

2. Monitor human use of the undercrossings and land bridge post-construction. If human use is detected regularly at any of the bridges or land bridge, it may be necessary to implement additional measures to ensure humans are not affecting wildlife use of the crossing structures.

5.0 REFERENCES

AECOM. 2009. State Route 76 South Mission to Interstate 15 Highway Improvement Project. Wildlife Movement Study 2007-2009. Prepared for the California Department of Transportation District 11. August.

AECOM. 2015. State Route 76 Middle Wildlife Movement Study. Prepared for the California Department of Transportation District 11. March.

AECOM. 2020a. State Route 76 South Mission to Interstate 15 Highway Project Postconstruction Wildlife Movement Study. Year 1 Report. Prepared for the California Department of Transportation District 11. May.

AECOM. 2020b. Memorandum regarding Brea Boulevard Corridor Improvement Wildlife Movement Study – ADT Volume Comparison. October 19.

AECOM. 2021. Draft Biological Technical Report Brea Boulevard Corridor Improvement Project. February.

AZTEC Engineering Group, Inc. (AZTEC). 2020. Draft Bridge Type Selection Report for Brea Boulevard Wildlife Overcrossing. October.

AZTEC. 2021. Wildlife Connectivity Strategy Scoping Report for the Brea Boulevard Corridor Improvements Project, Orange County, California. April 26.

Bates D, Mächler M, Bolker B, Walker S. 2015. "Fitting Linear Mixed-Effects Models Using lme4." Journal of Statistical Software, 67(1), 1–48. doi: 10.18637/jss.v067.i01.

Benson, J.F., P.J. Mahoney, T.W. Vickers, J.A. Sikich, Paul Beier, S.P.D. Riley, H.B. Ernest, W.M. Boyce. 2019. Extinction vortex dynamics of top predators isolated by urbanization. Ecological Applications. March.

Bissonette, J. A., and P. Cramer. 2008. Evaluation of the use and effectiveness of wildlife crossings. NCHRP Report 615. Washington, DC: National Cooperative Research Program, Transportation Research Board.

Cavallaro, L, K. Sanden, J. Schellhase, and M. Tanaka. 2005. Designing Road Crossings for Safe Wildlife Passage: Ventura County Guidelines. MS Thesis, U.C. Santa Barbara.

Clevenger, A.P. and N. Waltho. 2005. Performance indices to identify attributes of highway crossing structures facilitating movement of large mammals. Biol. Cons. 121: 453-464.

Cooper, D.S. 2000. Breeding landbirds of a highly threatened open space: the Puente-Chino Hills, California. Western Birds 31:213-234.

Gordon, K. M., and S. H. Anderson. 2003. Mule deer use of underpasses in western and southeastern Wyoming. *In* 2003 Proceedings of the International Conference on Ecology and Transportation, Center for Transportation and the Environment, North Carolina State University, Raleigh.

Haas, C.D., and K. Crooks. 1999. Carnivore abundance and distribution throughout the Puente/Chino Hills. Final Report. Prepared for The Mountains Recreation and Conservation Authority and State of California Department of Transportation.

Haas, C.D. 2000. Distribution, relative abundance, and roadway underpass responses of carnivores throughout the Puente-Chino Hills. Unpubl. M.S. Thesis. California State Polytechnic University, Pomona, CA. 110 pp.

Haas, C.D., and Turschak, G. 2002. Responses of large and medium-bodied mammals to recreation activities: the Colima Road Underpass. Final Report. Prepared for Puente Hills Landfill Native Habitat Preservation Authority. U.S. Geological Survey, Western Ecological Research Center.

Haas, C.D., A.R. Backlin, C. Rochester, and R.N. Fisher. 2002. Monitoring reptiles and amphibians at long-term biodiversity monitoring stations: The Puente-Chino Hills. Final Report. Prepared for Mountains Recreation and Conservation Authority, Puente Hills Landfill Native Habitat Preservation Authority, and California State Parks.

Hanksi, I. 1999. Metapopulation Ecology. Oxford University Press. New York.

Lyren, L.M. 2001. Movement patterns of coyotes and bobcats relative to roads and underpasses in the Chino Hills area of Southern California. Unpubl. M.S. Thesis, California State Polytechnic University, Pomona, CA. 127 pp.

Mock, P.J., M. Grishaver, D. King, B. Crother, D. Bolger, and K. Preston. 1992. Baldwin Otay Ranch wildlife corridor studies. Ogden Environmental and Energy Services Co., Inc. Project nr 110850020. 113 p.

Newkirk, E. S. 2016. CPW Photo Warehouse. Colorado Parks and Wildlife, Fort Collins, Colorado, USA. http://cpw.state.co.us/learn/Pages/ResearchMammalsSoftware.aspx.

Ng, S. J., J. W. Dole, R. W. Sauvajot, S. P. D. Riley, and T. J. Valone. 2004. Use of highway undercrossings by wildlife in southern California. Biological Conservation 115: pgs 499-507.

Nguyen, T., M. Saleh, M-K. Kyaw, G. Trujillo, M. Bejarano, K. Tapia, D. Waetjen, Ph.D., and F. Shilling, Ph.D. 2020. Special Report 4: Impact of COVID-19 Mitigation on Wildlife-Vehicle Conflict. Road Ecology Center of UC Davis. June 24.

Noss, R., P. Beier, and W. Shaw. 1997. Evaluation of the Coal Canyon biological corridor. Unpublished report.

PCR Services Corporation, Frank Hovore & Associates, and FORMA Systems. 2000. Executive summary of the proposed Los Angeles County Significant Ecological Areas. Prepared for Los Angeles County Department of Regional Planning. November.

PCR Services Corporation. 2002. Biological constraints analysis: Aera Master Planned Community. Prepared for Los Angeles County Regional Planning, Los Angeles, CA. April.

R Core Team. 2020. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Reed, D.F., T.N. Woddard, and T.M. Pojar. 1975. Behavioral response of mule deer to a highway underpass. Journal of Wildlife Management 39:361-367.

Robertson, G., D. Fretz, and D. Zacovic. 1995. Wildlife movement in the Puente-Chino Hills: potential pathways and impediments. Prepared for Wildlife Corridor Conservation Authority. January.

Seiler, A. 2003. Effects of infrastructure on nature. In: Trocme M et al. (eds) COST 341 – Habitat fragmentation due to transportation infrastructure; The European review. Office for Official Publications of the European Communities, Luxembourg, pp. 31-50.

Santos S.M., Carvalho F., Mira A. 2011. How Long Do the Dead Survive on the Road? Carcass Persistence Probability and Implications for Road-Kill Monitoring Surveys. PLoS ONE 6(9): e25383. doi:10.1371/journal.pone.0025383.

Santos, S.M., J.T. Marques, A. Lourenço, D. Medinas, A.M. Barbosa, P. Beja, and A. Mira. 2015. Sampling effects on the identification of roadkill hotspots: Implications for survey design. Journal of Environmental Management 162 pgs 87-95.

Shilling, F., A. Collins, T. Longcore, and W. Vickers. 2020. Understanding Behavioral Responses of Wildlife to Traffic to Improve Mitigation Planning. A Research Report from the National Center for Sustainable Transportation. UC Davis Institute for Transportation Studies. February.

Spencer, W.D. 2005. Maintaining Ecological Connectivity Across the "Missing Middle" of the Puente-Chino Hills Wildlife Corridor. Final Report. Prepared for Resources Legacy Fund Foundation. Sacramento, California. July 2005.

The Wildlife Society (TWS). 2019. Watch: Recreationists use wildlife overpass. June 25. https://wildlife.org/watch-recreationists-use-wildlife-overpass/.

Vickers, T.W., J.N. Sanchez, C.K. Johnson, S.A. Morrison, R. Botta, T. Smith, B.S. Cohen, P.R. Huber, H.B. Ernest, and W.M. Boyce. 2015. Survival and Mortality of Pumas (Puma concolor) in a Fragmented, Urbanizing Landscape. PloS One 10: e0131490. Doi: 10.1371/journal.pone.0131490. July 15, 2015.

Yanes, M., J.M. Velasco, and F. Suárez. 1995. Permeability of roads and railways to vertebrates: the importance of culverts. Biological Conservation 71:217-222.

APPENDIX A

WILDLIFE CAMERA LOCATION PHOTOGRAPHS AT WILDLIFE CROSSINGS

Photograph 1: View of Camera 1 facing southwest at grade with Brea Boulevard located directly behind the camera. Camera 1 was angled to capture wildlife using a dirt access road that lead to Brea Boulevard. There is a small culvert (Culvert 1) located directly south (10 feet to the left of the camera) of Camera 1 potentially used by small wildlife species.

Photograph 2: View of western end of Culvert 1 on west side of Brea Boulevard with nearby Camera 1.

Photograph 3: View west through the northern span of Bridge 1 from Camera 2 (located on the east side of Brea Boulevard).

Photograph 4: View west from the east side of Brea Boulevard of Bridge 1 with double spans. The southern span of Bridge 1 is completely full of deep water from Brea Creek. The north span of Bridge 1 has a sandy bottom and Cameras 2 and 3 were attached to a palm tree on the east side of the north span.

Photograph 5: View east from Camera 3 of wildlife trail along the north side of the north span underneath Bridge 1.

Photograph 6: View southeast from Camera 4 (located on the west side underneath Bridge 2) looking underneath the south span of Bridge 2. Brea Creek flows south through Bridge 2, but is relatively shallow (less than a foot deep) with a cement, rock, and sandy bottom.

Photograph 7: View south from Camera 5 (located on the west side underneath Bridge 2) that shows both spans of Bridge 2, with Brea Creek flowing south through both bridge spans.

Photograph 8: View north from Camera 6 (located on the east side underneath Bridge 2) that shows both spans of Bridge 2. Brea Creek is relatively shallow here and large rocks have been cemented to the creek bottom for stability.

Photograph 9: View southeast from Camera 7 (located at grade south of Brea Boulevard) across a fenced-off dirt trail.

Photograph 10: View south across dirt road from Camera 8 (located at grade on the south side of Brea Boulevard) on the west side of Brea Creek and Bridge 3.

Photograph 11: View southeast across Brea Creek from Camera 9 (located on the west side of Brea Creek and Bridge 3 and the south side of Brea Boulevard).

Photograph 12: View southeast from Camera 10 looking under Bridge 3 at Brea Creek. Bridge 3 has three spans and Camera 10 was angled to capture wildlife moving through the eastern-most bridge spans.

Photograph 13: View east along the south side of Brea Boulevard from Camera 11 (located at grade).

Photograph 14: View of Camera 12 (located on the south side of Brea Boulevard) pointed northwest and looking into Culvert 2.

Photograph 15: Top-down view of Camera 13 (attached on a Coast live oak tree on the south side of Brea Boulevard) which was angled north looking into Culvert 3.

Photograph 16: View of Camera 14 which was attached to a Eucalyptus tree on the north side of Brea Boulevard. The camera was oriented to capture photos across a dirt access road to one of Cal Resources LLC facilities.

Photograph 17: View of Camera 15 angled southeast across dirt access road located on the south side at the same grade as Brea Boulevard.

Photograph 18: View of Camera 16 (located on the east side of Tonner Canyon Road) looking east down a triple span undercrossing for Brea Creek. Brea Creek flows southwest under Tonner Canyon Road here.

This page intentionally left blank.

APPENDIX B

REPRESENTATIVE ROADKILL SURVEY AND WILDLIFE PHOTOGRAPHS

Photograph 1: Road killed raccoon on the east side of Brea Boulevard, south of Canyon Country Road.

Photograph 2: Road killed striped skunk on the south side of Brea Boulevard.

Photograph 3: Road killed juvenile gopher snake on the south side of Brea Boulevard.

Photograph 4: Road killed feral house cat on the south side of Brea Boulevard.

Photograph 5: Female mule deer and fawn about to cross Brea Boulevard at grade on Camera 1.

Photograph 6: Bobcat walking towards Camera 2 about to cross under Bridge 1.

Photograph 7: Mule deer buck walking towards Camera 7 along the south side of Brea Boulevard.

Photograph 8: Striped skunk walking underneath Brea Boulevard at Camera 12 after passing through Culvert 2.

Photograph 9: Coyote walking into Culvert 3 from the south side of Brea Boulevard on Camera 13.

Photograph 10: Bobcat detected on Camera 15 at grade on the south side of Brea Boulevard.

Photograph 11: Raccoon walking towards Brea Boulevard on Camera 14.

APPENDIX C

LIST OF WILDLIFE SPECIES DETECTED DURING WILDLIFE CAMERA AND ROADKILL SURVEYS

Appendix C
List of Wildlife Species Detected During
Wildlife Camera and Roadkill Surveys

Taxonomic Group	Common Name	Scientific Name	Detected by Camera Survey	Detected by Roadkill Survey
Bird	American Crow	*Corvus brachyrhynchos*	x	-
	Anna's Hummingbird	*Calypte anna*	x	-
	Barn Owl	*Tyto alba*	x	-
	Black Phoebe	*Sayornis nigricans*	x	-
	California Towhee	*Melozone crissalis*	x	x
	Great Egret	*Ardea alba*	x	-
	Great Horned Owl	*Bubo virginianus*	x	-
	Mallard	*Anas platyrhynchos*	x	-
	Mourning Dove	*Zenaida macroura*	x	-
	Northern Mockingbird	*Mimus polyglottos*	-	x
	Unidentified Bird	-	x	-
	Unidentified Raptor	-	x	-
	Yellow-rumped Warbler	*Setophaga coronata*	x	-
Reptile	California Kingsnake	*Lampropeltis getula californiae*	-	x
	Gopher Snake	*Pituophis catenifer*	-	x
	Unidentified Snake		x	-
	Western Fence Lizard	*Sceloporus occidentalis*	x	-
Large Mammal	Bobcat	*Lynx rufus*	x	-
	Coyote	*Canis latrans*	x	-
	Domestic Dog	*Canis lupus familiaris*	x	-
	Human	*Homo sapiens*	x	-
	Mule Deer	*Odocoileus hemionus*	x	x
Medium Mammal	Desert Cottontail	*Sylvilagus audubonii*	x	x
	Domestic Cat	*Felis catus*	x	-
	Raccoon	*Procyon lotor*	x	x
	Striped Skunk	*Mephitis mephitis*	x	x
	Unidentified Medium-sized Mammal	-	-	x
	Virginia Opossum	*Didelphis virginiana*	x	x
Small Mammal	California Ground Squirrel	*Otospermophilus beecheyi*	-	x
	Eastern Fox Squirrel	*Sciurus niger*	x	x
	Unidentified Gopher	-	x	-
	Wood Rat	*Neotoma sp.*	x	-

APPENDIX I
CULTURAL, HISTORICAL, AND PALEONTOLOGICAL RESOURCES ASSESSMENT

CULTURAL, HISTORICAL, AND PALEONTOLOGICAL RESOURCES ASSESSMENT

BREA BOULEVARD CORRIDOR IMPROVEMENT PROJECT

Prepared for:

Orange County Public Works
601 North Ross Street
Santa Ana, CA 92701

Contact:

Austin Morgan, P.E.

Prepared by:

AECOM
999 Town & Country Road
Orange, CA 92868

September 2022

CULTURAL, HISTORICAL, AND PALEONTOLOGICAL RESOURCES ASSESSMENT FOR THE BREA BOULEVARD CORRIDOR IMPROVEMENT PROJECT

COUNTY OF ORANGE, CALIFORNIA

September 2022

USGS Quadrangles: La Habra, Yorba Linda

Acreage: Approximately 29.8 acres

Keywords: *Gabrielino*, *Pimocangna*, Brea Canyon Road, Brea Boulevard, Brea Canyon, Art in Public Places Program, *Sunburst*, Sergio O'Cadiz, Brea Canyon Portola Monument, Native Daughters of the Golden West, Grace Parlor No. 242, Carrie Earl McFadden Ford, Brea-Olinda Oil Field (P-30-177012)

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

EXECUTIVE SUMMARY

AECOM was retained by the Orange County Public Works (OC Public Works) to conduct a Phase I cultural resources assessment to identify potential impacts to cultural resources, including paleontological, archaeological, historical, and tribal cultural resources, in compliance with the California Environmental Quality Act (CEQA) for the Brea Boulevard Corridor Improvement Project (Project). The Project is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route 57 (SR-57) southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor, or "corridor"). OC Public Works has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the corridor (approximately 1.5 miles), replacing and widening three functionally obsolete bridges, installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge, adding open graded asphalt concrete (OGAC) paving at the southern end of the corridor, and providing striping and installing new signage. Construction of these improvements would be conducted within permanent and temporary limits of disturbance along the corridor (i.e., the project limits). The Project is within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra (1964) U.S. Geological Survey 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda (1981) 7.5-minute quadrangle map. The permanent and temporary limits of disturbance (excluding surfaces to be paved with open graded asphalt concrete) encompass a linear area that is approximately 29.8 acres (i.e., the "project limits" for this assessment).

The investigation included a records search at the South Central Coastal Information Center of the California Historical Resources Information System (CHRIS), housed at California State University, Fullerton. The records search revealed that 13 cultural resource investigations were previously conducted within a 0.5-mile radius of the project limits, and approximately 20 percent of the project limits has been previously studied. Three cultural resources have been previously recorded within 0.5 mile of the project limits. All three are historic. One cultural resource, the Brea-Olinda Oil Field (30-177012), has previously been recorded within the project limits. In addition to the resources that are formally documented in the CHRIS, two resources were identified in the project limits or close vicinity. They are a monument to the Portola Expedition privately erected in 1932 and a sculpture by Sergio O'Cadiz entitled *Sunburst,* installed as part of the City of Brea Art in Public Places Program.

A Sacred Lands File search conducted for this Project by the Native American Heritage Commission (NAHC) did not result in the identification of any documented sacred lands within the project area. The letter nevertheless stated, "however the area is sensitive for cultural resources." The letter included an attached list of five Native American contacts who may have knowledge of cultural resources in the vicinity of the project limits. A Native American contact

program was implemented; three contacts from this program, Mr. Anthony Morales, Mr. Andrew Salas, and Mr. Robert Dorame, expressed concern about the likelihood of Native American cultural resources in the project area. The interested Native American parties were also invited to engage in government-to-government consultation in compliance with Assembly Bill (AB) 52, and Chairperson Salas engaged in AB 52 consultation with OC Public Works.

A records search at the Natural History Museum of Los Angeles County (NHMLAC) indicated that no known NHMLAC vertebrate fossil localities lie within the project limits. However, potentially fossiliferous deposits do exist within the project area. Portions of the project area have the potential to yield significant vertebrate fossils.

As part of the cultural resources field investigation, an intensive survey for archaeological and historic architectural resources that had the potential to be impacted by the Project was conducted on May 29 and 30, 2018. Four resources were identified during the course of the survey and were documented on appropriate Department of Parks and Recreation (DPR) 523 forms. The Brea-Olinda Oil Field (30-177012) was discovered to extend into the project limits, and multiple structures associated with oil exploitation were observed. Brea Boulevard was identified as historic-in-age. And the *Sunburst* sculpture and Brea Canyon Portola Monument were documented. No new archaeological or paleontological resources were identified.

The built resources within the project area were all evaluated. The segment of the Brea-Olinda Oil Field (30-177012) in the project limits, including all the structures within the project area, was found not eligible for inclusion in the California Register of Historical Resources (CRHR). Brea Boulevard was recommended not eligible for inclusion in the CRHR. O'Cadiz's *Sunburst* sculpture and the Brea Canyon Portola Monument were recommended eligible for inclusion in the CRHR.

As the Project is currently designed, the *Sunburst* sculpture will not be directly impacted by the Project. No further work is recommended for the *Sunburst* sculpture, Brea Boulevard or for the Brea-Olinda Oil Field (30-177012).

The Brea Canyon Portola Monument would be impacted by the Project. Widening of the road would require the removal of the road shoulder on which the monument is located. The Brea Canyon Portola Monument should be moved to a new location as near as possible to its current location where it can continue to be accessed by the public. Proper precautions should be taken to preserve, package, move, and store the resource. The movement should be done in consultation with the Native Daughters of the Golden West, who installed the monument and continue to maintain and visit it. With this mitigation, the Project's impact to historical resources pursuant to §15064.5 would be reduced to a less than significant level.

Although no paleontological resources were identified within the project limits during the course of this background research and cultural resources field survey, potentially significant buried paleontological resources may exist in the project limits. Therefore, paleontological monitoring is recommended for the Project; in particular, for the hillside excavations. Any paleontological resources encountered during monitoring should be recovered under the direction of a paleontologist who meets the professional standards of the Society for Vertebrate Paleontology.

With this mitigation, the Project's impact to paleontological resources would be reduced to a less than significant level.

Although no archaeological resources were identified within the project limits during the course of this background research and cultural resources field survey, potentially eligible buried archaeological resources may exist. Therefore, archaeological monitoring under the direction of an Orange County Certified Archaeologist is recommended during ground-disturbing activities in undisturbed younger quaternary alluvium. If archaeological resources are encountered, they will be evaluated by the Orange County Certified Archaeologist for eligibility for inclusion in the CRHR. If the resource is determined to be significant and avoidance is not feasible, a data recovery plan will be developed and implemented. With this mitigation, the Project's impact to archaeological resources pursuant to §15064.5 would be reduced to a less than significant level.

In addition, it is recommended that construction personnel and supervisory staff be given training on possible archaeological resources that may be present in the area in order to establish an understanding of what to look for during ground-disturbing activities.

No specific tribal cultural resources were identified during the preparation of this report. However, three tribal government leaders indicated that Brea Canyon is sensitive for potential unknown tribal cultural resources. If Native American cultural materials are encountered during Project-related ground disturbance, an Orange County Certified Archaeologist with knowledge of Native American resources will assess the significance of the find. If the resources are Native American in origin, OC Public Works will coordinate with the Tribe regarding evaluation, treatment, curation, and preservation of these resources. Ongoing consultation with the tribal representatives who have expressed interest in the Project will be maintained, and they will be consulted as to the treatment and final disposition of any resources of Native American origin that are encountered during Project activities. With this mitigation, the Project's impact to tribal cultural resources would be reduced to a less than significant level.

If human remains are discovered, work in the immediate vicinity of the discovery shall be suspended and the Orange County Coroner contacted. If the remains are deemed Native American in origin, the Coroner will contact the NAHC and a Most Likely Descendant will be identified pursuant to Public Resources Code §5097.98 and CEQA Guidelines §15064.5. Work may be resumed at the landowner's discretion, with input from the MLD and Lead Agency, but will only resume after consultation and treatment have been concluded. Work may continue on other parts of the Project while consultation and treatment are conducted.

INTRODUCTION

This document reports a Phase I cultural resources assessment in connection with the Brea Boulevard Corridor Improvement Project (Project). The Project is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the State Route 57 (SR-57) southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor, or "corridor"). Orange County Public Works (OC Public Works) has identified the need to widen Brea Boulevard consistent with the Orange County Transportation Authority (OCTA) Master Plan of Arterial Highways (MPAH). The Project involves widening Brea Boulevard from two to four lanes (two lanes each direction) between Canyondale Drive and the northern end of the corridor (approximately 1.5 miles), replacing and widening three functionally obsolete bridges, installing traffic signals approximately 1,200 feet north of Canyon Country Road and at the intersection of Brea Boulevard and Tonner Canyon Road, replacing the existing signal at Canyon Country Road, modifying existing driveway ingress/egress, installing a new wildlife overpass/land bridge, adding open graded asphalt concrete (OGAC) paving at the southern end of the corridor, and providing striping and installing new signage. Construction of these improvements would be conducted within permanent and temporary limits of disturbance along the corridor (i.e., the project limits). The permanent and temporary limits of disturbance (excluding surfaces to be paved with OGAC) encompass a linear area that is approximately 29.8 acres (i.e., the "project limits" for this assessment).

PROJECT PERSONNEL

AECOM personnel involved in the cultural resources assessment are as follows: Marc Beherec, Ph.D., RPA, served as principal investigator, conducted archival research and fieldwork, and served as principal report author; Jennifer Redmond, M.A., RPA, conducted archival research and fieldwork; Amy Burgess and Alec Stevenson provided graphics and geographic information system support; Christy Dolan, M.A., RPA, provided senior review. Resumes of key personnel are included in Appendix A.

REPORT ORGANIZATION

This report is organized following the *Archaeological Resource Management Reports (ARMR): Recommended Contents and Format* guidelines (California Office of Historic Preservation 1990). These guidelines provide a standardized format and suggested report content, scaled to the size of the Project. First, a project description, including project location, proposed undertaking, and construction schedule, is provided. Next, the environmental and cultural settings are presented along with a detailed history of the project area. The research methods are then presented, followed by the results of the archival research, Native American contact program, and field survey. The final section summarizes the results of the cultural resources assessment and provides recommendations for resource eligibility and further work.

PROJECT DESCRIPTION

PROJECT LOCATION AND SETTING

The Project is located within the City of Brea and unincorporated Orange County, from Central Avenue/State College Boulevard to the SR-57 southbound on-ramp approximately 1,700 feet northeast of Tonner Canyon Road, a total length of approximately 8,800 linear feet or 1.7 miles (the Brea Boulevard Corridor, or "corridor") (Figures 1 and 2). The Project is within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra (1964) U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda (1981) 7.5-minute quadrangle map.

Proposed Project

OC Public Works has identified the need to widen Brea Boulevard consistent with the OCTA MPAH (Figure 3). Under the Project, Brea Boulevard would be widened from two to four lanes (two lanes each direction) with 12-foot width lanes and shoulders varying from 6-feet to 10-feet wide. It would also include a median that is either 12-foot wide raised with landscaping, 6-foot wide with a concrete barrier, or striped of varying widths. Widening would occur between Canyondale Drive and the SR-57 southbound on-ramp, a total length of approximately 8,100 linear feet or 1.5 miles. In an effort to limit the footprint of the Project, the design would utilize a modified Primary Arterial Highway per OC Public Works' Standard Plan 1103 for Standard Street Sections which includes: right-of-way (R/W) width less than 100 feet, reducing the median width to less than 14-foot, and no sidewalk throughout the corridor within unincorporated County. Within the City of Brea, the roadway section would be a modified Primary Arterial Highway Section per City of Brea's Standard Plan 109-0 to match the existing roadway configuration south of Canyondale Drive by reducing the shoulder width.

Road widening will require replacement of the three bridges within the corridor, all of which are over 80 years old and functionally obsolete. There are approximately 13 culvert crossings (for drainage or utilities or both) that will need to be extended or reconfigured as part of the widening. The horizontal alignment of the existing roadway will be modified to increase sight distance and minimize the footprint of the Project. Due to the steep topography of the area adjacent to the roadway, stability of roadway cut and fill will require approximately 16 retaining walls throughout the corridor. Typical wall heights vary from 8-feet to 32-feet with an average of approximately 20-feet along the corridor. One wall, located at the "bend", will be approximately 60-feet tall.

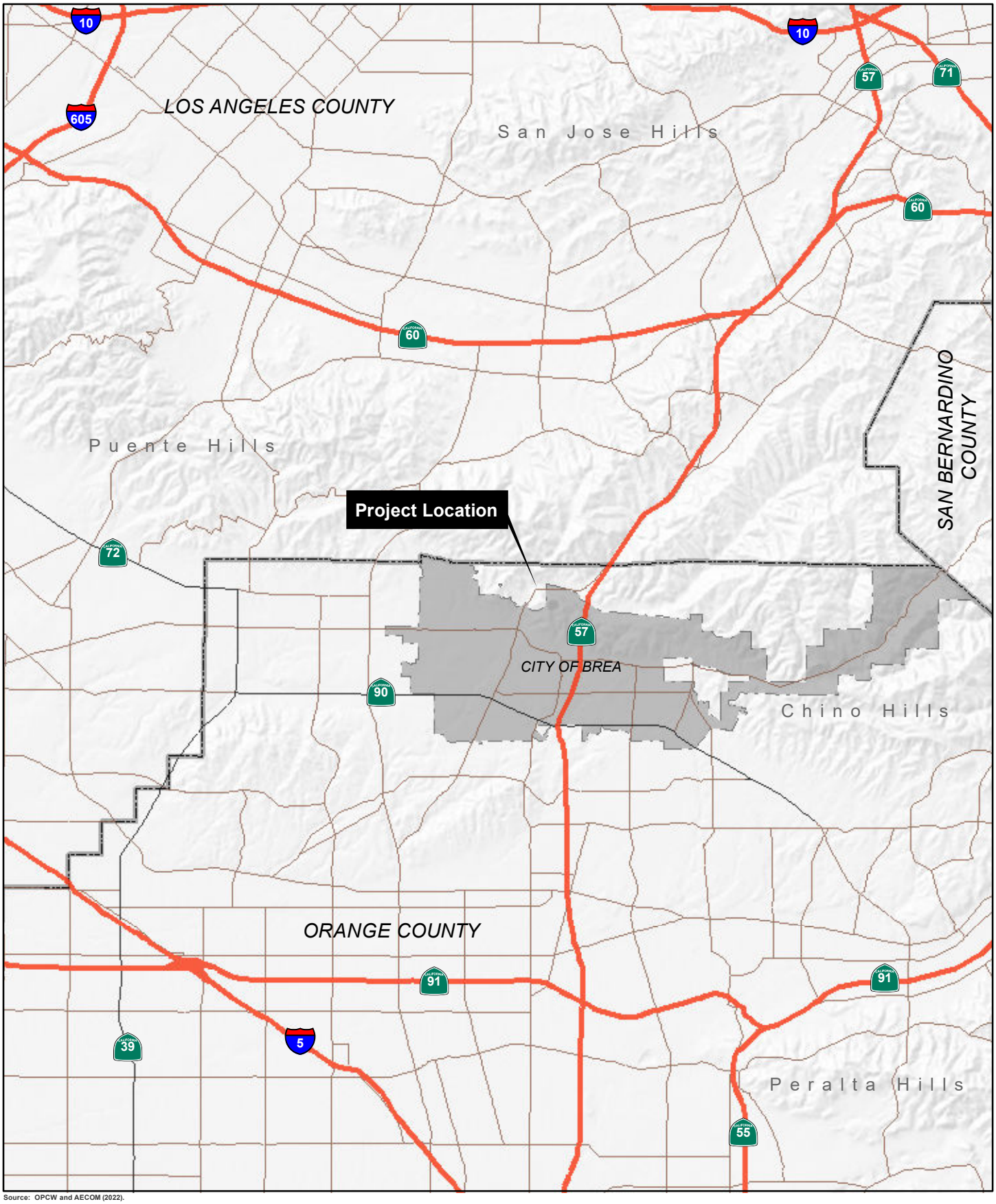
In addition, to enhance wildlife movement across Brea Boulevard the Project would include construction of a new wildlife overpass/land bridge that would span the full width of the widened roadway, matching the existing top of ridge on either side of the roadway (with minimum vertical clearance of over 19 feet above the widened roadway).

The Project will require road easements, retaining wall easements, slope easements, temporary construction easement, basin easements, and utility easements. It will require permanent partial

property acquisitions for road easements R/W, retaining wall easements, slope easements, and easements for water quality features from adjacent private properties. During construction, temporary construction easements are required from adjacent private properties.

The existing one-way stop-controlled T-intersection at Tonner Canyon Road and Brea Boulevard is proposed to be signalized to enhance safety by reducing conflicts between motorists attempting to merge in either direction onto Brea Boulevard. Installation of a new traffic signal approximately 1,200 feet north of Canyon Country Road will allow left turn movement onto Brea Boulevard for the oil field operator from their facility west of Brea Boulevard. The existing traffic signal poles and equipment at Brea Boulevard and Canyon Country Road will be replaced to accommodate the road widening.

Additionally, to reduce the existing high traffic noise levels along Brea Boulevard, OGAC paving will be installed at the southern end of the corridor to minimize roadway surface noise in the City of Brea. OGAC will be added from Central Avenue/State College Boulevard north to the City/unincorporated County boundary (a total length of approximately 2,000 feet).

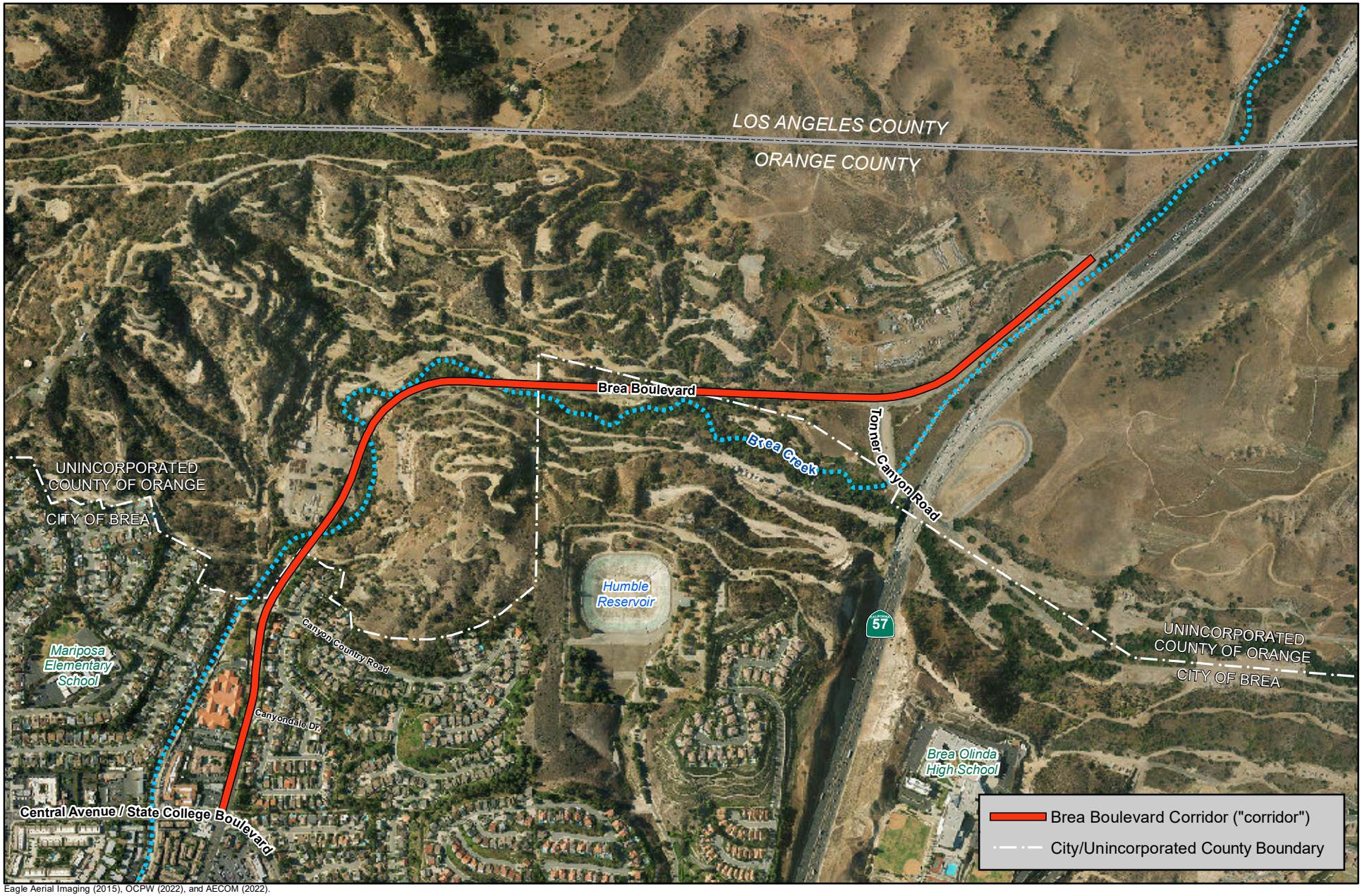


Source: OPCW and AECOM (2022).

Scale 1 : 126720
1" = 2 miles

0 1 2 4 Miles

Figure 1
Regional Map

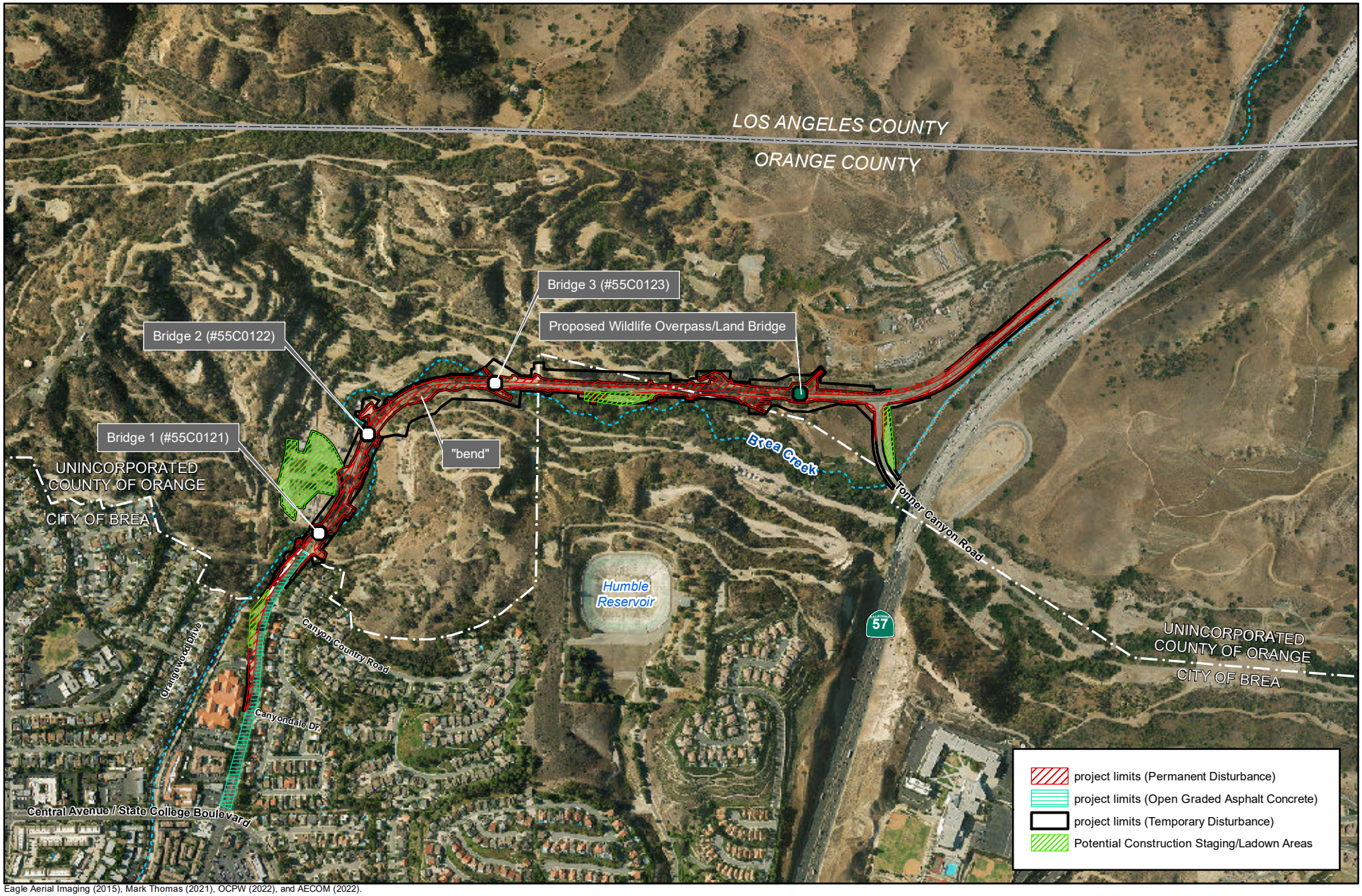


Eagle Aerial Imaging (2015), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 2
Vicinity Map



Eagle Aerial Imaging (2015), Mark Thomas (2021), OCPW (2022), and AECOM (2022).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 3
Proposed Project

SETTING

ENVIRONMENTAL AND GEOLOGICAL SETTING

The corridor is located in Brea Canyon. This canyon was created by tectonic activity of the Elsinore-Whittier Fault. More specifically, the canyon is adjacent to the Tonner Fault. The local geology consists of steeply dipping sedimentary beds uplifted by the fault. Oil travels upward through permeable rock and up the faults from source rocks below. Tar seeps were visible on the surface in prehistoric and historic times.

Vegetation includes chaparral, grasslands, and riparian forest. Coast live oak, California black walnut, and California sycamore are the dominant trees. Climatically, this area is generally Mediterranean and is characterized by mild winters and moderate, dry summers with occasional storms. The Santa Ana Canyon south of Brea Canyon forms a wind tunnel channeling that gives name to the strong Santa Ana winds that blow through the canyon annually.

CULTURAL SETTING

As a framework for discussing the potential cultural resources that may exist within the project limits, the following discussion summarizes the current understanding of major prehistoric and historic developments in Southern California. This is followed by a more focused discussion of the history of the vicinity of the corridor.

Additional historic research to develop a historical context for the corridor was conducted at a number of archival repositories. Archives searched include the Los Angeles Public Library, Calisphere (the University of California's digital collections), the California Digital Newspaper Collection, and the University of Southern California digital archives. Library of Congress electronic resources, searched during the course of the research include book and journal publications, historic newspaper articles, historic photographs, and historic maps.

Prehistoric Overview

The earliest occupation of Southern California may be associated with the peoples who first colonized North America in the terminal Pleistocene/earliest Holocene. These cultures are characterized by fluted points. Among Southern California's fluted points is a fluted obsidian point found in a stratified deposit beside an ancient lake bed in the mountains of eastern San Diego County (Kline and Kline 2007). Other fluted points have been reported at other locations in Santa Barbara, Los Angeles, and San Diego Counties (Rondeau 2009). Closest to the project area, an isolated fluted projectile point has been reported from Crystal Cove State Park near Laguna Beach and has been identified with the Clovis material culture (Fitzgerald and Rondeau 2012). Clovis is the earliest universally recognized material culture in North America and dates to approximately 11,500 radiocarbon years before present (B.P.).

Scholarly consensus, however, generally places the first widespread evidence of human occupation of Orange County at 8,000 or 9,000 years B.P. There have been several sites studied within the county that have been dated to this period, and some of these sites include ORA-246, ORA-339, ORA- 1403, and ORA-1406 (Arrington and Sikes 2006: Chapter 32-11). This occupation is associated with a period known as the Millingstone Cultural Horizon (Wallace 1955; Warren 1968). Departing from the subsistence strategies of their nomadic big-game hunting predecessors, Millingstone populations established more permanent settlements. These settlements were primarily on the coast and in the vicinity of estuaries, lagoons, lakes, streams, and marshes where a variety of resources including seeds, fish, shellfish, small mammals, and birds were exploited. Early Millingstone occupations are typically identified by the presence of handstones (manos) and millingstones (metates), while those Millingstone occupations dating later than 5000 B.P. contain a mortar and pestle complex as well, signifying the exploitation of acorns in the region.

During the Millingstone period, there were small stable populations along the Orange County coast, in particular Newport Bay where the inhabitants had a variety of ecosystems to exploit including the bays, estuaries, marshes, and the Santa Ana and San Gabriel River systems (Koerper et al. 2002). These groups most likely moved seasonally between the coast and interior foothills. Some sites along the coast of Orange County (most notably ORA-1405 Component B and ORA-64) have produced fired-clay artifacts such as figurines, effigies, and small vessels, This suggests that a small, localized pottery industry may have existed during this early time period (Arrington and Sikes 2006: Chapter 32-13).

Although many aspects of Millingstone culture persisted, by 3500 B.P. a number of socioeconomic changes occurred (Erlandson 1994; Wallace 1955; Warren 1968). These changes are associated with the period known as the Intermediate Horizon (Wallace 1955). Increased populations in the region necessitated the intensification of existing terrestrial and marine resources (Erlandson 1994). This was accomplished in part through the use of the circular shell fishhook on the coast, and more abundant and diverse hunting equipment. Evidence for shifts in settlement patterns has been noted at a variety of locations at this time and is seen by many researchers as reflecting increasingly territorial and sedentary populations. The Intermediate Horizon marks a period in which specialization in labor emerged, trading networks became an increasingly important means by which both utilitarian and nonutilitarian materials were acquired, and travel routes were extended. Archaeological evidence suggests that the margins of numerous rivers, marshes, and swamps within the Santa Ana and Los Angeles River drainages served as ideal locations for prehistoric settlement during this period. These well-watered areas contained a rich collection of resources and are likely to have been among the more heavily traveled routes.

The Late Prehistoric period, from approximately 1500 B.P. to the mission era, is the period associated with the florescence of contemporary Native American groups. These groups are generally known by their Spanish names or derivations from their Spanish names, including the *Gabrieleño, Luiseño,* and *Juaneño* (Wallace 1955). Most scholars, as well as the modern *Gabrielino*, place the project area within *Gabrielino* territory (Bean and Smith 1978; Bean and Shipek 1978).

In October of 1542, Juan Rodriguez Cabrillo was the first European to make contact with the *Gabrielino* Indians. Occupying the southern Channel Islands and adjacent mainland areas of Los Angeles and Orange Counties, the *Gabrielino* are reported to have been second only to their *Chumash* neighbors in terms of population size, regional influence, and degree of sedentism (Bean and Smith 1978). The *Gabrielino* are estimated to have numbered around 5,000 in the pre-contact period (Kroeber 1925). Subsistence consisted of hunting, fishing, and gathering. Small terrestrial game were hunted with deadfalls and rabbit drives, and by burning undergrowth, while larger game such as deer were hunted using bows and arrows. Fish were taken by hook and line, nets, traps, spears, and poison (Bean and Smith 1978; Reid 1939 [1852]). The primary plant resources were acorns, gathered in the fall and processed with mortars and pestles, and various seeds that were harvested in late spring and summer and ground with manos and metates. The seeds included chia and other sages, various grasses, and islay or holly leafed-cherry (Reid 1939 [1852]). Both animal and plant foodstuffs were often cooked in subsurface ovens. The *Gabrielino* lived in domed, thatch buildings resembling half-oranges which held up to 50 inhabitants, organized into permanent and semi-permanent villages. Today, the *Gabrielino* call themselves *Tongva* or *Kizh*, and their traditional name for themselves is debated.

Notably for the project area, the *Gabrielino* and their neighbors collected and traded naturally occurring tar. This tar was obtained either where it washed ashore from submarine seepages or where it occurred naturally on the surface in places such as at the La Brea Tar Pits in Los Angeles and Brea Canyon in Orange County. The tar was used for several purposes. It was used to waterproof baskets, reed canoes, and plank boats. It was also used as an adhesive. It held shell fishhooks and mounted basket hoppers to stone mortars. It was used to apply shell inlays to bone, wood, and stone implements, including both household and ritual objects (McCawley 1996:135–136). Native American groups who lived in the vicinity of natural tar seeps were in a position to collect and trade the tar with other groups whose homelands yielded other natural resources.

Historic Overview

Spanish explorers made brief visits to *Gabrielino* territory in 1542 and 1602, and on both occasions the two groups exchanged trade items (McCawley 1996). Sustained contact with Europeans did not commence until the onset of the Spanish Period, which began in 1769 when Gaspar de Portola and a small Spanish contingent began their exploratory journey along the California coast from San Diego to Monterey. The Portola expedition forded the Santa Ana River on July 28, 1769. On the banks of the river, they encountered "a populous village of Indians, who received us with great friendliness" (qtd. in McCawley 1996:60). On July 29, 1769, the Portola expedition continued through the Brea Canyon area, as described more fully below, before passing into what is now Los Angeles County.

In the years following the Portola expedition, missions were established across California. Mission San Gabriel Arcàngel was established in 1771 in what is now Whittier Narrows in Los Angeles County, and the project area fell within its area of influence. The original location considered for the mission was near the Santa Ana River (McCawley 1996:189). The natives that occupied the northern areas of Orange County became known as the "*Gabrielino*." The mission system brought with it significant changes in *Gabrielino* health and cultural integrity.

Alta California became a state when Mexico won its independence from Spain in 1821, and Los Angeles selected its first city council the following year. The authority of the California missions gradually declined. The missionaries, mostly Spanish, came into conflict with the secular Mexican authorities. The missions were secularized in 1834. Although the Mexican government directed that each mission's lands, livestock, and equipment be divided among its converts, the majority of these holdings quickly fell into non-Indigenous hands. Mission buildings were abandoned and quickly fell into decay.

The first party of U.S. immigrants arrived in Los Angeles in 1841, although surreptitious commerce had previously been conducted between Mexican California and residents of the United States and its territories. As the possibility of a takeover of California by the United States loomed large, the Mexican government increased the number of land grants in an effort to keep the land in the hands of upper-class *Californios* like the Avila, Domínguez, Lugo, and Sepúlveda families (Wilkman and Wilkman 2006:14–17). Governor Pío Pico and his predecessors made more than 600 rancho grants between 1833 and 1846, putting most of the state's lands into private ownership for the first time (Gumprecht 1999).

The United States took control of California after the Mexican–American War of 1846, and seized Monterey, San Francisco, San Diego, and Los Angeles (then the state capital) with little resistance. Hostilities officially ended with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory, which included California, Nevada, and Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. The conquered territory represented nearly half of Mexico's pre-1846 holdings. California joined the United States in 1850 as the 31st state (Wilkman and Wilkman 2006:15).

The discovery of gold at Sutter's Mill in 1849 led to an enormous influx of people from other parts of the United States in the 1850s and 1860s; these "forty-niners" rapidly displaced the old rancho families. Southern California's prosperity in the 1850s was largely a result of the increased demand for cattle for meat and hides, which was created by the gold rush. Southern California was able to meet this need, and the local ranching community profited handsomely (Bell 1881:26).

When the Southern Pacific Railroad extended its line from San Francisco to Los Angeles in 1876, newcomers poured into Southern California. The completion of the second transcontinental line, the Atchison, Topeka and Santa Fe, took place in 1886 causing a fare war that drove fares to an unprecedented low. More settlers continued to head west and the demand for real estate skyrocketed. As real estate prices soared, land that had been farmed for decades outlived its agricultural value and was sold to become residential communities. The subdivision of many of the large ranchos took place during this time (Meyer 1981:45).

History of the Project Area

Gabrielino Occupation

According to material collected by Bernice Eastman Johnston, a *Gabrielino* village was located within Brea Canyon north of today's City of Brea. Johnston states that in the vicinity of "the present Brea Canyon cut-off road…was the home of an important village which was to give

many a convert to the San Gabriel Mission, where it was listed as 'Pomoquin,' although the better known form of it was *Pimocangna*, and it was also recorded as *Pumu'kingna*. This was associated in the memory of one of J. P. Harrington's informants with the idea of sleeping outside of the house, as in the 'beginning of the world,' when the first people slept, naked and cold, not in houses but in the open" (Johnston 1962:119). McCawley, however, citing a different passage in Harrington's notes, suggests that the village was further north, in Los Angeles County, in the vicinity of today's City of Walnut (McCawley 1996:47).

Portola Expedition and the Native Daughters of the Golden West

As already noted, the Portola expedition passed through the approximate location of modern Brea Canyon. The locations of Portola's campsites are important. Historically significant themselves, many of Portola's campsites were also at or near the locations of Native American villages. The campsites and nearby villages are significant to history and may yield archaeological data important to history.

In 1906, the Native Daughters of the Golden West and the California Federation of Women's Clubs began research to map El Camino Real, the road which once connected the 21 Spanish missions and secular settlements such as Los Angeles. Each parlor of the Native Daughters of the Golden West has a History and Landmarks Committee which contributed to the effort. Work in the Brea area (which is today's City of Brea) was conducted by Grace Parlor No. 242, and at that time their committee was chaired by noted local philanthropist Carrie Earl McFadden Ford. The research was based on translations of Portola's diary as well as the diaries of Miguel Costanso and Juan Crespi, the two friars who traveled with Portola (see Appendix C; Ferguson 2012).

The committee came to the conclusion that Portola followed different routes during his northward journey and his return journey. They determined that the return journey's route became El Camino Real, and passed through modern day City of Fullerton. During Portola's initial, northward journey, the committee concluded he camped within what is now the project area. They identified a location within Brea Canyon north of the City of Brea where they believed Portola made his camp. There was a pool of water like that mentioned in the expedition diaries, and a stand of pepper trees provided shade. According to Past Grand President Sherry Farley, "I am told Indian and Spanish artifacts were also recovered from this location."

A short distance to the east of the location they identified, which was on private property, the Native Daughters erected a concrete monument to the expedition in the project area in Brea Canyon on June 2, 1932. June 2, 1932 was also the fifth anniversary of the establishment of the Grace Parlor of the Native Daughters. This monument states that Portola camped in the area on July 31, 1769 (Plate 1).

However, this location may not be the location of any of Portola's camps. The monument testifies to a persistent local tradition, and is located at a site which may have been important in Native American as well as Spanish and Mexican times. But pepper trees are a species introduced to California by the Spanish. Both ranching and mining activities of men such as Juan Pacifico Ontiveros, described below, may have led to the planting of pepper trees in this vicinity long before 1932.

Plate 1: Early, Undated Photo of the Brea Canyon Portola Monument Beneath Pepper Trees (Courtesy of Past Grand President Sherry Farley, Native Daughters of the Golden West).

Most scholars agree that by July 31, 1769, the Portola expedition was already in Los Angeles County. On July 28, Portola and his men forded the Santa Ana River in the area of today's City of Yorba Linda (McCawley 1996:59). On July 29, 1769, Portola's company halted on a ridge or knoll overlooking a grassy valley, somewhere in today's Orange County. In the narrow canyon was a Native American village beside a small pool or several small pools. Missionary Father Crespi called the village "very large," with a population of over 70, but Portola himself identified only "about fifty inhabitants." The natives possessed some items of Spanish manufacture, which Crespi believed they obtained from Spanish New Mexico, possibly through trade with the Apaches. The water at this village was enough for the Native Americans and for Portola's men, but was not enough for the expedition's animals, who went without. Crespi named the place the Village of the Little Pool and the Valley of Santa Marta. Lieutenant Pedro Fages, who was also on the expedition and who later would be named Governor of Alta California, called the village Los Ojitos (The Little Pools) (Pacifica Historical Society n.d.). Portola's company spent just one night at the Village of the Little Pool, and by July 31 they had left the area and camped west of City of Alhambra in Los Angeles County. Most historians place Portola's camp of July 29 in the vicinity of Hillcrest Park in the City of Fullerton.

Herbert Eugene Bolton is one of the most prolific authors on the topic of the outskirts of Spain's empire in what is now the American Southwest. He famously retraced Anza's path on foot, mule, and Model T Ford, setting the records straight on the route of Anza's journey, correcting many locations that had been misidentified by earlier scholars. However, in his translation of Crespi's diary, he notes only that Portola's company camped on July 29 in "La Brea Canyon, north of

Fullerton" (Bolton 1927:130). In early USGS maps, Brea Canyon is shown much farther south than it is shown today, along Brea Creek in the southern part of the City of Brea. The mouth of Brea Canyon was most likely where today's Brea Boulevard meets Harbor Boulevard, in the approximate location of the City of Fullerton's Hillcrest Park, when Bolton identified the location from Crespi's diary.

Orange County historian Don C. Meadows suggested that, on July 29, "Camp was established on the top of the ridge northeast of Hillcrest Park in Fullerton. The Indian village and the little pool were in Brea Canyon a short distance above Brea Dam" (Meadows [1965] 2004:3).

Following on Meadows, Orange County historian and avocational archaeologist Helen C. Smith suggested three possible locations of the July 29 campsite:

- "at the intersection of Harbor Boulevard and Brea Canyon Road [Brea Boulevard] in lower Hillcrest Park"
- "in what is still 'a very green little valley' above Brea Dam"
- "or possibly closer to La Habra … near which is a natural spring now developed as a City of Fullerton recreation area" (Smith [1965] 2004:8).

There are also geographical reasons that make it unlikely that Portola would have traveled to the location of the present monument. The expedition was marching towards Monterey from San Diego. They camped the night of July 28 on the east bank of the Santa Ana River, probably in the vicinity of modern Olive, an unincorporated parcel in the City of Orange. According to Crespi, after leaving the Santa Ana River they "followed the plain to the northwest" before turning west-northwest into the mountains. The Daughters of the Golden West marker, however, stands well within Brea Canyon, northeast of modern City of Brea, out of the way of the expedition's generally northwesterly route. The party would have had to journey out of its way to the northeast, proceed up the canyon in the direction of modern Pomona, realize their mistake, and turn back. Nothing like this is recorded in the diaries. Moreover, the expedition was preceded by guides who advised Portola on the best route to take. It is unlikely that the seasoned explorers would have made such a mistake.

In short, on July 29–30, 1769, the Portola Expedition likely passed slightly over 4 miles southwest of the project area, close to Hillcrest Park in what is today Fullerton. Portola and his men likely entered what is illustrated in early maps as Brea Canyon, but only at its southernmost reaches, south of what is today the City of Brea. They then proceeded northwest through modern day City of La Habra before leaving today's Orange County. The campsite and Native American villages described in the expedition diaries are probably not within the project limits. Nevertheless, the monument erected by the Native Daughters is itself historic, and was likely placed at a location which was important to Native Americans as well as the Spanish and Mexicans.

Ranchos and Farms

Although the project area was claimed first by Spain and then Mexico, and was within the area of influence of Mission San Gabriel, it lay outside the main areas of Spanish and Mexican

interest, until Governor Jose Figueroa oversaw the initial secularization of the mission system and increased land grants. In 1833, Juan Pacifico Ontiveros requested Governor Figueroa grant him "the place that is vacant from the Canada Verde, as far as the Canada de la Brea" (qtd. in Carpenter 1978:10). A variant of the name Brea Canyon, Canada de la Brea, therefore existed at least as early as 1833, although the term may have applied first to what is now known as Tonner Canyon. Figueroa began the process of granting the land, but the land grant was never finalized. Ontiveros' descendants believed they owned the land, subdivided it, and resold it, leading to considerable confusion and lengthy court cases (Carpenter 1978).

In 1834, Governor Figueroa granted Rancho Canon de Santa Ana, including modern day City of Brea and the western portion of the corridor, to Jose Antonio Yorba's son, Bernardo Yorba, in 1834. Bernardo Yorba constructed his adobe Hacienda Yorba in what is today's City of Yorba Linda. In 1841, Governor Juan Alvarado granted Rancho Rincon de la Brea, including most of the corridor, to Gil Maria Ybarra. The rancho is sometimes also known as Rancho de los Ybarras (Robinson 1948).

By 1860, the project area came into the possession of real estate speculator Abel Stearns. While Stearns platted and sold several town sites across Southern California, he retained possession of the Brea area until his death. Stearns, and then the Stearns Ranchos Company, leased the area around Brea area to Spanish and French Basque sheep herders (Cramer 1992:30–39).

These lands also proved productive for citrus growing, particularly as oil producers (described below) worked hand-in-hand with citrus growers to dig wells and irrigate the land. In 1910, the heirs of Domingo Bastanchury, one of the region's first Basque sheep ranchers, began growing citrus in the Brea area. Thousands of acres would be turned into citrus groves in the next few decades, and citrus farming remains important locally (Cramer 1992:215–234).

Oil and Tar

As previously noted, Brea area's natural tar deposits were gathered by Native Americans who used it for waterproofing, as adhesive for artistic shell inlay, and as a trade item. The same tar also drew the attention of the Mexican settlers. From the Spanish into the American period, settlers collected the tar for roofing, flooring, and fuel. In the relatively treeless area, the tar was cut in blocks and burned like peat (Plate 2). Although it was treated by some as common property, certain landowners such as Yorba specifically protected their ownership of the tar in land deeds (Carpenter 1978:10). In 1869, the Los Angeles Gas Company bought the rights to dig the tar (Carpenter 1978:21–22).

In 1865, there were attempts to drill for oil in Brea Canyon. The intent was to distill the oil for kerosene to fuel lamps. L. L. Robinson, Major Max Strobel, and the Santa Ana Petroleum Company bought the oil rights for the property from Stearns and brought a steam drill powered by a 10-horsepower engine from Coffey, Risdon & Company of San Francisco. "The rope, for boring, is a 3/4 inch wire-rope, the first one, I believe, used in California for that purpose," Strobel noted. The well was dug to a few hundred feet before the experiment abandoned (Cramer 1992:46).

Plate 2: Digging Tar Blocks for Fuel in Brea Canyon, Ca. 1900 (La Habra Old Settlers Historical Society).

Experimental oil drilling continued in the Brea area and the Puente Hills from the 1860s onwards, but oil production in the vicinity of the corridor began in earnest in the 1880s. In 1883, Burdette Chandler and the Chandler Oil Company bought land and filed claims near where Tonner Canyon meets Brea Boulevard, but the oil had to be shipped to Los Angeles for refining, and the venture was not very profitable. Much of the land was sold, and the Brea Canon Oil Company was formed to exploit the fields. In 1894, the Union Oil Company purchased large swaths of Stearns Ranchos Company, including land along what is now Brea Boulevard in the corridor and vicinity, and began oil production on an industrial scale (Cramer 1992:50–52). By 1910, eight companies operated in and near Brea Canyon: the Brea Canyon Oil Company; the Fullerton Oil Company; the Menges Oil Company; the Union Oil Company; and the Santa Fe, Graham-Loftus, Columbia, and Puente Companies all had operations in the area (LAH 1910).

The oil field came to be known as the Brea-Olinda Oil Field, after the two settlements that grew up to serve the oil workers. Brea area was first platted as Randolph in 1908, and renamed Brea in 1911. The City of Brea was incorporated in 1917. Olinda was platted during a period of land speculation in 1887 and settled in the late 1880s and 1890s (Cramer 1992).

Brea Boulevard

Brea Canyon is a break in the Puente Hills connecting the Santa Ana River Valley to the San Gabriel River Valley. Native Americans no doubt used the passage as a way through the hills. A wagon road existed in the canyon at an early date. As discussed in the Historical Map Database

subsection of the Archival Research and Contact Program section below, the earliest USGS maps, which date to the 1890s, show this road. The road was once known as the Spadra Road. The road connected the Santa Ana River drainage with Spadra; a town eventually annexed by modern day City of Pomona. The road was graded and oiled before World War I, but was not a major thoroughfare until the 1920s. The development of oil communities spurred the development of the road to today's City of Pomona, which was improved and paved by the Counties of Orange and Los Angeles in 1920–1923 (Cramer 1992:133–134).

Art in Public Places Program

The City of Brea's Art in Public Places Program was established by City Council Resolution in 1975. It is reportedly one of the first private art development programs established in the State of California. The measure was conceived by City Manager Wayne Wedin as an outgrowth of the City of Brea by Design initiative to maintain the City's small-town feel and aesthetic qualities despite the development boom of the late twentieth century. After a tour of Europe, Wedin noted, "It began to sink in to me that artwork in general—and sculpture in particular—had a very enriching quality to it" (qtd. in Cramer 1992:264). The intent of the program is to create a partnership between private developers and the City of Brea to beautify the City by integrating three-dimensional art into the city fabric. Subsequent ordinances have refined the program. Under the current ordinance, passed in 2013, the City of Brea requires developers whose project costs exceed $1.5 million to allocate 1 percent of their total project building valuation to commissioning public art pieces. The art is commissioned by private developers and approved by a board created by the City. The art must be placed in locations where it can be viewed by the public, but is maintained by the developer. The artist must be recognized by both critics and peers as a "professional practitioner of the visual arts" who has already established a body of work (Art in Public Places 2013:14).

ARCHIVAL RESEARCH AND CONTACT PROGRAM

The cultural resources investigation for this Project involved archival research and a field survey. The archival research conducted for this Project included a records search at the South Central Coastal Information Center (SCCIC), a sacred lands file (SLF) search, and a consultation of relevant online archives.

Archaeological Records Search

Archival research of the project limits was conducted by Marc Beherec on March 21, 2018, at the SCCIC housed at California State University, Fullerton. The research focused on the identification of previously recorded cultural resources within a 0.5-mile radius of the proposed project limits. The archival research involved review of cultural resources site records, historic maps, and historic site and building inventories. The National Register of Historic Places (NRHP) database and listings for the California State Historic Resources Inventory (HRI), and the California Historical Landmarks (CHL) Register were examined to determine whether any resources in the 0.5-mile radius were listed in or had been determined eligible for these registers. The California Point of Historical Interest, the California Register of Historical Resources

(CRHR), and Riverside County Historic Landmarks also were reviewed for resources within or adjacent to the project limits.

The records search revealed that 13 cultural resources investigations were previously conducted within a 0.5-mile radius of the project limits (Table 1). One is an investigation of known archaeological sites, two are monitoring reports, and 11 are reports or cultural resources surveys and impact assessments.

Table 1. Previous Surveys Conducted within 0.5 Mile of the Project Limits

Author	Report #	Description	Date
Cottrell, Marie	OR-00371	Archaeological Investigations of Sites CA-ORA-376 and CA-ORA-377	1976
Padon, Beth	OR-00816	An Archaeological and Paleontological Assessment of the Moreland Sterns Lease Annexation Parcel 1 & 2, Orange County, California	1986
Bissell, Ronald M., and Kenneth Becker	OR-01089	Cultural Resources Reconnaissance of the Proposed North Orange County Landfill Alternative Technologies Study (noclats) Landfill Property, Approximately 2,700 Acres in Orange County, California	1991
White, Robert S., and Laura S. White	OR-01480	An Archaeological Assessment of the Olinda/Olinda Alpha Landfill Alternative Access Routes, Brea, County of Orange	1994
Mason, Roger D.	OR-01780	Cultural Resources Survey Report for a Pacific Bell Mobile Services Telecommunications Facility: Om 0184-11 Near Brea, Orange County, California	1998
Pence, Robert L.	OR-02114	Archaeological Assessment of the Brea Raintree Project, City of Brea, Orange County	1978
Pence, Robert L.	OR-02115	Archaeological Assessment of the Brea Dyer-Johnson Project, City of Brea, Orange County	1978
Mason, Roger D.	OR-02884*	Cultural Resources Survey Report for the Stearns Property, City of Brea, Orange County	1997
Ashkar, Shahira	OR-03279	Cultural Resources Inventory of Four Proposed Sites for the Brea Sports Park, Orange County, California	2000
Dietler, John, Clarus Backes, and Charles Cisneros	OR-03888	Archaeological Monitoring for the Tonner Hills PA 7 Project, City of Brea, Orange County, California	2010
Backes, Clarus, John Dietler, Laura Hoffman, Joan Brown, and Virginia Austerman	OR-03911	Archaeological Monitoring for the Tonner Hills Project Located in Brea, Orange County, California	2010
Brown, Joan C.	OR-03912	Cultural Resources Reconnaissance of the 600 Acre Stearns – UNOCAL Project Area, California	1989
Bonner, Wayne, and Kathleen Crawford	OR-03931	Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate IE24013-I (Bastanchury SCE LA), 18525 Bastanchury Road, Yorba Linda, Orange County, California	2010

*Investigations that overlap the project area.

In addition to the reports archived at the SCCIC, AECOM is aware of an approved California Department of Transportation (Caltrans) *Archaeological Survey Report for the State Route 57/Lambert Road Interchange Improvement Project* (Fulton 2012). That study is also within 0.5 mile of the project limits, and it includes a reevaluation of resource 30-177012, the Brea-Olinda Oil Field, which overlaps with the project area.

Approximately 20 percent of the project limits has been previously surveyed.

The records search indicated that three cultural resources have been previously recorded under 15 primary/site numbers within 0.5 mile of the project limits (Table 2). None of these resources are prehistoric; all are historic in age. The historic sites include a dump, a recreation and picnic area, and an oilfield and company park. One of these sites, the oilfield, overlaps much of the project area.

19-188026
This resource consists of a historic recreational facility north of Brea Boulevard. The facility is believed to date from the 1940s to 1950s. The facility includes large hoist barbeques, a children's play area, a semi-enclosed cooking area, bathrooms, and an enclosed eating area. The facility appears to have been built to accommodate large groups of people for company gatherings associated with the nearby oil field.

30-001625
This resource consists of a historic dump. When the site was recorded in 1989, purple glass fragments, metal fragments, china, crockery, china doll fragments, a horseshoe, hand-sawed faunal bones, and wire and square-headed nails were observed scattered across a 2-acre area. In addition, two fig trees were observed standing approximately 100 and 200 meters east of the dump, and were cited by the recording archaeologist as possibly indicative of a vanished home site (Brown 1989). In 2005 and 2006, other archaeologists revisited the location but could not relocate the site or any artifacts. It is presumed the site was completely destroyed between 1989 and 2005 (Hunt and O'Neil 2006).

30-177012
This resource consists of a portion of the Brea-Olinda Oil Field and a park constructed for the families of oil field workers, Wildcatter's Park. A portion of the corridor passes through this oil field. The recorded segment is bounded by Valencia Avenue on the east, Lambert Road on the south, Brea Boulevard on the west and north, and Tonner Canyon Road in the north; these boundaries were defined based on the limits of the Tonner Hills Project and do not reflect the actual limits of the oil field. More than 300 oil wells have been drilled in the field since 1894, and the oil field consisted of 200 active wells in 1997. The segment of the field recorded in 2006 was operated by Union Oil Corporation (UNOCAL). The site form notes, "Throughout the oilfield, newer and older operating facilities present a catalog of pumping, storage, transport, and maintenance structures and buildings from the field's century of operations" (Steely 2007), but most of the oil field was not recorded in detail.

Table 2. Previously Recorded Cultural Resources within 0.5 Mile of the Project Limits

Permanent Trinomial (CA-)	Primary Number (P-)	Other Identifier	Description	Eligibility Determination
None	19-188026	Aera-1; Recreational Building and Picnic Grounds	Ca. 1940s–1950s recreational building and picnic grounds including barbeques, children's play area, semi-enclosed cooking area, bathrooms, and enclosed seating area	Found ineligible for NRHP, CRHR, or local designation through survey evaluation
ORA-1625H	30-001625	S-5	A 2-acre historic dump including glass, crockery, tableware, metal debris, china doll fragments, a horseshoe, square-headed nails, and saw-cut bones. Also, two fig trees possibly indicating a home site. Site recorded 1989; completely destroyed by 2006.	Unevaluated; site destroyed
None	30-177012*	Wildcatter's Park Brea-Olinda Oil Field	Historic Oil Field and Park	Appeared eligible for NRHP and CRHR as individual property through survey evaluation in 2006; reevaluated and found ineligible for NRHP or CRHR through survey evaluation in 2012. Individual oilfield elements found not eligible for CRHR in 2000.

*Indicates a resource within the project area

One part of the oil field was set aside by UNOCAL as an employee's park called Wildcatter's Park. A wildcatter is an oil prospector who drills exploratory oil wells, often acting independently and at great financial risk in areas not previously known to yield oil. Wildcatter's Park possessed a utilitarian concrete-block restrooms building, a fabricated metal pavilion, a small wooden kiosk, and a ballcourt. The park also possessed a portion of a historic steel oil derrick, which was originally constructed in 1928 in the Stearns 71 portion of the oil field in Tonner Canyon and moved to Wildcatter's Park in 1994.

Portions of the oil field, consisting of an air balance pumpjack and a counterbalance pumpjack, were recorded and evaluated as individual properties in 2000. Both were found ineligible for inclusion in the CRHR (Ashkar and Fryman 2000).

James W. Steely of SWCA evaluated the Wildcatter's Park portion of the resource and recommended it as eligible for the NRHP and the CRHR under Criterion A/1 because of its association with UNOCAL and under Criterion B/2 because of its association with UNOCAL President Reese Taylor, who apparently ordered its construction (Steely 2007).

The resource was revisited in 2012 by Teri Fulton of LSA Associates. At the time the site was revisited, approximately 50 percent of the area within the site's defined boundaries had been developed or was in the process of development for residential and commercial uses. The Wildcatter's Park segment of the resource had been completely destroyed. Noting that Steely's recommendation of eligibility applied primarily to the Wildcatter's Park portion of the site, Fulton recommended the resource no longer be considered eligible for the NRHP or CRHR under any criteria because of the destruction of Wildcatter's Park and other impacts to the site (Fulton 2012).

California State Historic Resources Inventory

The California Office of Historic Preservation's HRI lists one historic resource within 0.5 mile of the project limits, an oil field in the City of Brea (Table 3).

Table 3. Previously Recorded Built Resources on the California State Historic Resources Inventory within 0.5 Mile of the Project Limits

Primary Number (P-)	Other Identifier	Address	Description
30-156361	Brea Canon Oil	1531 N. Brea Boulevard	Facility within 30-177012, Brea-Olinda Oil Field

1531 North Brea Boulevard / 30-156361
This is the listed in the HRI as "Brea Canon Oil." The resource was constructed in 1912 and is listed as 3S, meaning the property appears eligible for listing in the NRHP as an individual property through survey evaluation. This property is a facility within the Brea-Olinda Oil Field, described above as 30-177012. This site form is not at the SCCIC, and was not requested from the Office of Historic Preservation.

California Historical Landmarks

A listing of CHLs identified no historic landmarks within 0.5 mile of the project limits.

Caltrans Bridge Survey

Study of the Caltrans Historic Bridge Inventory focused on bridges within the project area (Caltrans 2010).

Three local agency bridges are within the project limits (Table 4). These bridges would be replaced by the Project. Caltrans evaluated these bridges and determined them not eligible for inclusion in the NRHP.

Table 4. Historic Bridges within the Project Area

Caltrans Bridge Number	Bridge Name	Location	Historic Evaluation	Date Constructed
55C0121*	Brea Canyon Channel	0.4 mile north of Central Avenue	Not eligible for NRHP	1920; 1929
55C0122*	Brea Canyon Channel	0.6 mile north of Central Avenue	Not eligible for NRHP	1930
55C0123*	Brea Canyon Channel	0.8 mile north of Central Avenue	Not eligible for NRHP	1939
55 0602K	Brea Canyon Channel	12-ORA-057-22.30	Not eligible for NRHP	1971

*Indicates a bridge within the project limits.

In addition, one state agency bridge is within the project area but will not be impacted by the Project. Caltrans also determined this bridge not eligible for inclusion in the NRHP.

Orange County Historical Maps and Historical Commission Historic Sites

Orange County Parks published County historical maps to mark the county's centennial in 1989 and quasquicentennial in 2014.

The Centennial Historical Map marks two historic sites within 0.5 mile of the project limits. The map's site #17 is the "Brea Canyon Oil Field." The map's #122 is the "Portola Trail Site" (OC Parks 1989).

The Quasquicentennial Historical Map shows only one historical site within 0.5 mile of the project limits. The map's #93 is the "Portola Trail Site" (OC Parks 2014). This site consists of a metal plaque mounted on a concrete obelisk. The plaque reads "DON GASPOR PORTOLA WITH 60 MEN CAMPED HERE JULY 31 1769 ON HIS FIRST EXPLORING MARCH FROM SAN DIEGO TO MONTEREY. DEDICATED JUNE 2 1932 BY GRACE PARLOR NO 242 NATIVE DAUGHTERS OF THE GOLDEN WEST" (Ferguson 2012).

Neither of these sites marked on these historic maps is designated with an Orange County Historical Commission historic site plaque.

City of Brea Art in Public Places Database

The City of Brea maintains an interactive map of art curated by the Art in Public Places Program (APP). The program was established in 1975, and today includes more than 175 pieces. Eleven pieces curated by the program are within 0.5 mile of the project limits (Table 5). Two of these art pieces are mapped within the project area and are described below.

Table 5. Art in Public Places Sculptures within 0.5 Mile of the Project Limits

Name	Sponsor	Artist	Location
*Selections**	Canyon Country Homes	Harold Pastorius	Northeast Corner of Brea Boulevard & Canyondale
Sunburst	Canyon Country Homes	Sergio O'Cadiz	Northeast Corner of Brea Boulevard & Canyon Country
Quintessence	Kindred Hospital	Joan Carl	West Side of Brea Boulevard, North of Central
Ascending Dancer	Vintage Canyon Senior Apartments	Robert Holmes	West Side of Brea Boulevard, North of Central
Sampson's Fall	North Hills Professional Plaza	David Falossi	North Side of Central, Between Brea Boulevard & Tamarack
California Saga	U.S. Bank	Robert Wendell	North Side of Central, Between Brea Boulevard & Tamarack
Kinor Shin II	Alterra Wynwood Senior Housing	Charna Rickey	North Side of Central, Between Brea Boulevard & Tamarack
California Dream	Tamarack Pointe Villas	Terry Thornsley	Southwest Corner of Central & Tamarack
Brea of Olde	Tamarack Apartments	Jeff Morse	Southeast Corner of Central & Tamarack
Nature's Guardians I	Berkeley Townhomes	Karen Heyl	West Side of Brea Boulevard, Between Central & Pepper Tree
Nature's Guardians II	Berkeley Townhomes	Karen Heyl	West Side of Brea Boulevard, Between Central & Pepper Tree

*Indicates a sculpture within the project limits.

Selections

Selections is a copper sculpture by Harold Pastorius that was commissioned by Canyon Country Homes in 1977. The sculpture was within the project limits, at the northeast corner of Brea Boulevard and Canyondale Drive. Pastorius was born in British Columbia in 1936 and worked in

Laguna Beach, where he died in 1995. Pastorius was very active in Southern California art circles, and contributed a total of 12 artworks to APP; he also served as a consultant with the program. His work is also on display elsewhere in California, Arizona, South Dakota, and New Zealand. The 8-foot-tall *Selections* incorporated 600 pounds of metal (Pastorius Sculpture 2018a, 2018b). However, *Selections* disappeared in August 2016 and is believed to have been stolen and melted down for its copper content. *Selections* was appraised at a value of $70,000 (Ratzlaff 2016). If the sculpture were pure copper, the 600-pound metal content would have been worth approximately $1,200 to $1,500 if sold legally in mid-2016 (InfoMine 2018).

Sunburst

Sunburst is a sculpture by Sergio O'Cadiz that was commissioned by Canyon Country Homes. The sculpture is adjacent to the project limits, at the northeast corner of Brea Boulevard and Canyon Country Drive. Commissioned in 1975, it is one of the first sculptures curated by APP.

Sergio O'Cadiz was born in Mexico City in 1934. He studied architecture at the Universidad Nacional Autónoma de México, graduating in 1958, and began work designing buildings in Mexico City. In 1962, he relocated to Orange County to work for the architectural firm William Blurock Associates, and was active as an architect, muralist, sculptor, and painter in Orange County until his death in 2002. His architecture was a modified Brutalism. Although he did not consider himself part of the Chicano movement, his art is known for its use of Mexican historical and cultural themes. His public work contains great variety in both media and location, and includes golf course projects in Japan and Spain, the sculptural fountain at the Fountain Valley Civic Center, and murals at Oberlin College in Ohio (Arellano 2012).

Sunburst is a 16-foot-tall reinforced-concrete sculpture. The sculpture is often cited as a highlight of not only Brea's APP collection. It is also considered one of the more important pieces of outdoor art in Southern California. The APP sculptures are documented in the Smithsonian American Art Museum's Art Inventories Catalog (Smithsonian Institution Research Information System n.d.). They were documented by Peggy Gaido, California coordinator for the Smithsonian Institution's Save Outdoor Sculpture! initiative. *Sunburst* was the only sculpture in the City of Brea in a list of 12 notable Orange County sculptures Gaido gave to the *Los Angeles Times* in 1995. "O'Cadiz, a Mexico City artist, has created a work that is at once contemporary and ancient in design," she told the *Times* (qtd. in Emmons 1995: 5).

Historical Maps Database

The USGS maintains a database of modern and historical topographic maps that are accessible to the public on the USGS website (store.usgs.gov). All available historical maps of the corridor were reviewed to identify any historical information of land use or structures that may not currently be visible within the corridor but were present in the past (Table 6). The earliest available USGS map is the 1896 1:62500 Anaheim map. This map, and the 1898 map of the same scale, shows the corridor entirely undeveloped with the exception of a road that extends through what is today known as Brea Canyon. Brea Canyon is labeled farther south, in the river valley now occupied by the City of Brea. The name may or may not apply to the valley north of Brea, which is today known as Brea Canyon.

Table 6. Historic Maps Reviewed

Map Name	Scale	Date
USGS Anaheim	1:62500	1896
USGS Anaheim	1:62500	1898
USGS Anaheim	1:62500	1901
USGS Southern California Sheet No. 1	1:125000	1901
USGS Corona	1:125000	1902
USGS Southern California Sheet No. 1	1:125000	1904
USGS Coyote Hills	1:31680	1935
USGS Anaheim	1:62500	1942
USGS Santa Ana	1:125000	1947
USGS Santa Ana	1:125000	1949
USGS Yorba Linda	1:24000	1949
USGS Yorba Linda	1:24000	1950
USGS La Habra	1:24000	1950
USGS La Habra	1:24000	1952
USGS Santa Ana	1:125000	1956
USGS Santa Ana	1:125000	1959
USGS Santa Ana	1:125000	1960
USGS La Habra	1:24000	1964
USGS Yorba Linda	1:24000	1964
USGS Santa Ana	1:125000	1965
USGS La Habra	1:24000	1974
USGS Yorba Linda	1:24000	1981
USGS Santa Ana	1:100000	1983

The 1901 Anaheim 1:62500 map and the 1902 1:125000 Corona map show three buildings in what is today Brea Canyon, in the vicinity of the corridor. The buildings stand east of where Brea Canyon and Brea Boulevard turn east, north of the City of Brea, with two buildings south of the road and one north of the road.

The 1935 Coyote Hills 1:31680 map shows Brea Boulevard but labels it Spadra Road. (Spadra was once a community west of Pomona; Harbor Boulevard in the City of Fullerton was also once called Spadra Road.) Other, unimproved roads are also shown in the canyon including in the corridor. Several buildings line these roads in the southwestern portion of the corridor, but the buildings seen in the 1901 and 1902 maps are now gone. Of particular interest, this map shows a small pool of water east of the corridor and near the current location of the Brea Canyon Portola Monument. This is the only map that shows this body of water.

The 1942 Anaheim 1:62500 map shows Brea Canyon Road (currently Brea Boulevard) and is the first to label it with this name. Numerous oil wells are shown scattered around the hills, particularly north of the corridor, where no oil wells are shown in previous maps. This appears to be development of the Brea-Olinda Oil Field. Buildings line Brea Canyon Road (currently Brea Boulevard) at the south end of the corridor, but no more buildings are seen in what has become the oil field in the central part of the corridor.

Most of the buildings along Brea Canyon Road (currently Brea Boulevard) in the south end of the corridor have disappeared by the 1950 La Habra 1:24000 map. Humble Reservoir appears for the first time. The oil wells remain the most ubiquitous man-made feature in the map. The 1952 La Habra map appears identical. The 1964 La Habra map is similar, but shows the road's name as Brea Canyon Boulevard (currently Brea Boulevard). The 1974 aerial photograph is similar but gives no road names.

The Yorba Linda 1:2400 map shows only the easternmost part of the corridor. The 1964 and 1981 maps show the road and label it Brea Boulevard.

Southern California Sheet No. 1 and the Santa Ana, California, maps (with scales of 1:100000 and 1:250000, respectively) were reviewed but found not useful due to the scale.

INTERESTED PARTIES CONSULTATION PROGRAM

Sacred Lands File Search

AECOM conducted a Native American contact program on behalf of OC Public Works, to inform interested parties of the Project and to address any concerns regarding Traditional Cultural Properties or other resources that might be affected by the Project. The program involved contacting Native American representatives identified in a list provided by the Native American Heritage Commission (NAHC) to solicit comments and concerns regarding the Project. Documents pertaining to the Native American contact program are attached as confidential Appendix B.

A letter was prepared and mailed to the NAHC on September 25, 2017. The letter requested that an SLF check be conducted for the Project and that contact information be provided for Native American groups or individuals that may have concerns about cultural resources within the project limits. The NAHC responded in a letter, sent via email and dated October 9, 2017. The letter indicated that "A record search of the Native American Commission (NAHC) *Sacred Lands File* was completed for the area of potential effect (APE) referenced above with negative results however the area is sensitive for cultural resources." The letter also stated "Please note that the absence of specific site information in the Sacred Lands File does not indicate the absence of Native American cultural resources in any APE." The letter included an attached list of five Native American contacts who may have knowledge of cultural resources in the vicinity of the corridor.

Native American Contact

Letters were mailed on October 10, 2017, to each group or individual provided on the NAHC contact list (Table 7). Maps depicting the project area and response forms were attached to each letter. If no answer was received within two weeks of mailing the letter, a follow-up phone call was placed to the number provided by the NAHC on February 8, 2018 (see Appendix B).

As a result of the letter and follow-up calls, five Native Americans were contacted, and a total of four responses were received. One contact, Charles Alvarez of the Gabrielino-Tongva Tribe, called to state that he had no comment on the Project. The remaining three Native American representatives, including Chairperson Andrew Salas, Chairperson Anthony Morales, and Chairperson Robert Dorame all stated that the project area is sensitive for cultural resources, and that ground-disturbing activities should be monitored by a Native American monitor.

Table 7. Native American Contacts

Native American Contact	Letter Sent	Date of Reply	Follow-Up	Response
Andrew Salas, Chairperson Gabrieleno Band of Mission Indians—Kizh Nation	10/10/2017	10/23/2017	03/18/2021: Consultation conducted between the Kizh Nation and OC Public Works.	Mr. Salas responded in a letter sent via email. The letter states that "The project location is within our Ancestral territory which may have potential for discoveries of our resources." Mr. Salas requests a Native American monitor from his group be present "during any and all ground disturbances." Mr. Salas and Tribal Biologist Matthew Teutimez met with Orange County representatives on 03/18/21. They stressed their tribal government's ancestral ties to the project area and argued that the area's tribal cultural sensitivity warrants Native American monitoring.
Anthony Morales, Chairperson Gabrielino/Tongva San Gabriel Band of Mission Indians	10/10/2017	01/26/2018	02/08/2018	Anthony Morales's son Adrian Morales, who coordinates the tribe's monitoring, emailed on 1/26 and asked the status of Project construction. He was informed that the EIR is not yet complete, and construction is still some time in the future. On 2/28, Anthony Morales was called. He asked the results of the records search, and was informed that no Native American resources were recorded in the 0.5-mile buffer. He informed us "that canyon is very sensitive." He stated that the whole Puente Hills area is of concern for cultural resources. He recommends monitoring ground disturbance.

Native American Contact	Letter Sent	Date of Reply	Follow-Up	Response
Sandonne Goad, Chairperson Gabrielino/Tongva Nation	10/10/2017	n/a	02/08/2018; Called and left voicemail	No response.
Robert Dorame, Chairperson Gabrielino Tongva Indians of California Tribal Council	10/10/2017	n/a	02/08/2017: Spoke with Mr. Dorame via telephone	Mr. Dorame requested a copy of the letter be emailed to him (which was done). He stated that Brea Canyon was culturally sensitive for his tribe. He said there were mineral springs in the canyon which were used by the Native Americans. He said that an old road ran through the canyon, and there was potential for sites along the road. He said he knew of a possible occupation site without a name in the canyon, and would check his tribe's records after getting our email. Mr. Dorame says Native American monitoring may be necessary.
Charles Alvarez, Chairperson Gabrielino-Tongva Tribe	10/10/2017	10/12/2017	10/12/2017 Emailed Mr. Alvarez regarding conversation	Mr. Alvarez called to inform us he has no comment on the Project. He asked that we email him for his records, which was done.

AB 52 Consultation

AB 52 consultation letters were sent on December 28, 2020 to the four tribes with standing notifications with OC Public Works. Mr. Andrew Salas requested and engaged in government-to-government consultation with OC Public Works in compliance with AB 52. Chairperson Andrew Salas and Tribal Biologist Matthew Teutimez met with OC Public Works representatives via telephone on March 18, 2021. The exact contents of AB 52 consultation are privileged and confidential, but call notes are on file with OC Public Works. Mr. Salas and Mr. Teutimez emphasized their tribal government's ancestral ties to the project area and reiterated their argument that the project area is generally sensitive for tribal cultural resources. They again requested Native American monitoring for any ground-disturbing activities for any ground-disturbing activities. OC Public Works concluded consultation with the Gabrieleno Band of Mission Indians - Kizh Nation and provided a letter to the Tribe concluding the consultation process on July 15, 2021.

Other Interested Party Contact

An email was sent on June 15, 2018, to Sherry Farley. Mrs. Farley is Past Grand President of the Native Daughters of the Golden West. She is also former President and current History and

Landmarks Chair of Grace Parlor No. 242. She is the third generation of her family to belong to Grace Parlor, and many of her cousins also belong to the parlor.

Mrs. Farley responded in a voicemail and an email on June 25, 2018. This was followed by a phone call and an additional email on June 27, 2018. In those calls and emails, Mrs. Farley provided AECOM with background information about, and historical photos of, the Brea Canyon Portola Monument erected by the Grace Parlor of the Native Daughters of the Golden West on June 2, 1932. This information is incorporated into this report.

In addition, Mrs. Farley stated that the Brea Canyon Portola Monument remains important to the Native Daughters of the Golden West. She stated that the Brea Canyon Portola Monument is visited and maintained by the Grace Parlor. In addition, it is one of 13 monuments erected by Grace Parlor No. 242 and Santa Ana Parlor No. 235 which are part of a regular Monument Search Scavenger Hunt.

Mrs. Farley stated that, if it is necessary to impact the Brea Canyon Portola Monument in the course of Project work, the Native Daughters would like the Brea Canyon Portola Monument to be relocated to a place where it can be enjoyed as close to its current location as possible. She stated that the Native Daughters would like to take part in a rededication of the monument if it is moved. Mrs. Farley stated that the Native Daughters would also appreciate being kept informed of Project progress.

Copies of correspondence and call notes with Mrs. Farley are contained in Appendix C.

PALEONTOLOGICAL RECORDS SEARCH

A paleontological records search was requested from the NHMLAC on September 22, 2017, to determine the level of paleontological sensitivity within the project area. The request was accompanied by a project description and a map of the project area.

Paleontological Records Search Results

The paleontological records search was conducted by Samuel McLeod, PhD, Vertebrate Paleontology Division of the NHMLAC, and reported on October 6, 2017.

The records check indicated that no known NHMLAC vertebrate fossil localities lie within the project limits (McLeod 2017). However, there are sedimentary deposits within the project area which have yielded fossils nearby.

The records search determined that mapped surficial deposits in the central portion of Brea Canyon, along Brea Boulevard, are younger Quaternary alluvium deposited by the creek that runs through Brea Canyon. Due to their age (less than 10,000 years old), younger Quaternary deposits are unlikely to contain fossils. However, younger Quaternary alluvium often overlies older Quaternary alluvium at varying depths. These older deposits may contain significant fossils. The closest older Quaternary NHMLAC fossil locality to the project area, LACM 4943 in

Soquel Canyon, yielded fossil specimens of ground sloth (*Nothrotheriops*) and horse (*Equus giganteus*).

The Pliocene Fernando Formation is exposed in the western portion of the corridor, and is also beneath the Quaternary alluvium in the central part of the corridor. This marine formation has been known to yield significant vertebrate fossils. The closest NHMLAC locality in the Fernando Formation, LACM 557, occurs southeast of the corridor, east of Highway 57 and south of Tonner Canyon. That locality yielded an important fossil of the fist *Laytonia californica*. Other nearby localities in the Fernando Formation have yielded toothed whale (Odontoceti), great white shark (*Carcharodon carcharias*), herring (*Ganolytes*), hake (*Merluccius*), lanternfish (*Diaphus* and *Lampanyctus*), mackerels (Scombridae), swordfish (*Coelorhynchus scaphopsis*), flounder (Pleuronectidae), and whale (Cetacea).

The Miocene Puente Formation (also sometimes known as the Monterey Formation) is exposed in the eastern portion of the corridor. Marine Puente Formation localities north-northwest of the corridor have yielded fossils including bonito shark (*Isurus oxyrinchus*), top smelts, (*Atherinops barkeri* and *Atherinopsis*), sauries (Scomberesocidae), herrings (*Etringus scintillans* and *Ganolytes cameo*), cod (*Eclipes*), anglerfish (*Acentrophryne longidens*), lanternfish (Myctophidae), jack (*Decapterus*), snake mackerel (*Thyrsocles kriegeri*), croakers (*Seriphus lavenbergi* and *Lompoquia*) sanddab (Pleuronectiformes), deep sea smelt (Bathylagidae), viperfish (*Chauliodus eximius*), bristlemouth (*Cyclothone*), pipefish (*Syngnathus emeritus*), and whale (Cetacea).

Dr. McLeod's letter is included as Appendix D.

CULTURAL RESOURCES SURVEY RESULTS

A cultural resources field survey of the project limits was conducted by Marc A. Beherec, Ph.D., RPA, and Jennifer Redmond, M.A., RPA, on May 29 and 30, 2018. Pedestrian survey was conducted within the project limits, with one exception. The private properties west of Brea Boulevard north of Bridge 3 are designated for temporary ground disturbance. These properties are graded and covered with imported gravels, so a pedestrian survey would be inconclusive in these areas, and accordingly did not include these areas. Approximately 24.6 acres of the 29.8-acre project limits was surveyed.

The cultural resources survey included identification of archaeological and built environment resources. One known built resource, the Brea-Olinda Oil Field (30-177012), was revisited and its boundaries extended. Three previously unrecorded resources, including Sergio O'Cadiz's *Sunburst* sculpture, the Brea Canyon Portola Monument, and Brea Boulevard itself, were identified during the survey.

ARCHAEOLOGICAL AND BUILT ENVIRONMENT SURVEY

The archaeological survey focused on the identification of any surface evidence of archaeological materials in the project limits. The pedestrian survey encompassed the areas that would be disturbed by the Project, with the exception of the gravel-covered areas of private property described above. Transects were walked on either side of Brea Boulevard within the project limits at distances of 15 meters or less. Most of the project area, which was not previously paved or graded for the road surface or for oil pads and dirt roads, slopes away from the road and is densely overgrown.

The built environment survey focused on documenting elements of the built environment which may be impacted by the Project. Structures and objects that exceed 45 years of age were documented on appropriate DPR 523 forms.

Survey Results

No archaeological resources were observed within the project area. Four historic built resources, consisting of numerous individual structures, were observed and documented within the project area (Figure 4). These include Brea Boulevard itself (including an abandoned road alignment and other structures associated with the road), Sergio O'Cadiz's *Sunburst* sculpture, the Brea Canyon Portola Monument, and a collection of structures associated with the Brea-Olinda Oil Field (30-177012).

Brea Boulevard

Brea Boulevard is a 30-foot-wide, two-lane, undivided highway (one lane in each direction) with portions of the roadway having no curb or gutter, and unpaved, earthen shoulders, and with other portions of the roadway improved with curb, gutter, and sidewalk. The existing R/W varies from 60 to 100 feet wide (Plate 3). Associated with the road are various utilities. Most of the utilities

are subsurface, but they also include an abandoned metal sewer line that runs above-ground parallel to the east of the road south of the curve.

Plate 3: Brea Boulevard East of Bridge #55C0123, View West. Note Culvert and Geodetic Benchmark on Shoulder.

Brea Boulevard has essentially remained intact since the roadway was realigned to its present configuration between 1928 and 1930. However, it has been resurfaced and otherwise maintained since that time.

There are approximately 13 existing culvert crossings (for drainage or utilities or both). These features were not documented individually. The culverts were all constructed of cast-in-place concrete (Plates 4 and 5). The imprints of wooden forms were observed on these features.

Three bridges crossing Brea Creek within the project limits will be removed and replaced: a two-span reinforced concrete slab bridge constructed circa 1920 and widened circa 1929 (Bridge 1 [#55C0121]), a two-span reinforced concrete T-beam bridge constructed circa 1930 (Bridge 2 [#55C0122]), and a three-span reinforced concrete T-beam bridge constructed circa 1939 (Bridge 3 [#55C0123]). These bridges have all been evaluated by Caltrans and found not eligible for inclusion in the NRHP.

In addition, Bridge #55 0602K over Brea Canyon Channel was within the survey area but will not be impacted by the Project. This bridge has also evaluated by Caltrans and found not eligible for inclusion in the NRHP.

Eagle Aerial Imaging (2015), OC Public Works (2017), and AECOM (2017).

Scale 1 : 12,000
1" = 1,000 feet

0 500 1,000 2,000 3,000 Feet

Figure 4
Historic Structures

Brea Boulevard Corridor Improvement Project

Plate 4: Drainage Culvert at Canyon Country Road.

Plate 5: Oil Line Culvert.

Three USGS benchmarks were observed in association with the road. One benchmark was observed at the turnout near the Brea Canyon Portola Monument (Plate 6). The other two were observed in proximity east of Bridge 3 (#55C0123). The benchmarks consist of brass medallions

set in concrete bases. All three benchmarks bear the basic legend, "U.S. COAST & GEODETIC SURVEY / BENCHMARK / ELEV FEET / ABOVE MEAN SEA LEVEL / $250 FINE OR IMPRISONMENT / FOR DISTURBING THIS MARK." Added to this, the benchmark near the Brea Canyon Portola Monument is marked "L351 / 1949" in the center of its medallion. The two markers east of the bridge are labeled "X423 / 1935" and "B351 / 1949."

Plate 6: U.S. Coast and Geodetic Survey Benchmark near Brea Canyon Portola Monument.

An abandoned weigh station platform is on the south side of the road, near the Stearns oil pumpjacks. The weigh station consists of two concrete drives (one for the left truck wheels and one for the right truck wheels), each 3 feet wide, and measures approximately 106 feet, 6 inches long (Plate 7). It is interrupted approximately midway along its length by a pad measuring approximately 6 feet 7 inches long and 14 feet wide, which probably houses the scale.

Plate 7: Abandoned Weigh Station, View West.

In addition to the existing roadway, one abandoned road surface was observed towards the southwest end of the corridor. Part of the abandoned road surface is within the boundaries of the planned road realignment, and part of the resource is within Possible Staging Area 1. The abandoned street surface is west of and parallel to the existing roadway, extending roughly north-south for approximately 750 feet, from a point south of Canyon Country Road in the south to a point where it rejoins the existing Brea Boulevard at a gate. The abandoned road is situated at a lower elevation than the existing roadway (Plate 8). The abandoned road surface measures approximately 17 feet, 8 inches wide. It is composed of concrete measuring approximately 8 inches thick (Plate 9). This road surface probably dates to 1920–1923 when Brea Boulevard was first paved, and was probably abandoned (except for local access) when the roadway was realigned to its present configuration between 1928 and 1930.

Plate 8: Abandoned Road Surface (Left), and Semi Truck on Existing Roadway (Right), View Northeast.

Plate 9: Animal Footprints Preserved in the Abandoned Concrete Road Surface.

Associated with the abandoned road surface is an abandoned bridge leading to private property (Plate 10). The bridge is constructed of wooden decking held up by I-beam construction mounted on metal pylons (Plate 11). The central portion of the bridge has collapsed into the river. A riveted metal plate retaining wall supports the east river bank.

Plate 10: Abandoned Bridge, View West.

Plate 11: Abandoned Bridge from Below, View Southwest.

Sunburst *Sculpture*

Sergio O'Cadiz's *Sunburst* sculpture is on a landscaped slope at the northeast corner of the intersection of Brea Boulevard and Canyon Country Road in the City of Brea (Plate 12). The sculpture was created of formed concrete, probably on this location, and likely using O'Cadiz's characteristic method of ad hoc Styrofoam molds. Stubs of the reinforcing rebar jut out of the sculpture, contributing to its angular style. The sculpture depicts a sun with a human face emitting rays. The symbolism is evocative of Aztec motifs, but it is not a copy of Aztec sculpture. The sculpture measures 16 feet tall and 8 feet wide. The sculpture is in excellent condition.

Plate 12: *Sunburst,* View Northeast.

Brea Canyon Portola Monument

The Brea Canyon Portola Monument consists of a bronze plaque mounted on a concrete obelisk that is set on a turnout on the east side of Brea Boulevard, approximately 30 feet from the edge of the pavement (Plate 13).

The obelisk stands approximately 5 feet tall. It stands on a base measuring 2 feet 7 inches square. The base in turn stands on a concrete pad measuring approximately 3 feet 7 inches square. One corner of the back of this pad is cracked and broken, and may have been run over by heavy machinery. The four sides of the obelisk's base are recessed, but there is no evidence of writing or plaques ever having been mounted on the base. The obelisk is covered by many coats of white paint. The monument as a whole is in good condition.

Plate 13: Brea Canyon Portola Monument, View South.

The plaque is set in the concrete of the obelisk; it is not attached to the side of the obelisk. The plaque is made of bronze and measures approximately 1 foot wide and 14 inches tall (Plate 14). At the top of the plaque is a bas relief of a conquistador wearing a helmet and a sheathed sword standing on a hill (Plate 15). He holds a banner that blows behind him. The conquistador, probably Portola himself, faces left. Two other men stand downhill on either side of this central figure. To the right, behind Portola, another conquistador stands with his back to the viewer, holding a halberd. The depictions of the two Spaniards as conquistadors is anachronistic: they wear the high-crowned *morion*-style helmets and wear garb associated in the common mind with the conquistadors of the 16th and 17th centuries; they are not dressed after the manner of the leather jacket soldiers who accompanied Portola and colonized California in the eighteenth century. To the left of the central figure is a tonsured man wearing robes, representing a Franciscan friar. The friar stands lower than the two soldiers. He faces the central figure and holds up a crucifix towards him. This figure may represent one of the friars who accompanied Portola, who included Juan Crespi and Francisco Gomez. Alternatively, it may represent Junipero Serra, whom many Californians erroneously believe accompanied Portola. Or this figure may simply be an anonymous friar symbolic of the Christianization of California. The bas relief is signed in the lower with the initials R J T; the R and the T are connected with a crossbar over the J.

Plate 14: Brea Canyon Portola Monument Plaque.

Plate 15: Brea Canyon Portola Monument Plaque Detail.

Beneath the pictorial relief is an inscription. The inscription reads, "DON GASPOR [*sic*] PORTOLA / WITH 60 MEN CAMPED HERE / JULY 31 1769 ON HIS FIRST / EXPLORING MARCH FROM / SAN DIEGO TO MONTEREY. / DEDICATED JUNE 2 1932 BY / GRACE PARLOR NO 242 / NATIVE DAUGHTERS / OF THE GOLDEN WEST." Grace Parlor No. 242, based in the City of Fullerton, was founded June 2, 1927, and this monument was therefore erected on the fifth anniversary of its founding (Native Daughters of the Golden West 2017a).

The monument is surrounded with a bed of red scoria and rounded landscaping pebbles held in place with wooden beams. This landscaping does not appear to date to the original installation of the monument and is not well maintained.

The monument is on the edge a wide flat in Brea Canyon, measuring approximately 1,000 feet (north-south) by 700 feet (east-west) (Plate 16). South of this flat, the hills on either side of Brea Canyon come together before the canyon opens up again in the flat expanse within which the City of Brea was built. The hills create a hidden space protected by the surrounding hills and invisible from the plains now occupied by housing tracts in the northern City of Brea. Most of this landform is graded and covered with imported gravel and is currently occupied by oil field facilities that will not be impacted by the Project. Therefore this flat was not surveyed. This flat is the location that the Daughters of the Golden West believed was Portola's actual campground and the Native American Village of the Little Pool.

Plate 16: The Brea Canyon Portola Monument (Circled, Far Left) in Context, beside Brea Boulevard at the Edge of a Sprawling Flat, View South.

Brea-Olinda Oil Field (30-177012)

Elements of at least two different leases were observed, although both leases are now owned by Bridge Energy. The two leases are the Stearns Lease and the Brea Lease. The structures observed in connection with the oil field included oil pumpjacks, a jackline support, and an oil and gas separator. Dirt roads were also observed. Both active and inactive pipelines were observed, many of which appeared recent, and none of which were formally recorded. Tall oil derricks dominate the skyline on the ridge overlooking the road, but none of these structures were within the project limits. All except one of the pumpjacks were within locked chainlink fences and were therefore inaccessible; they were documented to the extent possible from outside the fence. Most of the pumpjacks appeared unused, and several appeared inoperable.

Stearns Lease

The segment of the Stearns Lease, which is within the project area, was encountered on the south side of the road west of the bend, within Possible Staging Area No. 2. Two pumpjacks were observed here. The pumps, both of which appear abandoned, stand at the southern end of the corridor, outside the planned roadway but inside the possible staging area. These pumps are Stearns No. 103 and Stearns No. 104.

Stearns 103

Stearns 103 is a well with an inoperable pumpjack unit (Plate 17). The pumpjack bears two manufacturer's plaques on one Samson beam of the pump. Both plaques indicate that the structure was constructed by Emsco Manufacturing Company of Los Angeles, California, and Houston and Garland, Texas. One of the plaques indicates it was inspected in 1944. Stearns 103 is powered by a Continental-Emsco Co. Green Triangle Motor, manufactured by Marathon Electric Manufacturing Company.

Plate 17: Stearns 103 Pumpjack, View Southwest.

Stearns 104

The Stearns 104 pumping unit (Plate 18) was constructed of Lufkin parts, including Lufkin part numbers 435W, 2706W, and 2954W, and a Ratigan 219L 20-ton clamp. Like Stearns 103, Stearns 104 was powered by a Continental-Emsco Co. Green Triangle Motor, manufactured by Marathon Electric Manufacturing Company. Lufkin was founded in 1869 and is still active; it has passed through a number of hands since its founding and is now a brand of Apex Tool Group. J.P. Ratigan, Inc., was founded in 1915. An undated, but recent online Ratigan Oilfield Equipment brochure describes the Ratigan 219 Wire Line Clamp as "our latest development in clamping devices" (J.P. Ratigan, Inc. n.d.). Both Stearns 103 and Stearns 104 were inactive at the time of visit, but the Stearns 104 pumpjack is in better condition and may be slightly later in age than Stearns 103. No dates were observed on the Stearns 104 pumpjack, and a manufacturer's plate could not be read from outside the fenced area.

Plate 18: Stearns 104 Pumpjack, View Southeast.

Brea Well #14

Brea Well #14 is on a concrete pad supported by a concrete retaining wall on the hillside, with an iron railing protecting edge around the pad. Brea Well #14 utilizes a National Supply Company pumping unit structure type EX-11SN-57DP, serial #1481G (Plate 19). The name NATIONAL appears in black capital letters on a yellow background on the walking beam. Brea Well #14 includes a pumping unit gear reducer manufactured by the National Supply Company of Gainesville, Texas. The engine is a General Electric Motor, 193482.

Plate 19: Brea Well #14, View West.

Brea Well #34

Brea Well #34 appeared constructed using the same construction methods as Brea Well #14 and was probably also manufactured by National at about the same time (Plate 20).

Plate 20: Brea Well #34, View East.

Brea Well #53

Brea Well #53 is an active, recent well within the project area (Plate 21). This well is a modern well, without a pumpjack, mounted on a new concrete pad inside a secondary containment. It uses an electric pump that appears to pump oil into a subsurface tank. Summit Brandon monitoring equipment and pipeline are used by this well. This recent pump most likely totally replaced an earlier pump in this location.

Plate 21: Brea Well #53, View East.

Brea Well #71

Brea Well #71 was operated by an Industrial Electric Motor, model number WWE5-18-184T, Serial No. 12408 GEJ, made in China, with Date Code 2006 G5 (Plate 22). The unit is inoperable and its horsehead, which bore no visible writing, was detached and laying on the ground some distance away.

Plate 22: Brea Well #71, View East.

Oil and Gas Separator

A short distance from Well #71 is an oil and gas separator (Plate 23). This unit bears a manufacturer's plaque that states that it is Model 41C220 and was built by Superior Tank and Construction Co. in March 1954.

Plate 23: Brea Well #71 Oil and Gas Separator, View North.

Brea Well #80

No dates were observed on Brea Well #80, but this active well appears outfitted with a newer model pump and motor. The pumpjack appears to predate the pump and motor but nevertheless is one of the younger structures in the field (Plate 24).

Plate 24: Brea Well #80, View Southeast.

Jackline Support

A jackline support stands next to the road at its curve and appears connected to the Brea wells (Plate 25). The support measures 7 feet 6 inches tall and 1 foot in diameter, and is constructed of cast iron. It once served to support a jackline attached to an oil jackline pump, but no remains of the rest of the structure were observed in the vicinity. No maker's marks or other diagnostic characteristics were observed on the support.

Plate 25: Jackline Support (Center), View Northeast.

In summary, a collection of oil field structures were observed and documented at the segment of the Brea-Olinda Oil Field within the project area. These include seven pumpjacks (two on the Stearns lease and five on the Brea lease), an oil and gas separator, and a jackline support. Some of these structures are functional, while others are clearly nonfunctional at this time. The earliest structure that could be dated with certainty dates to 1944, and the most recent dates to 2006. However, each of these structures is composed of interchangeable parts, and most appear updated and repaired over time, such that all of these structures appear modified over time. For example, Brea Well #71 has an inoperable pumpjack that could not be dated but appears relatively early in date, and beside the pumpjack is an oil and gas separator dating to 1954. However, although the pumpjack appears to date to the middle of the twentieth century, it is outfitted with a motor dating to 2006. Each of the pumpjacks in the project area is likely to have been repeatedly repaired and updated with replacement parts.

EVALUATIONS AND RECOMMENDATIONS

REGULATORY SETTING

CRHR

Cultural resources in California are protected by a number of federal, state, and local regulations, statutes, and ordinances. Cultural resources (including paleontological resources) are protected from adverse effect if they meet standards of significance. The CRHR was created to identify resources deemed worthy of preservation on a state level and was modeled closely after the NRHP. The criteria are nearly identical to those of the NRHP but focus on resources of statewide, rather than national, significance. The determination of CRHR significance of a cultural resource is guided by specific legal context outlined in §15064.5 (b), 21083.2, and 21084.1 of the Public Resources Code (PRC), and the CEQA Guidelines (Code of California Regulations [CCR] Title 14, §15064.5). A cultural resource may be eligible for listing in the CRHR if it:

1. is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. is associated with the lives of persons important in our past;
3. embodies the distinctive characteristics of a type, period, region or method of construction or represents the work of an important creative individual or possesses high artistic values; or
4. has yielded, or may be likely to yield, information important in prehistory or history.

A cultural resource determined to meet one or more of the above criteria is considered a historical resource under CEQA. In addition to meeting one or more of the above criteria, historical resources eligible for listing in the CRHR must retain enough of their historic character or appearance to be able to convey the reasons for their significance. Such integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association.

Human Remains

Human remains, including those interred both inside and outside of formal cemeteries, are protected by CEQA both as cultural resources that may be eligible for the CRHR and independently of their potential scientific significance. California Health and Safety Code § 7050.5 requires that, if human remains are discovered outside of a formal cemetery, excavations shall halt in the vicinity of the find, and the Coroner shall be notified. The Coroner will determine the nature of the remains.

If the Coroner determines the remains are Native American in origin, the Coroner will contact the NAHC and a Most Likely Descendant will be identified pursuant to PRC § 5097.98 and

CEQA Guidelines § 15064.5, which requires that the concerns of a Most Likely Descendant (MLD) be considered in the treatment and final disposition of such remains.

Tribal Cultural Resources

On September 25, 2014, Governor Jerry Brown signed into law AB 52. Among other provisions, AB 52 established a new category of protected resources in CEQA called tribal cultural resources. The purpose of establishing this new category of resources is to consider tribal cultural values in addition to scientific and archaeological values when determining Project impacts and mitigation measures during the planning process. According to PRC § 21074, tribal cultural resources consist of either of the following:

> (1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
>
> (A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.
>
> (B) Included in a local register of historical resources as defined in subdivision (k) of § 5020.1.
>
> (2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of § 5024.1. In applying the criteria set forth in subdivision (c) of § 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.
>
> (b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.
>
> (c) A historical resource described in § 21084.1, a unique archaeological resource as defined in subdivision (g) of § 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of § 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

Paleontological Resources

Paleontological resources are similarly protected by CEQA. Impacts to paleontological resources are addressed in Appendix G of the CEQA Guidelines (Code of California Regulations [CCR] Title 14, § 15064.5). Any project that will "Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature" requires mitigation. For the purposes of CEQA, a "unique paleontological resource" consists of a scientifically significant, particularly if the resource provides new data on evolutionary trends, provide data that helps in dating the rock unit in which it is found, provide data regarding the interaction among extinct plant and animal species, or is found in a geologic formation that is in short supply and in danger of being destroyed by human or natural processes (Scott and Springer 2003).

APPLICATION OF CRHR CRITERIA

Brea Boulevard

Brea Boulevard and its associated infrastructure do not appear eligible for inclusion in the CRHR under any criteria. From its beginning, the road has always been a secondary road. Although it was important to the development of the Brea-Olinda Oil Field and as a connection between the San Gabriel Valley and the La Habra Valley, it is not associated with events that have made a significant contribution to the broad patterns of California's history (Criterion 1). Research has not indicated that the road was important in the lives or careers of any important individuals or groups (Criterion 2). The road and its associated structures are all typical of their period and type. They are not exemplars of construction or design and do not have high artistic value, nor are they the work of a particular creative individual (Criterion 3). Finally, Brea Boulevard has not yielded, and is not likely to yield, information important in prehistory or history. Brea Boulevard does not appear eligible for listing in the CRHR.

The bridges to be replaced for the Project have been evaluated by Caltrans and found not eligible for inclusion in the NRHP. They appear not eligible for inclusion in the CRHR.

Brea-Olinda Oil Field (30-177012)

As noted earlier, individual pumpjacks within the Brea-Olinda Oil Field were first recorded and evaluated in 2000. At that time, the pumpjacks were found not eligible for inclusion in the CRHR (Ashkar and Lassell 2000).

In 2007, James W. Steely of SWCA mapped the oil field to extend within the Brea Boulevard Corridor Improvement Project area. Steely evaluated the Wildcatter's Park portion of the resource, a company park dating to circa 1960, and recommended it as eligible for the CRHR under Criterion 1 because of its association with UNOCAL and under Criterion 2 because of its association with UNOCAL President Reese Taylor, who apparently ordered its construction (Steely 2007).

The resource was revisited in 2012 by Teri Fulton of LSA Associates. At the time the site was revisited, approximately 50 percent of the area within the site's boundaries as defined by Steely had been developed or was in the process of development for residential and commercial uses. The Wildcatter's Park segment of the resource had been completely destroyed. Noting that Steely's recommendation of eligibility applied primarily to the Wildcatter's Park portion of the site, Fulton recommended the resource no longer be considered eligible for the CRHR under any criteria because of the destruction of Wildcatter's Park and other impacts to the site (Fulton 2012).

This study extends the site boundaries of the Brea-Olinda Oil Field to include more property within the project area. Each structure within this site boundary was recorded.

Potential periods of significance for the Brea-Olinda Oil Field include the periods from approximately 1874, when the oil field was first exploited, to the present. The most significant period is approximately circa 1865 to circa 1900. At the beginning of that period experimental oil

drilling techniques were practiced in the field, and in the period from approximately 1880 to 1900 the field was developed into a productive oil field. However, the field has continued to be in production to this day, and has the potential to include significant elements throughout the late nineteenth to twentieth centuries. The Wildcatter's Park portion of the oil field for example, which is the only segment recommended eligible for the CRHR to date, was constructed circa 1960.

Neither the segment of the Brea-Olinda Oil Field surveyed nor any of the individual structures within the project area appear eligible for listing in the CRHR. The portion of the Brea-Olinda Oil Field encountered for the Brea Boulevard Corridor Improvement Project includes portions of the Stearns Lease and the Brea Lease, both currently operated by Bridge Energy. No link to UNOCAL was uncovered during archival research. The segment of oil field encountered during the survey is part of the early Brea-Olinda Oil Field, which was first exploited in the late nineteenth century and which played an important role in the development of Southern California oil. But the hardware observed during the survey all post-dates World War II. None of the hardware dates to the period of significance for the development of the oil field. The oil field segment as encountered cannot be said to have a significant association with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1). The segment of oil field encountered is not associated with UNOCAL President Reese Taylor. Historic research did not identify any association with the life or career of any important individuals or groups (Criterion 2). The structures documented consisted of standard engineering structures composed of mass-produced parts typical of the second half of the twentieth century. They are not exemplars of construction or design and do not have high artistic value, nor are they the work of particular creative individual (Criterion 3). The standard post-World War II engineering structures within this segment of the Brea-Olinda Oil Field have not, and are unlikely to, yield data important to history or prehistory (Criterion 4). Finally, each of the structures appears extensively modified. Many of the structures are inoperable, and parts have been removed from these structures. Parts were replaced during the course of regular maintenance on most of the structures, such that some pumpjacks dating to the middle twentieth century are outfitted with electronic pumps from the early twenty-first century. None of the structures retains its integrity of materials, design, or workmanship. This segment of the Brea-Olinda Oil Field, including the seven pumpjacks, the oil and gas separator, and the jackline support, taken individually or as a whole, does not appear eligible for inclusion in the CRHR under any criteria.

Sunburst **Sculpture**

Sergio O'Cadiz's *Sunburst* sculpture appears eligible for inclusion in the CRHR under Criterion 3 as the work of "an important creative individual." As described in the APP portion of the Archival Research section above, sculptor Sergio O'Cadiz was an important figure in art and architecture in Southern California and beyond. O'Cadiz's work graces a number of public buildings, university campuses, and other public spaces in the United States, and he has contributed to works in his native Mexico City and in Japan. *Sunburst* itself is one of the first, or possibly the first, installation in Brea's successful APP program. This program invites and subsidizes artists who are judged by their peers to be noted important creative individuals to create art specifically to beautify the public places of the City of Brea. O'Cadiz is one of the first individuals, or the first individual, to be honored with such a commission. In the 43 years since

Sunburst was sculpted and the 14 years since his death, O'Cadiz's status as an artist has remained stable and perhaps increased, and the need to preserve his work has achieved further impetus following the destruction of a large mural he painted in Colonia Juarez in Fountain Valley, which was demolished in 2001 (Arellano 2012).

Moreover, this particular work of O'Cadiz also "possesses high artistic values," further qualifying it for inclusion under Criterion 3. The unique piece was probably cast in place using O'Cadiz's signature method of using ad hoc Styrofoam molds. The piece has achieved fame in California and listing in the Smithsonian American Art Museum's Art Inventories Catalog. The piece is remarkable for its allusions to traditional Mexican themes without directly copying ancient art.

Brea Canyon Portola Monument

The Brea Canyon Portola Monument appears eligible for inclusion in the CRHR under Criteria 1 and 2. Excavations in the vicinity of the monument have the potential to yield data which may also make the site eligible for inclusion under Criterion 4.

The Brea Canyon Portola Monument appears eligible for inclusion in the CRHR under Criterion 1 for its connection to the 1930s historic preservation campaign of the Native Daughters of the Golden West.

The monument notes that it was erected on June 2, 1932, by Native Daughters of the Golden West Parlor No. 242. More specifically, the monument was erected by the parlor's History and Landmarks Committee, which was chaired by Carrie Earl McFadden Ford, a noted philanthropist (Richey 2011). The Native Daughters of the Golden West is a women's fraternal and patriotic organization composed of women born in the State of California. The organization was founded in 1886, and soon after, it adopted as its founding principles "Love of Home, Devotion to the Flag of our Country, Veneration of the Pioneers of California, and an Abiding Faith in the Existence of God (Briggs 1953). Between 1886 and 2017, a total of 338 chapters of the organization, called parlors, were founded, although approximately 70 percent of them have disbanded or consolidated with neighboring parlors (Native Daughters of the Golden West 2017b). Grace Parlor No. 242 was founded in the City of Fullerton on June 2, 1927, and named for Past Grand President of the Native Daughters Grace S. Stoermer. It is still in existence (Native Daughters of the Golden West 2017a). The Brea Canyon Portola Monument was erected on the fifth anniversary of the parlor's founding, and was the first monument erected by the Native Daughters in Orange County. The monument was donated by Native Daughters Member Saddie Winn Brainard of Sacramento. The artist signed the sculpture with the initials R J T. However, the artist's name is not documented in the records of the Grace Parlor, and the artist has not been identified.

The monument commemorates an event that made significant contribution to the broad patterns of California's history, the Portola Expedition. However, as explained in the historic background section above, it is not clear that this monument stands in the location of an actual Portola campsite. Most scholars argue that the closest Portola Expedition campsite is most likely in Hillcrest Park in the City of Fullerton, approximately 4 miles southwest of the project area.

However, the Brea Canyon Portola Monument was erected during a period of intense interest in preserving the history of California, at a time when preservationists were fighting to save important places in California's past. The monument was erected as part of a state-wide effort of public and private groups, including the Native Daughters of the Golden West, to mark El Camino Real. At a time when automobiles made Californians increasingly mobile, these organizations sought to commemorate and romanticize California's past by marking historic spots (and in particular spots associated with California's Spanish past) in metal and stone and linking them by a road that was itself an attraction (Kropp 2008; Masters 2013). On June 1, 1932, just one day before the Brea Canyon Portola Monument was erected, the State of California designated California State Historical Landmark #2: Portola Journey's End, at the site of Portola's northernmost campsite in San Mateo County (Whittle 2016). The erection of the Brea Canyon Portola Monument was part of a statewide effort to preserve and commemorate California's past that appears to make it eligible for inclusion in the CRHR under Criterion 1.

The Brea Canyon Portola Monument also appears to be eligible for listing in the CRHR under Criterion 2. Monuments are generally not considered to be significantly associated with the people they commemorate. The Brea Canyon Portola Monument is not significantly tied to the man whose achievement it commemorates, Gaspar de Portola. However, the monument is closely tied to Carrie Earl McFadden Ford and Native Daughters of the Golden West Parlor No. 242. The Native Daughters of the Golden West are known throughout California for their placement of markers such as the Brea Canyon Portola Monument, which is one way they practice their founding principle of "Veneration of the Pioneers of California." They are an important movement for historic preservation locally to Orange County and more broadly to California. Installation of this particular monument was overseen by History and Landmarks Committee Chair Carrie Earl McFadden Ford, a noted local philanthropist and historian whose home in the City of Fullerton is Fullerton Local Landmark No. 85 (Richey 2011). Both as a Native Daughter and as a member of the Mojave Chapter of the Daughters of the American Revolution Ford played a role in commemorating important historical sites in Orange County. Before the Brea Canyon Portola Monument, for example, she was responsible for marking the Santa Ana Valley School (*Santa Ana Daily Register* 1930). Research has not revealed additional information about Member Saddie Winn Brainard, who paid for the monument or its plaque, the name of the artist, or information about any other significant members of the Native Daughters whose lives and careers were tied to the monument. However, the roles of the Native Daughters as a whole, Grace Parlor No. 242, and Carrie McFadden Ford in the 1930s statewide movement to commemorate California's past appears to make the monument eligible for inclusion in the CRHR under Criterion 2.

The monument itself has not yielded, nor is it likely to yield, information important to history or prehistory (Criterion 4). However, the site is located at a location where Native American and Spanish or Mexican period artifacts are rumored to have been found. Although this may not be the location of the Portola campsite of July 31 or of any other date, excavations at this location have the potential to yield information important to history and prehistory. At this time the resource does not appear to be eligible for inclusion in the CRHR under Criterion 4, but future excavations in the vicinity may change this assessment.

RECOMMENDATIONS

Historical Resources

There are four historic-in-age resources documented within or adjacent to the APE. These include Brea Boulevard, artist Sergio O'Cadiz's *Sunburst* sculpture, the Brea Canyon Portola Monument, and the Brea-Olinda Oil Field. With mitigation, the Project's impact to historical resources pursuant to §15064.5 would be reduced to a less than significant level.

Brea Boulevard
Brea Boulevard and its associated structures, including the abandoned weigh station, abandoned road segment, and abandoned bridge onto private property, were evaluated and found not eligible for listing in the CRHR. No further work is recommended.

Sunburst Sculpture
The *Sunburst* sculpture was evaluated and found eligible for listing in the CRHR under Criterion 3. Preservation of historical resources is always the preferred option under CEQA. The sculpture is on a slope within the corridor but is outside of the planned area of work (i.e., is outside the project limits). The sculpture, which is a little more than 25 feet from the edge of the existing sidewalk, would not be impacted by any construction activity, which would be restricted to the street-side of the sidewalk. Moreover, it will still be able to be appreciated in its existing context and therefore will not be indirectly impacted by work. The sculpture would be preserved-in-place. Project activities will not cause a substantial adverse change in the significance of this historical resource.

Brea Canyon Portola Monument
The Brea Canyon Portola Monument was evaluated and recommended eligible for inclusion in the CRHR. Moreover, the monument has been a focus of activity for the Native Daughters of the Golden West Grace Parlor No. 242, which visits the site at least annually as part of their Monument Search Scavenger Hunt. The monument is located within the project limits.

The Native Daughters of the Golden West Grace Parlor No. 242, who erected, maintain, and visit the monument, have indicated that, if it is necessary for the Project, they are open to seeing the monument moved to a new, nearby location. OC Public Works should move the monument to a nearby location in order to preserve its integrity of setting while still allowing cars to stop beside it. The new location of the monument should be decided upon by OC Public Works in consultation with the Native Daughters of the Golden West Grace Parlor No. 242. OC Public Works should retain qualified staff to safely package, store, and transfer the monument. The concrete monument is now nearly 90 years old and may be brittle; it must be properly protected against accidental breakage during this process. After the monument is moved, the new location should be documented on an appropriate DPR 523 update form and the form filed with the SCCIC. When the monument is moved, the Native Daughters of the Golden West Grace Parlor No. 242 have expressed interest in taking part in a rededication ceremony for the monument. The Parlor requests to be kept informed of the Project's progress.

With mitigation, the impact to the Brea Canyon Portola Monument would be reduced to a less than significant level.

Brea-Olinda Oil Field (30-177012)

The Brea-Olinda Oil Field has been documented and evaluated several times. One part of the field, Wildcatter's Park, was once considered eligible for listing in both the NRHP and the CRHR. However, that segment of the oil field has been destroyed and reevaluated; it is no longer considered eligible for inclusion in the NRHP or the CRHR.

A segment of the Brea-Olinda Oil Field was documented and evaluated for this Project, including portions of the oil field that were not previously documented. The segment of the oil field within the project area was evaluated and does not appear eligible for listing in the CRHR. No further work is recommended for this resource.

Paleontological Resources

No paleontological resources were identified within the project limits during the course of this background research and cultural resources field survey, and the Project will not directly or indirectly destroy a known unique paleontological resource or site or unique geologic feature. However, potentially significant buried paleontological resources may exist in the project area. Exposures of the fossiliferous Fernando and Puente Formations exist in the project area. Notably, the road straightening will require a roadside cut of up to 50 feet or more in height, which will require the removal of quantities of potentially fossiliferous rock.

Surficial deposits in the central part of the corridor are limited to younger Quaternary alluvium. Because of their age (less than 10,000 years old), these deposits are unlikely to contain fossils. However, at varying depths beneath the surface, these deposits may overlie older Quaternary alluvium. Older Quaternary alluvial deposits have been recorded to contain significant fossils. In addition, fossiliferous deposits of the Fernando Formation likely exist beneath the alluvium in the project area.

Because the potential to encounter significant paleontological resources exists for this Project, paleontological monitoring is recommended. In particular, paleontological monitoring is recommended for the hillside excavations and for any deep (i.e., 6 feet or greater) excavations along the stream channel. It is recommended that an Orange County Certified Paleontologist oversee monitoring and decide where and how monitoring will take place and describe microfossil sampling techniques. The paleontological monitor will have the authority to redirect construction equipment in the event potential paleontological resources are encountered. In the event paleontological resources are encountered, work within 50 feet of the discovery will immediately halt until appropriate treatment of the resource is determined by a qualified paleontologist in accordance with the provisions of CEQA Guidelines CCR Title 14, § 15064.5. Work may continue on other parts of the Project while consultation and treatment are conducted. Any paleontological materials recovered should be prepared for and curated at an approved facility. Monitoring and reporting should be conducted or overseen by an Orange County Certified Paleontologist. Fossils should be properly identified and processed for curation at an approved facility, such as the John D. Cooper Archaeological and Paleontological Center at California State University, Fullerton. If, in the course of monitoring, the Certified Paleontologist

determines that the deposits are disturbed or otherwise not sensitive for paleontological resources, monitoring may be reduced or suspended at the Certified Paleontologist's discretion.

In addition, it is recommended that construction personnel and supervisory staff be given training on possible paleontological resources that may be present in the area in order to establish an understanding of what to look for during ground-disturbing activities.

The recovery of any significant unanticipated paleontological finds by an Orange County Certified Paleontologist will reduce the impact of the Project to a less than significant level.

Archaeological Resources

The Project will not cause a substantial adverse change in the significance of any known archaeological resource pursuit to §15064.5.

However, although no archaeological resources were identified within the project limits during the course of this background research and cultural resources field survey, potentially eligible buried archaeological resources may exist. Archaeological deposits can be buried with no surface indications of their existence, particularly in developed areas or in areas of alluvial deposits. The degree of archaeological deposit below the modern surface remains unknown. In addition, subsequent land use is an essential factor in whether archaeological remains have been preserved below the modern surface.

Brea Canyon lies in an area of abundant water that may have made this area desirable for human settlement and use during both the prehistoric and historic periods. The project limits occur along the banks of Brea Creek in a place where it is geologically restricted in its movement. The project area is important for its water and for the access it provides between the San Gabriel and La Habra Valleys. Moreover, the area's tar deposits have drawn people to Brea Canyon from prehistoric times to today's oil workers. Although no archaeological sites have been formally recorded in the canyon, both Native American and Spanish or Mexican artifacts are rumored to have been found in the vicinity of the Brea Canyon Portola Monument, where a stand of pepper trees was planted which were already old in 1932.

Because the potential to encounter archaeological resources exists for this Project, archaeological monitoring is recommended during ground-disturbing activities in undisturbed younger quaternary alluvium. The archaeological monitor will have the authority to redirect construction equipment in the event potential archaeological resources are encountered. In the event archaeological resources are encountered, work in the vicinity of the discovery will halt until appropriate treatment of the resource is determined by an Orange County Certified Archaeologist and in accordance with the provisions of CEQA Guidelines CCR Title 14, § 15064.5. The Certified Archaeologist must have experience in prehistoric archaeology in Southern California. Any archaeological materials recovered should be prepared for and curated at an approved facility. If in the course of monitoring, the Orange County Certified Archaeologist determines that the sediment within the project area is disturbed, or work has extended in sediments that are otherwise not sensitive for cultural resources, then archaeological monitoring may be reduced or suspended at the discretion of the Certified Archaeologist.

In addition, it is recommended that construction personnel and supervisory staff be given training on possible archaeological resources that may be present in the area in order to establish an understanding of what to look for during ground-disturbing activities.

Data recovery of any unanticipated finds conducted under the direction of an Orange County Certified Archaeologist will reduce the impact of the Project to a less than significant level.

Tribal Cultural Resources

The Project will not cause a substantial adverse change in the significance of any known tribal cultural resource pursuit to §21074.

No resources of specifically California Native American origin were identified during the investigation, and no specific resources that could be designated tribal cultural resources were identified during the archival research, tribal contact, or field survey.

Of the four historic resources identified, one, the Brea-Olinda Oil Field, was previously found eligible through survey evaluation for the NRHP and CRHR, but has since been impacted in a way that negates its previous eligibility. Two resources recorded for this study, the Brea Canyon Portola Monument, and Sergio O'Cadiz's *Sunburst* sculpture, appear eligible for inclusion in the CRHR. However, these are both twentieth century creations, and therefore do not figure into the ethnographic and ethnohistoric literature related to the *Gabrielino*. In addition, no tribal representatives contacted during the tribal outreach efforts identified these resources as having cultural value for their tribes.

The NAHC was contacted and a Sacred Lands File search was requested for the Project. The results of the search were negative. The NAHC identified five *Gabrielino* tribal contacts who are culturally affiliated with the project area and who may have knowledge of and interest in the project area. An attempt was made to contact all five tribal representatives, and four of the representatives were spoken with and queried as to their concerns about the project. None of these tribal government representatives identified specific resources within the project area that might be designated tribal cultural resources. However, three tribal representatives indicated that the project area is sensitive for unknown tribal cultural resources. Those three representatives are Chairperson Andrew Salas, Gabrieleno Band of Mission Indians—Kizh Nation; Chairperson Anthony Morales, Gabrielino/Tongva San Gabriel Band of Mission Indians; and Chairperson Robert Dorame, Gabrielino Tongva Indians of California Tribal Council. The three representatives recommended tribal monitoring of ground-disturbing activities by a qualified tribal monitor. Each representative requests that the monitor come from within his own tribal body.

If unanticipated Native American cultural materials are encountered during Project-related ground disturbing activities in previously undisturbed soils or visually evident in imported soils, it is recommended that OC Public Works implement the following measures: All work should halt within a 50-foot radius of the discovery. OC Public Works should have an Orange County Certified Archaeologist with knowledge of Native American resources to assess the significance of the find. If the resources are Native American in origin, OC Public Works should coordinate

with the Tribe regarding evaluation, treatment, curation, and preservation of these resources. The archaeologist should have the authority to modify the no-work radius as appropriate, using professional judgment in consultation with OC Public Works. Work should not continue within the no-work radius until the archaeologist conducts sufficient research and evidence and data collection to establish that the resource is either: (1) not cultural in origin; or (2) not potentially eligible for listing on the CRHR. If a potentially eligible resource is encountered, then the archaeologist and OC Public Works, as lead agency, in consultation with the Tribe, will arrange for either: (1) avoidance of the resource, if possible; or (2) test excavations to evaluate eligibility, and if eligible, an attempt to resolve adverse effects to determine appropriate mitigation. The assessment of eligibility should be formally documented in writing as verification that the provisions in CEQA for managing unanticipated discoveries and PRC Section 5024 have been met. Ongoing consultation with the tribal representatives who have expressed interest in the Project should be maintained, and they should be consulted as to the treatment and final disposition of any resources of Native American origin that are encountered during Project activities.

Known and Unknown Burials

The Project is not anticipated to disturb any human remains, including those interred outside of formal cemeteries. Map research did not indicate the presence of any formal cemeteries within the project area. Neither archival research nor the archaeological survey identified cremains or burials within the project area. However, in the unlikely event that human remains are discovered, work in the immediate vicinity of the discovery shall be suspended and the Orange County Coroner contacted. If the remains are deemed Native American in origin, the Coroner will contact the NAHC and a Most Likely Descendant will be identified pursuant to PRC § 5097.98 and CEQA Guidelines § 15064.5. Work may be resumed at the landowner's discretion, with input from the MLD and Lead Agency, but will only resume after consultation and treatment have been concluded. Work may continue on other parts of the Project while consultation and treatment are conducted.

REFERENCES CITED

Arellano, Gustavo
2012 Sergio O'Cadiz: El Artist. *OC Weekly*. 4 October. Online: https://www.ocweekly.com/sergio-ocadiz-el-artist-6424237/. Accessed June 25, 2018.

Arrington, Cindy, and Nancy Sikes
2006 *Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project State of California.* OR-3373. 2 volumes. Document on file, SCCIC.

Art in Public Places Program
2013 *City of Brea Art in Public Places Policy Manual.* Online: http://www.ci.brea.ca.us/DocumentCenter/View/174/APPPolicyManual. Accessed May 30, 2018.

Ashkar, S., and L. Fryman
2000 DPR 523 forms for Air-Balance Pump Jack and Counterbalance Pump Jack within P-30-177012. Document on file, SCCIC.

Ashkar, S., and S. Lassell
2000 DPR 523 forms for Counterbalance Pump Jack within P-30-177012. Document on file, SCCIC.

Bean, Lowell John, and Florence C. Shipek
1978 Luiseno. Vol. 8, pp. 550–563 in *Handbook of North American Indians*. Edited by Robert F. Heizer. Washington, D.C.: Smithsonian Institution.

Bean, Lowell John, and Charles R. Smith
1978 Gabrielino. Vol. 8, pp. 538–549 in *Handbook of North American Indians*. Edited by Robert F. Heizer. Washington, D.C.: Smithsonian Institution.

Bell, Horace
1881 *Reminiscences of a Ranger or Early Times in Southern California.* Los Angeles: Yarnel, Caystile, and Mathes.

Bolton, Herbert Eugene, editor
1927 *Fray Juan Crespi: Missionary Explorer on the Pacific Coast, 1769-1774.* Berkeley, CA: University of California Press.

Briggs, Bertha A.
1953 Founding of the Order of Native Daughters of the Golden West. Online: http://www.ndgw.org/FoundingHistory.htm Accessed June 25, 2018.

Brown, Joan C.
1989 P-30-001625 DPR 523 forms. Documents on file, South Central Coastal Information Center.

California Office of Historic Preservation
1990 *Archeological Resource Management Reports (ARMR) Guidelines*. Department of Parks and Recreation, State of California, Sacramento.

California Department of Transportation (Caltrans)
2010 *Historic Bridge Inventory*. Online: http://www.dot.ca.gov/hq/structur/strmaint/historic.htm. Accessed June 25, 2018.

Caltrans—see California Department of Transportation

Carpenter, Virginia L.
1978 *Canada de la Brea: Ghost Rancho*. Santa Ana, California: Orange County Historical Society.

Cramer, Esther Ridgway
1992 *Brea: The City of Oil, Oranges, and Opportunity*. Brea, California: City of Brea.

Elliott, Bob
2017 Eaton's Crouse-Hinds Division Celebrates 120 Years of Success. Online: https://www.linkedin.com/pulse/eatons-crouse-hinds-division-celebrates-120-years-success-bob-elliott/. Accessed June 14, 2018.

Emmons, Steve
1995 A Guide to Outdoor Sculpture. *Los Angeles Times,* Orange County Edition. 5 April. Los Angeles, California.

Erlandson, Jon M.
1994 *Early Hunter-Gatherers of the California Coast.* Plenum Press, New York.

Ferguson, Brandon
2012 Mysteries of Brea Canyon: Portola Expedition. *OC Weekly* 5 March. Online: https://www.ocweekly.com/mysteries-of-brea-canyon-portola-expedition-6467373/. Accessed April 5, 2018.

Fitzgerald, Richard, and Michael Rondeau
2012 A Fluted Projectile Point from Crystal Cove State Park, Orange County, Alta California. *California Archaeology* 4(2): 247–256.

Fulton, Terri
2012 *Archaeological Survey Report for the State Route 57/Lambert Road Interchange Improvement Project, City of Brea, County of Orange, California.* Document on file, City Clerk's Office, City of Brea. Online: http://weblink.cityofbrea.net/WebLink/0/doc/72158/Page19.aspx. Accessed June 21, 2018.

Gumprecht, Blake
1999 *The Los Angeles River: Its Life, Death and Possible Rebirth.* John Hopkins University Press, Baltimore, MD.

Hunt, K., and S. O'Neil
2006 P-30-001625 DPR 523 forms. Documents on file, South Central Coastal Information Center.

InfoMine
2018 5 Year Copper Prices and Price Charts. Online: http://www.infomine.com/investment/metal-prices/copper/5-year/. Accessed May 30, 2018.

J.P. Ratigan, Inc.
n.d. Oilfield Equipment. Online: https://www.upcoglobal.com/images/brochures/Brochure-Ratigan-Web.pdf. Accessed June 14, 2018.

Johnston, Bernice Eastman
1962 *California's Gabrielino Indians.* Los Angeles: Southwest Museum.

Kline, George E., and Victoria L. Kline
2007 Fluted Point Recovered from San Diego County Excavation. *Proceedings of the Society for California Archaeology* 20:55–59.

Koerper, H.C., R.D. Mason, and M.L. Petersen.
2002 Complexity, Demography, and Change in Late Holocene Orange County. Pp. 63-81 in *Catalysts to Complexity: Late Holocene of the California Coast.* Edited by J. Erlandson and T.L. Jones. Los Angeles: Cotsen Institute of Archaeology, University of California, Los Angeles.

Kroeber, A. L.
1925 Handbook of Indians of California. *Bureau of American Ethnology Bulletin 78*, Smithsonian Institution, Washington D.C.

Kropp, Phoebe S.
2008 *California Vieja: Culture and Memory in a Modern American Place.* Berkeley: University of California Press.

Los Angeles Herald (LAH)
1910 Brea Canyon Gains in Oil. 10 January:9. Los Angeles, California.

"Major"
1865 Notes of a Tour Through the Southern Coast Counties of California. Number XI. *Daily Alta California* 2 September:1. San Francisco, California.

Masters, Nathan
2013 How El Camino Real, California's 'Royal Road,' Was Invented. KCET Lost LA: 4 January. Online: https://www.kcet.org/shows/lost-la/how-el-camino-real-californias-royal-road-was-invented Accessed July 17, 2018.

McCawley, William C.
1996 *The First Angelinos: The Gabrielino Indians of Los Angeles.* Malki Museum Press, Banning.

McLeod, Samuel A.
2017 Letter to AECOM re: Paleontological Resources of the Proposed Brea Canyon Road Widening Project in the City of Brea, Orange County, Project Area. October 6.

Meadows, Don C.
[1965] 2004 First European Contact with the Indians. Pp. 1-3 in *The Portola Expedition, 1769*. N.p.: Orange County Historical Society.

Meyer, L.
1981 *Los Angeles, 1781–1981*. A Special Bicentennial Issue of California History, Spring 1981. California Historical Society, Los Angeles.

Native Daughters of the Golden West
2017a Grace Parlor No. 242. Online: http://www.ndgw.org/242.htm Accessed June 15, 2018.

2017b Subordinate Parlors Instituted. Online: http://www.ndgw.org/FoundingHistory2.htm. Accessed June 15, 2018.

OC Parks
1989 *Orange County Centennial Historical Map.* N.p.: Orange County Historical Commission and Automobile Club of Southern California.

2014 *Orange County Quasquicentennial Historical Map.* N.p.: Orange County Historical Commission and Automobile Club of Southern California.

Pacifica Historical Society
n.d. Portola Expedition, July 30, 1769 Diaries. Online: https://pacificahistory.wikispaces.com/Portola+Expedition+July+30%2C+1769+Diaries Accessed June 25, 2018.

Pastorius Sculpture
2018a Milestones. Online: https://pastoriussculpture.com/biography/his-life-story/. Accessed May 30, 2018.

2018b *Selections*. Online: https://pastoriussculpture.com/works/selections/. Accessed May 30, 2018.

Ratzlaff, Angela
2016 Brea's 8-foot-tall Public Sculpture 'Selections' Stolen, Likely for its Copper. *Orange County Register*, 10 August. Online: https://www.ocregister.com/2016/08/10/breas-8-foot-tall-public-sculpture-selections-stolen-likely-for-its-copper/. Accessed May 30, 2018.

Reid, Hugo
1939 [1852] Letters on the Los Angeles County Indians. In *A Scotch Paisano in Old Los Angeles*, by Susanna Bryant Dakin, pp. 215–286. University of California Press.

Richey, Debora
2011 Carrie E. Ford: Fullerton Pioneer, Historian, and Philanthropist. *Fullerton Heritage* 17(2): 1, 3-6.

Robinson, W. W.
1948 *Land in California: The Story of Mission Lands, Ranchos, Squatters, Mining Claims, Railroad Grants, Land Scrip, Homesteads.* University of California Press, Berkeley, CA.

Rondeau, Michael F.
2008 Fluted Points of the Far West. *Proceedings of the Society for California Archaeology* 21:265–274.

Scott, Eric, and Kathleen Springer
2003 CEQA and Fossil Preservation in California. *The Environmental Monitor*. Fall: 4-10.

Smith, Helen C.
[1965] 2004 The Portola Camps Revisited. Pp. 4-9 in *The Portola Expedition, 1769*. N.p.: Orange County Historical Society.

Santa Ana Daily Register
1930 First Pupils Return to Old School House. 26 June: 2. Santa Ana, California.

Smithsonian Institution Research Information System
n.d. Sunburst (sculpture). Online: https://siris-artinventories.si.edu/ipac20/ipac.jsp?&profile=ariall&source=~!siartinventories&uri=full=3100001~!291812~!0#focus. Accessed June 12, 2018.

Steely, James W.
2007 California DPR 523 Forms, 30-177012. Document on file, South Central Coastal Information Center, California State University, Fullerton.

Wallace, William J.
1955 A Suggested Chronology for Southern California Coastal Archaeology. *Southwestern Journal of Anthropology* 11(3): 214–230.

Warren, Claude N.
1968 Cultural Traditions and Ecological Adaptation on the Southern California Coast. In *Archaic Prehistory in the Western United States*, edited by Cynthia Irwin-Williams. Eastern New Mexico University Contributions in Anthropology 1(3): 1–14.

Whittle, Syd, ed.
2016 Portola Journey's End. Historical Marker Database. Online: https://www.hmdb.org/marker.asp?marker=25054 Accessed July 17, 2018.

Wilkman, Nancy, and Jon Wilkman
2006 *Picturing Los Angeles.* Gibbs Smith Publishers, Salt Lake City.

APPENDIX A

RESUMES

Marc A. Beherec, PhD, RPA
Archaeologist

Education
PhD, Anthropology, University of California, San Diego, La Jolla, CA, 2011
MA, Anthropology, University of California, San Diego, La Jolla, CA, 2004
BA, Anthropology (Geology minor), University of Texas, Austin, Austin, TX, 2000

Professional Registration and Certifications
Register of Professional Archaeologists (RPA), Registrant 989598
Hazardous Waste Operations and Emergency Response (HAZWOPER) 40-hour trained
HAZWOPER Supervisor trained
Occupational Safety and Health Administration (OSHA) 30-hour Construction and General Industry trained

Professional Affiliations
Member, Society for American Archaeology
Member, Society for California Archaeology

Dr. Marc Beherec is an archaeologist who has been involved in the field of cultural resources management for nearly twenty years. He has worked throughout California and the Southwest on projects within Federal and State regulatory framework, and has written cultural resources assessments for several agency clients, satisfying the requirements of both the California Environmental Quality Act and Section 106 of the National Historic Preservation Act. He is experienced in the identification and analysis of both prehistoric and historic era artifacts. Dr. Beherec also has extensive experience in Paleoindian and Archaic period sites in the western US and has taken part in large-scale excavations in Jordan. He has served as Project Manager and Task Lead for projects in the Greater Los Angeles, Orange County, Kern County, and Owens Valley areas since 2012. He manages a team of full-time archaeologists and numerous project-specific part-time employees and subcontractors conducting work across the Greater Los Angeles area.

Selected Project Experience

Los Angeles Metropolitan Transportation Authority Compliance Monitoring
Project Archaeologist and Project Manager for the cultural resources compliance monitoring of multiple multi-year projects within the greater Los Angeles area, including the 8.5-mile Crenshaw rail transit corridor and associated stations and the 1.9-mile Regional Connector subway corridor and associated stations. Tasks involve instructing construction team in cultural resources compliance; the scheduling and coordination of multiple concurrent Native American and archaeological monitors on diverse construction efforts throughout the metropolitan area; testing and evaluating finds; compilation, QA/QC, and delivery of daily monitoring logs and other documentation for all on-site monitors; serving as a liaison between archaeological monitors, construction crew, and client project team; preparing weekly and monthly reports of activities and findings; and ensuring overall cultural resources compliance within the permitted conditions of the project.

Los Angeles Metropolitan Transportation Authority Zanja Discovery Program
Conducted archival research and assembled historical data to determine the location and construction history of the Los Angeles Zanja System; the city's first irrigation system. Included research within city archives and published records to determine the probable locations of underground portions of this miles-long

system, which is treated as an eligible resource for the National Register of Historic Places. Information was used to guide cultural resources compliance during construction of the Regional Connector subway corridor.

Los Angeles Department of Water and Power; City of Los Angeles Bureau of Engineering; Water Replenishment District of Southern California; Los Angeles Metropolitan Transportation Authority; County of Orange; City of Santa Ana; Port of Los Angeles
Cultural Resources Assessments
Los Angeles, Orange, and Inyo Counties, CA
Assessed sites for pumping stations, pipelines, and other infrastructure improvements in compliance with CEQA and CEQA Plus. Tasks included archival research including researching known sites at the South Central Coastal Information Center at California State University, Fullerton; conducting archaeological and built environment surveys; assessing finds for inclusion on the California Register of Historic Places; writing reports of findings.

Los Angeles World Airports
Cultural Resources Specialist
Archaeologist and monitoring coordinator on Qantas Hanger, Midfield Satellite, Gateway, and Baggage Handling construction projects. Tasks involve scheduling and coordination of archaeological/paleontological monitors and ensuring overall cultural resources compliance within the permitted conditions of the project.

Chevron

Midway-Sunset and Cymric-McKittrick Oil Fields Improvement Projects, Kern County, CA

Led pedestrian archaeological surveys in order to relocate and evaluate previously-recorded sites prior to developments in new and active oil fields in support of CEQA compliance.

Terra-Gen

Point Wind Project, Tehachapi and Mojave, Kern County, CA Led pedestrian survey to identify archaeological resources for a wind farm development project in support of CEQA compliance.

Southern California Edison
Cultural Resources Specialist
Archaeologist on multiple infrastructure projects. Completed cultural resources sensitivity reports, advised clients on monitoring requirements, and oversaw archaeological monitoring.

County of Los Angeles Department of Public Works
Topanga Underground Utilities District Archaeological Mitigation
Field director of archaeological mitigation at CA-LAN-8, a prehistoric site in the Santa Monica Mountains. Oversaw a team of 8 in hand-excavation and sieving of mechanically excavated soils. Tasks include coordinating archaeologists and Native American monitors; compilation and QA/QC of field documents; preparing reserving as a liason between the Most Likely Descendant and other Native American groups, construction crew, and client representatives; writing reports of findings.

NextEra Genesis Solar Energy Project Cultural Resources Compliance Monitoring, Riverside County, Texas
Lead Monitor for the cultural resources compliance monitoring of a 2000-acre solar power project under the jurisdiction of the California Energy Commission and Bureau of Land Management (BLM) on BLM land in the Colorado Desert of eastern Riverside County. Tasks involve the coordination of between 5 and 20 concurrent archaeological monitors on diverse construction efforts throughout the project site; compilation, QA/QC, and delivery of daily monitoring logs for all on-site monitors; attending project construction scheduling and Health and Safety meetings; conducting and documenting daily monitoring crew Health and Safety meetings; serving as liaison between archaeological monitors, construction crew and client project team; ensuring overall cultural resources compliance with the permitted conditions of the project.

San Bernardino National Forest San Jacinto District Contract Archaeologist, Idyllwild, CA
Archaeologist assigned to Idyllwild Ranger Station, San Jacinto District, San Bernardino National Forest, Riverside County, California. Over the course of one year, assisted District Archaeologist in cultural resources efforts, including supervision of crews conducting cultural resources inventories of mountainous terrain, GPS documentation of resources, preparation of DPR 523 forms, research of prehistoric and historic artifact parallels, including projectile point typologies, makers' marks, and tin can typologies, and authoring technical reports. Work was performed before joining this firm.

Border Field State Park, San Diego County, CA
Excavated coastal Early Archaic sites in and adjacent to Border Field State Park in conjunction with the construction of the Mexico-United States Border Barrier. Work was performed before joining this firm.

East Texas Pipeline Survey, Rural East Texas
Crew Chief for intensive pedestrian survey of a new east Texas pipeline corridor. Efforts included field survey, shovel testing, site recordation, and GPS operation. Work was performed before joining this firm.

Gault Site Archaeological Project, Bell County, TX
Excavated at the Gault Paleoindian site (41BL323), completed documents, conducted preliminary lithic analysis, measured lithic blades for statistical studies, and supervised student volunteers in washing lithics. Work was performed before joining this firm.

Jennifer Redmond, RPA

Archaeologist-Precontact and Historical

Education
MA, Cultural Resources Management, Sonoma State University, 2009
BA, Anthropology, and Earth and Planetary Science, University of California, Berkeley, 2003

Years of Experience
With AECOM: 6
With Other Firms: 9

Training and Certifications
Certified AECOM Project Manager
40-Hour HAZWOPER certified
Wilderness First Aid, 2020
How to Make a Project Budget for CRM Professionals (ACRA), 2017
Successful CEQA Compliance Seminar (University of California, Davis Extension), 2016
CEQA: Cultural Resources Management webinar (ACRA), 2016
California Historical Resources Information System (CHRIS) internship (Sonoma State University), 2006
Archaeological field school (University of California, Berkeley), 2001

Professional Affiliations
Society for California Archaeology (SCA)
Society for Historical Archaeology (SHA)

Licenses/Registrations
Registered Professional Archaeologist, #989151

Summary

Ms. Redmond has 15 years of experience in cultural resources management and archaeology throughout California and the Midwest. Her experience includes archival research; field survey, monitoring, excavation, and data collection; archaeological resource evaluation; and project management. Jennifer has worked on various federal, state, and local projects including urban land development, transportation, and disaster recovery projects to determine impacts and effects under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Section 106 of the National Historic Preservation Act (NHPA) and routinely assists agencies with Tribal consultation. Jennifer meets the Secretary of the Interior's standards for archaeology and history and is currently 40 Hour HAZWOPER certified.

Project Experience

Southern California Gas Company, PSEP Services 2020-2025 - Line 2000 Chino Hills State Park Hydrotest, Orange, Riverside, and San Bernardino counties, CA. Lead archaeologist during implementation of gas line hydrotest project in State Park. Coordinated archaeological and Tribal monitors; conducted archaeological monitoring; coordinated artifact repatriation among client, State Parks, and Tribe; and prepared draft monitoring report and update to DPRs [2021-present].

Southern California Edison, Riverside Transmission Reliability Project, Riverside County, CA. Prepared Cultural Resources Monitoring and Treatment Plan pursuant to mitigation measures in project EIR and Supplemental EIR [2021-present].

San Francisco Public Utilities Commission (SFPUC), Mountain Tunnel Improvements Project, Tuolumne County, CA. Conducted pedestrian survey to identify archaeological resources along the Mountain Tunnel in advance of improvements to the Hetch Hetchy system in the Stanislaus National Forest (SNF). Recorded five newly-identified historic period archaeological resources and updated seven previously identified historic period and precontact resources, prepared DPR forms and sketch maps in ArcGIS, and contributed to technical report on findings. Conducted construction monitoring during implementation of project [2018-present].

Federal Emergency Management Agency (FEMA) Woolsey and Hill Fires Private Property Debris Removal Program, Los Angeles and Ventura Counties, CA. Lead field archaeologist for Section 106 compliance for debris removal efforts for the Woolsey and Hill fires (FEMA-4407-DR-CA). Prepared archaeological monitoring plan and implemented plan during several months of debris removal activities. Reviewed state-prepared Incident Action Plans to identify monitoring locations and assigned monitors to work sites. Used ArcGIS to determine whether resources were in parcels included in the projects. Coordinated extensively with Tribes to complete archaeological surveys and monitoring during project implementation. Prepared cultural resources findings report and California Department of Parks and Recreation 523 Series (DPR) forms and sketch maps for sites including habitation sites, lithic deposits, and ranching resources for submittal to the State Historic Preservation Officer (SHPO) [2020-2021].

Pacific Gas and Electric Company (PG&E) System Hardening Program, Various Counties, CA. Conducted desktop archaeological reviews for pole replacement projects across PG&E service territory. Reviews consisted of conducting archival research and records searches using PG&E's internal ArcGIS-based interface and assessing environmental factors to determine archaeological sensitivity and the need for archaeological surveys, monitoring, and/or mitigation measures. Reviews were conducted entirely remotely and interactions with PG&E staff occurred on Salesforce [2020-2021].

PG&E, Whitaker Forest Microgrid Pilot Program, Tulare County, CA. Conducted pedestrian survey and photo-documentation of built environment resources in advance

of a proposed infrastructure project in UC Berkeley-owned land adjacent to Kings Canyon National Park and Sequoia National Forest. Prepared results memorandum, including recommendations for alternatives for infrastructure siting and potential mitigation measures for future CEQA compliance [2020-2021].

FEMA, Sepulveda Adobe Debris Removal Project, Malibu Creek State Park, California Department of Parks and Recreation, Los Angeles County, CA. Served as lead archaeologist for Section 106 compliance for a disaster recovery project in Los Angeles County that was partially funded by FEMA. Assisted FEMA with consultation with federally-recognized Tribes, conducted historical research, and prepared the reporting of findings and SHPO consultation letter [2020].

FEMA, Lakeland Village Master Drainage Plan Line H Flood Hazard Reduction Project, Pre-Disaster Mitigation Program, Lakeland Village, Riverside County, CA. Lead archaeologist for Section 106 compliance for an infrastructure project in Lakeland Village, Riverside County, that was partially funded by FEMA. Conducted a records search at the information center, assisted FEMA with consultation with federally-recognized Tribes, and directed the pedestrian survey of the APE. Assisted with geoarchaeological testing of APE and preparation of report of findings and SHPO consultation letter [2018-2019].

FEMA, Flood Repairs at Kern River Valley Cemetery, Kern River Valley Cemetery District, Kern County, CA. Lead archaeologist for Section 106 compliance for a disaster recovery project in Kern County that was partially funded by FEMA. Assisted FEMA with records search, conducted the pedestrian survey of the APE, and prepared the reporting of findings [2018].

FEMA, Whitehall Lane Culvert Repair Project, Napa County, CA. Lead archaeologist for Section 106 compliance activities for a bridge repair project following the 2014 Napa Earthquake. Assisted FEMA with consultation with Yocha Dehe Wintun Nation (YDWN) and conducted archaeological surveys, testing, and monitoring in coordination with YDWN. Prepared technical memoranda of findings and drafted SHPO consultation letters. Prepared Archaeological Treatment Plan to address adverse effects to historic properties [2016-2020].

Sacramento Municipal Utility District, Solano County Municipal Utility District Phase 4 Wind Project, Montezuma Hills, Solano County, CA. Conducted pedestrian survey to identify archaeological resources for an energy development project. Recorded two historic period cultural resources, and prepared DPR forms and summary of findings in support of CEQA compliance [2018].

SFPUC, Cherry Dam Outlet Valve Replacement Project, Tuolumne County, CA. Field director for three-day pedestrian survey to identify archaeological resources exposed on the lakebed during repair work at Cherry Dam. Recorded four historic period archaeological resources and one precontact isolate, and prepared DPR forms and a technical report [2017].

SFPUC, Mountain Tunnel Access and Adits Improvements Project, Tuolumne County, CA. Assisted with Extended Phase I excavation at a multicomponent resource located in a critical service road for Hetch Hetchy Water and Power in the SNF. Responsible for documentation of findings, dry processing of material from excavation, artifact identification, and preliminary analysis [2017].

California College of the Arts, Hooper Street Project, San Francisco County, CA. Lead archaeologist and project manager for campus housing development project. Prepared Archaeological Testing Plan and budgets and proposals for multiple phases of work following identification of significant deeply buried precontact archaeological site in project area. Managed subcontracts, oversaw data recovery efforts and laboratory studies, and initiated preparation of final technical report [2019-present].

FEMA, PA Program for the 2015 California Fires, Calaveras and Lake Counties, CA. Lead archaeologist for Section 106 compliance activities undertaken as part of disaster-recovery efforts for the Valley and Butte fires (FEMA-4240-DR-CA), including large scale tree removal efforts. Coordinated with FEMA to complete all aspects of documentation required for consultation with the SHPO. Coordinated extensively with Tribes to complete surveys and monitoring. Used ArcGIS to determine whether resources were in parcels included in the projects. Prepared consultation letters, archaeological treatment plans, cultural resources findings reports, DPR forms, and sketch maps for dozens of sites including lithic deposits, road alignments, and mining resources for submittal to the SHPO. [2015-2017]

FEMA, PA Program for the South Napa Earthquake, Napa and Solano Counties, CA. Archaeologist/Historic Preservation Specialist. Lead archaeologist beginning in late 2015 for Section 106 compliance activities undertaken as part of the disaster-relief efforts from the Napa earthquake. Projects included culvert replacement and hospital repair. Coordinated with FEMA to complete all aspects of documentation required for consultation with the SHPO. Prepared consultation letters and coordinated with Tribes to complete surveys and monitoring. Prepared consultation letters and cultural resources findings reports for submittal to the SHPO [2015-2017]

Sacramento Regional Transit, Watt/I-80 Transit Project, Sacramento, Sacramento County, CA. Lead archaeologist for CEQA and Section 106 compliance for a transportation project in Sacramento County. Conducted background research and records search; contacted the

California Native American Heritage Commission (NAHC) and drafted letters to identified Tribes pursuant to AB 52 and Section 106; assisted with consultation among the state and federal agencies and interested parties; and prepared the Section 106 memorandum, State Historic Preservation Officer (SHPO) consultation letter, and Cultural Resources Monitoring and Discovery Plan [2020-2021].

Contra Costa County Public Works Department, Morgan Territory Road Slide Repair Project, Contra Costa County, CA. Conducted historical and archaeological research and completed a pedestrian survey in support of CEQA compliance for a road repair project. Prepared a technical report and DPR forms documenting and evaluating historic-period roads within the project site [2017].

Alpaugh Community Services District, Alpaugh Water System Arsenic Treatment Project, Alpaugh, Tulare County, CA. Conducted pedestrian archaeological survey and results memorandum for an infrastructure project in compliance with a CEQA mitigation measure. Prepared archaeological monitoring plan, conducted archaeological monitoring, and coordinated monitors with project managers [2019].

Paradise Irrigation District (PID), Spoils Disposal Project, Butte County, CA. Conducted archaeological survey on PID lands adjacent to the Plumas National Forest in advance of proposed water system improvements. Collected data using Trimble GPS, and completed survey notes, photograph log, and memorandum of findings [2016].

Christy Dolan, MA, RPA
Historical Archaeologist

Education
MA, Anthropology, Concentration Historical Archaeology, College of William and Mary, 1994
BA, History and Anthropology, University of New Hampshire, 1985
Museum Studies Certificate Program, Harvard University 1992

Professional Registration
Register of Professional Archaeologists (RPA)

Affiliations
Member, Society for Historical Archaeology
Member, Society for California Archaeology

Training
FEMA:
- E253 Coordinating Environmental and Historic Preservation Compliance

National Preservation Institute:
- Section 106: A Review for Experienced Practitioners
- Identification and Evaluation of Mid-20th-Century Resources

Ms. Dolan has over 25 years of experience in the study of cultural resources. She meets the Secretary of Interior's qualifications (36 CFR Part 61) in archaeology and history. She has conducted or overseen document research; surveys; and excavations of 18th through 20th century resources in California, Arizona, Washington, Nevada, Colorado, Missouri, Virginia, Washington, DC, and throughout New England. Ms. Dolan has authored documents that represent the results of historic studies, surveys, inventories, evaluations, and preservation plans. Her work with a variety of clients has broadened her knowledge of procedures for NEPA, NHPA, and CEQA.

Project Experience

Los Angeles Department of Water and Power On-Call, Los Angeles, CA. Multiple on-call projects including National Register nomination updates, assessment of historical structures, archaeological surveys and reports.

Los Angeles County Metropolitan Transportation Authority, Metro Transportation On-Call Environmental Compliance Services, Los Angeles, California. On-call senior QA/QC cultural and historical resources on multi-year construction project. Work includes architectural studies, mitigation and monitoring plans, archaeological monitoring, as well as SHPO, Federal Transit Authority (FTA), and Native American consultation.

County of Los Angeles Arroyo Seco Bike Path Historic Property Survey Report, Los Angeles, CA
As Historic Resource Specialist, conducted an architectural survey and archival research of the stone-mortared and concrete-lined Arroyo Seco Flood Control Channel and associated bridges. Identified character-defining features of the channel and prepared a Historic Architectural Survey Report and portions of the Historic Property Survey Report.

County of Los Angeles Arroyo Seco Bike Path Finding of Effects Documentation, Los Angeles, CA
As Historic Resource Specialist, oversaw preparation of the historic resources portion of a Finding of Effects for a proposed bike path in the Arroyo Seco Flood Control Channel. Used character-defining features identified during the preparation of a Historic Architectural Survey Report to help determine the effects.

Air Force Materiel Command Los Angeles Air Force Base Contextual Study, Los Angeles, CA
As Historian, conducted historic research at the Los Angeles Air Force Base, a Space and Missiles System Center. The information was used to create a contextual study for the base.

City of Los Angeles, Bureau of Engineering Public Safety Facilities Master Plan, Historical Assessment, Los Angeles, CA
As Project Manager, oversaw historical assessment of 1950s building that serves as the Los Angeles Police headquarters. Also assessed associated landscaping. The landscaping and building were designed by architect Welton Beckett. Prepared the technical report, which evaluated the resources and assesses impacts.

Los Angeles County Courthouse EIR, Los Angeles, CA
As Historian, conducted archaeological and architectural survey of four city blocks. Conducted in-depth historic research for each of the blocks and recorded and assessed several buildings. Prepared technical reports and EIR sections with findings.

Chapman University Cultural Resource Survey, Orange, CA
As Historical Archaeologist, performed an inventory of 25 properties within the historic urban core of Orange. Conducted historical research and architectural assessments for each property within the project area. Also assessed potential for the presence of subsurface cultural resources through review of Sanborn fire insurance maps.

City of West Hollywood Pacific Design Center Cultural Resource Survey, West Hollywood, CA
As Historical Archaeologist, conducted historic research and prepared document assessing the potential for the presence of archaeological resources. Reviewed Sanborn fire insurance maps, early photographs, and historical accounts to determine the archaeological sensitivity for the property.

NAVFAC Southwest Cultural Resource Phase I Inventory Report for Small Arms, Demolition Ranges, and Training Areas on San Clemente Island, Los Angeles County, CA
As Historical Archaeologist, inventoried historic resources on San Clemente Island including World War II-era military sites, Chinese abalone camps, and sites relating to the early ranching period on the island.

Chapman University California Cordage Company Historic American Buildings Survey (HABS), Orange, CA
As Project Manager for Historical Resources, oversaw the HABS documentation of an old industrial complex in Orange, California. This included extensive historic research, oral histories, large format photo-documentation, and documentation of the architectural features of the building. The end result was a comprehensive historic context, architectural description, and photographic depictions of the resource.

City of Palm Springs Indian Canyon Drive and Bridge Widening, Palm Springs, CA
As Historian, conducted National Register eligibility study for several historic buildings and structures under Caltrans guidelines. Prepared HRER with the findings.

Harper Lake Specific Plan; Cultural Resources Constraints Report, San Bernardino County, CA
As Historical Archaeologist, conducted site visit and prepared report identifying archaeological sites and constraints for a proposed 3,300-acre Specific Plan area near Barstow, California.

Manchester Avenue/Interstate 5 Interchange Historic Properties Survey, San Diego, CA. In support of an EIR/EIS, prepared assessment of historic structures for the California Department of Transportation (Caltrans) and Federal Highway Adminstration (FHWA). Project passed through multiple cities and hundreds of buildings that touched the project with their property line were examined to determine age and if needed, historical significance.

Southern Nevada Supplemental Airport EIS, Las Vegas ad Primm, NV. Manager for large alternatives study for a proposed supplemental airport for Las Vegas. Oversaw archaeological and architectural reconnaissance surveys, , including archaeological survey of 17,000 acres, architectural survey for the Las Vegas expansion alternative, and investigation in several urban areas for noise and vibration impacts to historic structures. EIS was lead by Joint Lead Agencies of the Bureau of Land Management (BLM) and Federal Aviation Administration (FAA) and included SHPO and Native American consultation, public meetings, and consultation with other interested parties.

Amy Grace Burgess St George, GISP, AICP

Planner / GIS Specialist III / Data Manager

Areas of Expertise

Geographic Information Systems (GIS)
Data Management
Site & Route Selection
Community Planning

Years of Experience

With AECOM (URS): 10 Year
With Other Firms: 2 Years
Within Private Industry: 12 Years
URS became a member of the AECOM family of companies in October 2014

Education

M.S., Community Planning/ Environmental Planning and GIS Concentration (2010)/ University of Cincinnati College of Design, Architecture, Art, and Planning, Cincinnati, Ohio
B.S., Biology (2005)/Denison University, Granville, Ohio

Specialized Training/ Certification

2022: American Institute of Certified Planners (AICP)
2019: Geographic Information Systems Professional (GISP)
2010: Geographic Information Systems Certification, University of Cincinnati

Ms. Burgess is a Planner specializing in GIS Applications in the AECOM Orange, CA. She is competent in the application of these software packages:

- ArcGIS Desktop (up to v10.8)
- ArcGIS Pro (up to v3.0)
- ArcGIS Online and Portal for ArcGIS
- ArcGIS extensions
  - Spatial Analyst
  - 3D Analyst
  - Model Builder
  - CommunityViz
- Microsoft Office Products (Excel, Access, Word, Powerpoint)
- GPS Pathfinder 3.1, 5.0, 5.4
- TerraSync
- Trimble GeoXT, Trimble GeoXH
- ArcGIS Collector

Pipeline Projects

Williams Transco, Atlantic Sunrise Project (2014-2017): GIS project lead for this 192-mile pipeline project in Pennsylvania. Used GIS to create modeling for archaeological site form data collection and used Microsoft Word Mail Merge to integrate site form data into Pennsylvania Site Forms. Developed models to monitor weekly survey progress for all spatial project elements. Created, processed, and managed GIS/GPS data. Provided survey result analysis for reporting. Prepared mapping for cultural resource field surveys, State Historic Preservation Office (SHPO) reporting, and Federal Energy Regulation Commission (FERC) reporting. Utilized Spatial Analyst for ArcGIS 10.2 to model artifact densities collected during Phase I archaeological survey for Phase II survey preparation. Provided mapping of Phase II total station survey results.

Electric Utility Projects

FirstEnergy, *Energizing the Future* Project (2014 – 2016): Ms. Burgess was the GIS project lead for ecology, engineering, and cultural resources groups for 26 transmission lines totaling over 400-miles. Her role included coordinating with the contractor Burns and McDonnell to update field collected Wetland and Cultural Resource GIS data for use in their OneTouch Viewer. Ms. Burgess directed work efforts of six co-workers in tasks related to the project, including mapping preparation for ecology, engineering, and cultural resources. Typical mapping prepared for the project included Access Maps, Wetland Delineation Figures, Storm Water Protection Plan (SWPP) Maps, Ohio Department of Transportation (ODOT) permit Maps, Haul Route Maps, and Cultural Resource Literature Review maps. Ms. Burgess also aided ecologists in the qualitative review of wetland delineation forms and GPS data and determined the best locations for access roads, crossings, and other construction features in GIS for use during construction.

Ecological and Natural Resource Projects

Haster Basin Recreation Field Project Habitat Mitigation and Monitoring Plan (2016-2018): Assisted with vegetation monitoring surveys consisting of assessing vegetation present along twelve 20-meter transects over a 5-year period. Analyzed collected vegetation data to determine progress and success of

the restoration site. Prepared and managed GIS & GPS data utilizing Portal for ArcGIS and ArcGIS Collector for field mapping and data collection. Developed final report figures using ArcGIS.

Mason Regional Park, Orange County Public Works (2016-2017): Assisted with vegetation monitoring surveys consisting of assessing vegetation present along twelve 20-meter transects over a 5-year period. Analyzed collected vegetation data to determine progress and success of the restoration sites. Prepared and managed GIS & GPS data utilizing Portal for ArcGIS and ArcGIS Collector for field mapping and data collection. Developed final report figures using ArcGIS.

Galavin Retarding Basin Project (2017): Assisted with vegetation monitoring surveys consisting of assessing vegetation present along twelve 20-meter. Analyzed collected vegetation data to determine progress and success of the restoration site. Prepared and managed GIS & GPS data utilizing Portal for ArcGIS and ArcGIS Collector for field mapping and data collection. Developed final report figures using ArcGIS.

Upper Newport Bay Mitigation Basin (2017): Prepared and managed GIS & GPS data utilizing Portal for ArcGIS and ArcGIS Collector for field mapping and data collection. Developed final report figures using ArcGIS including vegetation, nesting bird survey, and hydrological maps.

TerraGen, Point Wind Project (2018): Prepared and managed GIS & GPS data utilizing Portal for ArcGIS and ArcGIS Collector for field mapping and data collection. Reviewed and mapped California Natural Diversity Database, habitat, rare plants, and State Historic Preservation Office for reporting.

Georemediation Projects

Tesoro Groundwater Monitoring (2016-2018): Utilized GIS to develop quarterly, semiannual, and annual report figure updates of ground monitoring well chemical concentrations at 12 Tesoro owned sites throughout Southern California. Figure creation included table joins of concentration data for Benzene, Toluene, Ethylbenzene, Total Xylene, MTBE, TBA, and TPH. Developed advanced labeling methods to quickly turn around map updates to the client.

Torrance Refinery Groundwater Monitoring (2016-2018): Utilized GIS to develop quarterly, semiannual, and annual report figure updates of ground monitoring well chemical concentrations at three Torrance owned sites throughout Southern California. Figure creation included table joins of concentration data for Benzene, Toluene, Ethylbenzene, Total Xylene, MTBE, TBA, and TPH. Developed advanced labeling methods to quickly turn around map updates to the client.

Publications/ Presentations

Burgess, Amy. “Promoting Domestic Water Conservation through the Utilization of a Scenario-Based Planning Support System.” Master's thesis, University of Cincinnati, 2010. Electronic Thesis or Dissertation. University of Cincinnati, 2010. *OhioLINK Electronic Theses and Dissertations Center*. 16 Jul 2013.

Wang, Xinhao, Amy Burgess, Jeff H. Yang, Heng Wei. (2011). *Assessing Domestic Water Consumption Spatial Distribution in an Urban Setting.* Presented to the 2011 American Institute of Chemical Engineers (AIChE) Conference, Minneapolis, Minnesota, October 18th, 2011.

Wang, Xinhao, Amy Burgess and Jeff Yang. "A scenario-based water conservation planning support system (SB-WCPSS)." *Stochastic Environmental Research and Risk Assessment.* March 2013, V. 27, Issue 3 pp. 629-641.

Alec Stevenson, RPA

Archaeologist / GIS Specialist

Education
MA, Public Archaeology, California State University, Northridge, 2017
BA, Anthropology, University of California, Santa Cruz, 2008

Years of Experience
With AECOM: 10
With Other Firms: 3

Training and Certifications
40-Hour HAZWOPER certified, 2022
Driver Safety, 2018
Defensive Driving Equivalent, 2018
CPR, 2019
First Aid, 2019
Archaeological field school, Pambamarca Ecuador (University of California, Los Angeles), 2009

Professional Affiliations
Society for American Archaeology (SAA)
Society for California Archaeology (SCA)

Licenses/Registrations
Registered Professional Archaeologist, #17345

Summary

Alec Stevenson has 13 years of experience in cultural resources management conducting all types and phases of archaeological work throughout southern California. This includes archival research, resource evaluation, reporting, consultation, and fieldwork, such as survey, monitoring, and excavation. He has worked on a variety of federal, state, and local projects as a technical lead. This includes buildings & places, energy, oil & gas, water, and transportation; to satisfy CEQA, NEPA, and Section 106 of the NHPA. Mr. Stevenson meets the Secretary of the Interior's standards for archaeology and is a Registered Professional Archaeologist. In addition to this, Mr. Stevenson has 10 years of concurrent GIS experience. This includes mapping, data analysis, GPS field equipment setup, data collection, and hardware/software technical assistance. He has served as the head GIS specialist and data manager on multiple large GIS projects including environment, energy, oil and gas, utility, and transportation. Mr. Stevenson has managed this data in a variety of housing protocols including ArcGIS Online and ArcGIS Portal in tandem with File Geodatabase formats, Earthsoft EQuIS, and Microsoft Access. This includes real-time data operation and management support.

Project Experience

CSULB Peterson Hall I Replacement, Kern County, CA. Lead archaeologist for the California State University, Long Beach Peterson Hall I Replacement Project. Responsibilities and tasks included AB-52 consultation advice to the agency, an archaeological survey, collecting and managing GIS data within an online cloud portal database system, and writing a memorandum and the associated MND chapter [2022].

Pipeline Safety Enhancement Plan Supply Line 2000 Chino Hills State Park, Kern County, CA. Lead GIS specialist for the Southern California Gas Company project. Responsibilities and tasks included maintaining a functioning GIS database through internal and cloud servers for mapping, field collection, and analysis purposes. Multiple collection data dictionaries were created to maintain effective quality controlled field data. Analysis included land value extrapolation with fragmented biological resources data [2021].

North Weedpatch Consolidation Project, Kern County, CA. Lead archaeologist for the North Weedpatch Consolidation Project. Responsibilities and tasks included an archaeological survey, collecting and managing GIS data within an online cloud portal database system, Native American consultation, and writing a Phase I Cultural Resources Technical Report. Due to state water special funds the project was conducted under CEQA Plus and NEPA, requiring it to meet both parameters [2020-2021]..

Oasis Wind Energy Project, Kern County, CA. Lead archaeologist for the Oasis Wind Energy Project. Responsibilities and tasks included an archaeological survey, collecting and managing GIS data within an online cloud portal database system, and writing a Phase I Cultural Resources Technical Report. Additional tasks included evaluating previously recorded cultural resources and making recommendations for avoidance measures of newly discovered and previously recorded cultural resources [2020].

High Desert Water Bank Project, Kern County, CA. Lead archaeologist for the High Desert Water Bank Project. Mr. Stevenson was responsible for a large multi-crew and survey. This included coordinating field staff, coordinating safety procedures, setting up and maintaining GIS databases (including cloud real time procurement databases), evaluating cultural resources, report writing, and making management recommendations for both archaeological and tribal cultural resources. Due to state water special funds the project was conducted under CEQA Plus and NEPA [2017-2018].

Vandenburg AFB Spacecom, Santa Barbara County, CA. Built environment resources survey and evaluation, GIS data analysis, and records search study for the Vandenburg Air Force Base Spacecom project. Specific tasks consisted of an archaeological survey as well as a historic resources buildings survey followed by GIS analysis of the gathered information on the survey. In addition to this, Mr. Stevenson conducted a records search at the Air Force base to ascertain the details of historic buildings within the area of potential effects [2021].

Gaviota Terminal Decommissioning Project, Santa Barbara County, CA. Archaeological monitor, data manager, and report writer for this Gaviota Terminal Decommissioning Project. Specific tasks consisted of archaeological monitoring, managing artifacts and data associated with monitoring, maintaining GIS and Microsoft Access database systems, and writing the Gaviota Terminal Decommissioning Archaeological Monitoring Report. In addition, Mr. Stevenson made recommendations to the lead agency alongside Native American monitors to maintain and avoid designated environmentally sensitive areas [2017-2021].

Archaeological and Paleontological Phase I Analysis for the Mojave Public Utilities District Well 30 Blending Project, Kern County, CA. Lead archaeologist for the Mojave Public Utilities District Well 30 Project. Specific tasks consisted of a Phase I archaeological survey, archaeological records search at the Information Center, as well as writing a Phase I Cultural Resources Report with CEQA recommendations alongside oversight. In addition, Mr. Stevenson performed paleontological surveys and created all GIS databases and files related to the project including survey databases, GPS setup, as well as maps [2018].

City of Los Angeles Department of Public Works, Bureau of Engineering Homeless Services Center, Los Angeles County, CA. Lead archaeologist of multiple projects for the City of Los Angeles Department of Public Works, Bureau of Engineering for the construction of various homeless services centers throughout the city. For these projects, Mr. Stevenson is tasked with writing Phase I cultural resources reports to identify potential impacts to the project under CEQA. This included a records search, survey, and a write-up of a Phase I Cultural Resources Technical report detailing mitigation measures for ground disturbance related to project activities [2017-2019].

Antelope Valley East Kern River Project, Kern County, CA. Lead archaeologist for the Antelope Valley East Kern River Project. Specific tasks consisted of managing an archaeological survey, archaeological records search at the Information Center, as well as writing a Phase I Cultural Resources Report with CEQA recommendations alongside oversight. In addition to this, Mr. Stevenson created all GIS databases and files related to the project including survey databases, GPS setup, as well as maps [2017].

P66 Hopkins Pipeline L352x4 Abandonment Project, Santa Barbara County, CA. Lead archaeologist for the P66 Hopkins Pipeline L352x4 Abandonment Project. Specific tasks consisted of a Phase I archaeological survey, archaeological records search at the Information Center, as well as writing a Phase I Cultural Resources Report with CEQA recommendations alongside oversight. Mr. Stevenson created all GIS databases and files related to the project including survey databases, GPS setup, as well as maps [2016].

Topanga Underground Utilities Project, Los Angeles, CA. Laboratory and field lead for different aspects of the Topanga Underground Utilities Project within the California Department of Transportation right of way. Specific tasks consisted of archaeological monitoring, excavating, and managing lab data in both GIS and Microsoft Access. This included creating and maintaining database structures specific to this project as well as cataloging artifacts. Mr. Stevenson managed staff during a one-year lab work process [2016-2022].

City of Los Angeles Department of Public Works, Bureau of Engineering for Road Restoration, Los Angeles County, CA. Lead archaeologist for the City of Los Angeles Department of Public Works, Bureau of Engineering for road restoration project. Mr. Stevenson was tasked with a cultural resources assessment to identify potential impacts to the project. This included a records search, survey, and a write-up of a Cultural Resources Technical Assessment report detailing mitigation measures for multiple different restoration possibilities [2015].

North Sky River Wind Energy Project, Kern County, CA. Managed GIS and archaeology data for the North Sky River Wind Energy Project, near the city of Tehachapi in Kern County. This included import and export of GIS and archaeology data taken from GPS units, managing and maintaining that data, making maps, and addressing cultural spatial questions for the client in order to streamline construction while maintaining site integrity. GPS data management involved managing Trimble devices and post-processing collected data using Arcpad and GPS Correct [2014-2016].

APPENDIX B

NATIVE AMERICAN CONTACT PROGRAM

AECOM Inc
300 South Grand Avenue, 8th Floor, Los Angeles, CA 90071
T 213.593.7700 www.AECOM.com

September 25, 2017

Native American Heritage Commission
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691

Subject: Brea Canyon Road Widening Project, Orange County, Sacred Lands File Search Request

Dear Commissioners:

This letter is to request a Sacred Lands File check for the planned County of Orange Brea Canyon Road Widening Project. AECOM is contracted to prepare a cultural resources impact study for the proposed project.

The proposed project is located within the City of Brea and unincorporated Orange County. The project area consists of approximately 1.75 miles along Brea Canyon Road and is roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast.

The project is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

Please feel free to call or email me if you have any questions or require further information.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
300 S Grand Avenue, 8th Floor
Los Angeles, CA 90071
D 213.593.8481
marc.beherec@aecom.com

I:\BreaCanyonRd_Widening\MXD\Figure_BreaCanyon.mxd

N

Feet
0 325 650
1 inch = 650 feet

500-ft Buffer
Envrionmental Limits

Figure 1
Brea Canyon Road

Brea Canyon Road Widening

AECOM

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

October 9, 2017

Dr. Marc A. Beherec
AECOM, Inc.

Sent by E-mail: marc.beherec@aecom.com

RE: Proposed Brea Canyon Road Widening Project, City of Brea; Yorba Linda USGS Quadrangle, Orange County, California

Dear Dr. Beherec:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results however the area is sensitive for cultural resources. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

Native American Heritage Commission
Native American Contact List
Orange County
10/9/2017

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chariperson
P.O. Box 393 Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
gabrielenoindians@yahoo.com

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., Gabrielino
#231
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490 Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino-Tongva Tribe
Charles Alvarez,
23454 Vanowen Street Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Brea Canyon Road Widening Project, Orange County.

AECOM Inc
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
T 213.593.8100 www.AECOM.com

October 10, 2017

Chairperson Andrew Salas
Gabrielino Band of Mission Indians - Kizh Nation
P.O. Box 393
Covina, CA 91723

Subject: Brea Canyon Road Widening Project

Dear Chairperson Salas:

AECOM has been retained by the County of Orange to prepare a cultural resources assessment in support of an Environmental Impact Report for the Brea Canyon Road Widening Project. The project is located in the City of Brea and in unincorporated Orange County west of State Route 57.

More specifically, the proposed project consists of approximately 1.75 miles along Brea Canyon Road, roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

AECOM has been requested to contact interested parties in accordance with state law. The goal of this letter, in addition to acquainting you with this project, is to request any information you have that may indicate an impact to cultural resources within the project area. The response form (Enclosure 2) is provided to help us identify and address your concerns with this project. Return of this form does not imply that you approve or disapprove of the project; nor does it limit your opportunity to comment at a later time. Please return the response form to the address shown below no later than November 10, 2017 so that we may include your concerns in our document.

Thank you very much for your assistance. Please feel free to contact me if you have any questions.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
marc.beherec@aecom.com
Office: 213-593-8481
Cell: 951-296-7561

I:\BreaCanyonRd_Widening\MXD\Figure_BreaCanyon.mxd

N

Feet
0 325 650
1 inch = 650 feet

500-ft Buffer
Envrionmental Limits

Figure 1
Brea Canyon Road

Brea Canyon Road Widening

AECOM

Beherec, Marc

From: Gabrieleno Band of Mission Indians <gabrielenoindians@yahoo.com>
Sent: Monday, October 23, 2017 10:21 AM
To: Beherec, Marc
Subject: Marc A. Beherec-Brea Canyon Widening Road Project
Attachments: Marc A. Beherec-Brea Canyon Widening Road Project .pdf

Please see attachment

Sincerely,

Brandy Salas

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians - Kizh Nation
PO Box 393
Covina, CA 91723
Office: 844-390-0787
Cell: (626)926-4131
Email: gabrielenoindians@yahoo.com
website: www.gabrielenoindians.org

Gabrieleno Band of Mission Indians – Kizh Nation
Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

October 23, 2017

Regarding: Brea Canyon Road Widening Project

Dear Marc A. Beherec,

This email is in response to the above referenced project located in the city of Brea Orannge County West of State Route 57 . The project location is within our Ancestral territory which may have potential for discoveries of our cultural resources . Therefore, we would like to request that one of our Native Monitors be present during any and all ground disturbances.

Should you have any questions or concerns, please contact our office at 844-390-0787.

Thank you,

Andrew Salas
Chairman, Gabreileno Band of Mission Indians-Kizh Nation

AECOM Inc
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
T 213.593.8100 www.AECOM.com

October 10, 2017

Chairperson Anthony Morales
Gabrielino/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA 91778

Subject: Brea Canyon Road Widening Project

Dear Chairperson Morales:

AECOM has been retained by the County of Orange to prepare a cultural resources assessment in support of an Environmental Impact Report for the Brea Canyon Road Widening Project. The project is located in the City of Brea and in unincorporated Orange County west of State Route 57.

More specifically, the proposed project consists of approximately 1.75 miles along Brea Canyon Road, roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

AECOM has been requested to contact interested parties in accordance with state law. The goal of this letter, in addition to acquainting you with this project, is to request any information you have that may indicate an impact to cultural resources within the project area. The response form (Enclosure 2) is provided to help us identify and address your concerns with this project. Return of this form does not imply that you approve or disapprove of the project; nor does it limit your opportunity to comment at a later time. Please return the response form to the address shown below no later than November 10, 2017 so that we may include your concerns in our document.

Thank you very much for your assistance. Please feel free to contact me if you have any questions.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
marc.beherec@aecom.com
Office: 213-593-8481
Cell: 951-296-7561

Beherec, Marc

From: Adrian Morales <moralesadrian66@yahoo.com>
Sent: Friday, January 26, 2018 11:41 AM
To: Beherec, Marc
Subject: RE: Bread Canyon Road Widening Project

Ok Great! Thank you.

Sent from Yahoo Mail on Android

On Fri, Jan 26, 2018 at 11:10 AM, Beherec, Marc <Marc.Beherec@aecom.com> wrote:

Hi, Adrian.

Thanks for the email! I actually need to do follow-up calls on this project, but had put it off because we're still awaiting permission to do the field survey.

The cultural report can't be finished until after the survey, and the EIR can't be completed until after the cultural report is finished, so I expect construction is still at least a couple of years off.

I'll save your email in the file and note that you want continuing consultation as an interested party.

Marc

From: Adrian Morales [mailto:moralesadrian66@yahoo.com]
Sent: Friday, January 26, 2018 10:30 AM
To: Beherec, Marc
Subject: Bread Canyon Road Widening Project

Greetings Marc,

Hope all is well with you. I just wanted inquire on the above mentioned project's status in the formality process Last I read AECOM was preparing a cultural assessment in support of an EIR ? Also may we request at this time to be included as a interested party ? Please reply at your convenience. Thank you.

Sincerely,

Adrian Morales

Tribal Consultations - CRM

Gabrieleno Tongva San Gabriel Band of Mission Indians

Sent from Yahoo Mail on Android

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc A Beherec

Date: 2/8/2018

Project # 60492260

Individual Contacted: Anthony Morales

Phone # 626-286-1262

Contact Information

Subject of Contact: Brea Canyon Road Widening

Items Discussed

Anthony Morales was reached by phone. He asked about the results of the records search, and I informed him that there were no recorded Native American sites within the project area or the 0.5-mile buffer. He informed us "that canyon is very sensitive." He said that the entire Puente Hills area is of concern for tribal cultural resources. He recommends tribal and archaeological monitoring, and would like a member of his tribe to monitor. He requests continued AB 52 consultation.

Follow Up

Mr. Morales requests continuing AB 52 consultation.

AECOM Inc
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
T 213.593.8100 www.AECOM.com

October 10, 2017

Chairperson Sandonne Goad
Gabrielino/Tongva Nation
106 ½ Judge John Aiso St., #231
Los Angeles, CA 90012

Subject: Asilomar Boulevard Landslide Mitigation Project

Dear Chairperson Goad:

AECOM has been retained by the County of Orange to prepare a cultural resources assessment in support of an Environmental Impact Report for the Brea Canyon Road Widening Project. The project is located in the City of Brea and in unincorporated Orange County west of State Route 57.

More specifically, the proposed project consists of approximately 1.75 miles along Brea Canyon Road, roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

AECOM has been requested to contact interested parties in accordance with state law. The goal of this letter, in addition to acquainting you with this project, is to request any information you have that may indicate an impact to cultural resources within the project area. The response form (Enclosure 2) is provided to help us identify and address your concerns with this project. Return of this form does not imply that you approve or disapprove of the project; nor does it limit your opportunity to comment at a later time. Please return the response form to the address shown below no later than November 10, 2017 so that we may include your concerns in our document.

Thank you very much for your assistance. Please feel free to contact me if you have any questions.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
marc.beherec@aecom.com
Office: 213-593-8481
Cell: 951-296-7561

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc A Beherec

Date: 2/8/2018

Project # 60492260

Individual Contacted: Sandonne Goad

Phone # 951-807-0479

Contact Information

Subject of Contact: Brea Canyon Road Widening

Items Discussed

A voicemail was left for Ms. Goad briefly describing the project and referencing our letter of October 10 and requesting she call with comment.

Follow Up

None necessary.

AECOM Inc
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
T 213.593.8100 www.AECOM.com

October 10, 2017

Chairperson Robert Dorame
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, CA 90707

Subject: Brea Canyon Road Widening Project

Dear Chairperson Dorame:

AECOM has been retained by the County of Orange to prepare a cultural resources assessment in support of an Environmental Impact Report for the Brea Canyon Road Widening Project. The project is located in the City of Brea and in unincorporated Orange County west of State Route 57.

More specifically, the proposed project consists of approximately 1.75 miles along Brea Canyon Road, roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

AECOM has been requested to contact interested parties in accordance with state law. The goal of this letter, in addition to acquainting you with this project, is to request any information you have that may indicate an impact to cultural resources within the project area. The response form (Enclosure 2) is provided to help us identify and address your concerns with this project. Return of this form does not imply that you approve or disapprove of the project; nor does it limit your opportunity to comment at a later time. Please return the response form to the address shown below no later than November 10, 2017 so that we may include your concerns in our document.

Thank you very much for your assistance. Please feel free to contact me if you have any questions.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
marc.beherec@aecom.com
Office: 213-593-8481
Cell: 951-296-7561

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc A Beherec

Date: 2/8/2018

Project # 60492260

Individual Contacted: Robert Dorame

Phone # 562-761-6417

Contact Information

Subject of Contact: Brea Canyon Road Widening

Items Discussed

Mr. Dorame was reached by phone. He stated that Brea Canyon had mineral springs which were used by the Indians. He said that sites are located along the road, and that in particular there is an occupation site with an unknown name along the road. Mr. Dorame recommends Native American monitoring, and requests that a member of his tribe monitor. He also requests continued AB 52 consultation.

Follow Up

Mr. Dorame requests continuing consultation.

AECOM Inc
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
T 213.593.8100 www.AECOM.com

October 10, 2017

Mr. Charles Alvarez
Gabrielino-Tongva Tribe
23454 Vanowen Street
West Hills, CA 91307

Subject: Brea Canyon Road Widening Project

Dear Mr. Alvarez:

AECOM has been retained by the County of Orange to prepare a cultural resources assessment in support of an Environmental Impact Report for the Brea Canyon Road Widening Project. The project is located in the City of Brea and in unincorporated Orange County west of State Route 57.

More specifically, the proposed project consists of approximately 1.75 miles along Brea Canyon Road, roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

AECOM has been requested to contact interested parties in accordance with state law. The goal of this letter, in addition to acquainting you with this project, is to request any information you have that may indicate an impact to cultural resources within the project area. The response form (Enclosure 2) is provided to help us identify and address your concerns with this project. Return of this form does not imply that you approve or disapprove of the project; nor does it limit your opportunity to comment at a later time. Please return the response form to the address shown below no later than November 10, 2017 so that we may include your concerns in our document.

Thank you very much for your assistance. Please feel free to contact me if you have any questions.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
marc.beherec@aecom.com
Office: 213-593-8481
Cell: 951-296-7561

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc A Beherec

Date: 10/12/17

Project # 60492260

Individual Contacted: Charles Alvarez

Phone # 310-403-6048

Contact Information

Subject of Contact: Brea Canyon Road Widening

Items Discussed

Charles Alvarez called me to discuss the Brea Canyon Road Widening Project. He said he had just received our letter. He said he has just taken over the task of answering these letters for his tribe, and that he had no comments on the current project. He asked me to send him an email summarizing our conversation so that he would have a record he had responded to our letter.

Follow Up

Email was sent as requested.

Beherec, Marc

From: Beherec, Marc
Sent: Thursday, October 12, 2017 2:25 PM
To: 'roadkingcharles@aol.com'
Subject: Brea Canyon Road Widening Project

Dear Mr. Alvarez:

I am sending this email to follow up on our phone conversation today.

Thanks very much for responding to our letter so promptly. As of now, you informed me have no comment on the project. If concerns about the project arise later, please feel free to inform me by phone or email.

Marc

Marc A. Beherec, Ph.D., RPA
Archaeologist
AECOM
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
Office: 213-593-8481
Cell: 951-296-7561
www.aecom.com

APPENDIX C

NATIVE DAUGHTERS OF THE GOLDEN WEST CONTACT DOCUMENTS

Beherec, Marc

From: Beherec, Marc
Sent: Friday, June 15, 2018 6:33 PM
To: 'sfarley@spritewater.com'
Subject: NDGW Portola Monument

Dear Ms. Farley:

I am an archaeologist who was recently hired by the County of Orange to study potential impacts to cultural resources by a proposed widening of Brea Canyon Road from Canyon Country Road to the County line. I'm writing to you regarding the monument to the Portola expedition the Daughters erected there in 1932. I found your email address on the Native Daughters' website.

I'm hoping you may be able to help me answer these questions about the monument:

- Why that specific place was chosen for the monument? I found an article online that quotes a Sherry Farley, who I believe is you, saying that the spot was chosen for a grove of pepper trees on private land nearby. Where exactly were these trees, and were there other reasons why this particular location was chosen?
- The art on the plaque is signed RJT. Do you know the name of the artist who designed the monument?
- Who in your organization decided to erect the monument?

Thank you very much for your consideration and for any help you can give me in answering these questions.

Sincerely,

Marc

Marc A. Beherec, Ph.D., RPA
Archaeologist
AECOM
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
Office: 213-593-8481
Cell: 951-296-7561
www.aecom.com

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc Beherec

Date: June 25, 2018

Project # 60492260

Individual Contacted: Sherry Farley

Phone # 951-735-1015

Contact Information

Subject of Contact: Brea Canyon Road Widening Portola Monument

Items Discussed

Ms. Farley called in response to my email, and left a voice mail message.

She stated that the NDGW are open to the monument being moved. But she states that the monument has some bullet holes in it, and they are concerned about protecting it if it is moved.

NDGW want to keep monument on side of he road for educational purposes, as close to its present location as possible.

Ms. Farley stated she has some questions about the project, and requested I call her.

Follow Up

Will follow-up with phone call.

Beherec, Marc

From: Sherry Farley <sfarley@spritewater.com>
Sent: Monday, June 25, 2018 4:38 PM
To: Beherec, Marc
Subject: RE: NDGW Portola Monument

Hello Marc,

My apology for the delay in responding. I was away on business.

Native Daughters of the Golden West is a fraternal organization of California born individuals dedicated to preserving the history of California. The organization began in 1886. Instituted June 2, 1927, Grace Parlor No. 242, Fullerton, is a local chapter of this organization. My grandmother, mother and multiple generations of cousins all belonged to this chapter too. I have been entrusted with the history of the landmarks dedicated by our local chapter.

Here are the answers to your questions:

1. In 1906 the Native Daughters of the Golden West and the Association of California Woman's Clubs began the research and marking of the El Camino Real (I have tons more history on this, but I won't bore you with the details). During this research, it was found that Portola's initial expedition did not follow the same path as the later "well-known" trail that was marked by mustard plants on each side. The research used translations of Don Gaspar Portola's diaries and diaries from Miguel Costansó and Frey Juan Crespi. The diaries led to placing an El Camino Real Bell in the middle of Harbor Blvd in Fullerton and the campsite in Brea Canyon. The diaries related camping near Indians and a small body of water. The monument site was chosen using early local maps (on display at the Brea museum). The chosen location was known to have a small body of water at the time and a grove of pepper trees, perfect for Portola's exhibition to establish a campsite. In addition, I am told Indian and Spanish artifacts were also recovered from this location. I have older photographs of the monument standing below the pepper trees, surrounded by a simple white fence. The small body of water has long since dried up and the grove of pepper trees is almost gone. This was the first marking of a historic landmark by our chapter done June 2, 1932.
2. The plaque was contributed by a Member of the Native Daughters of the Golden West, Saddie Winn-Brainard from Sacramento. I do not have records for the name of the artist.
3. Each chapter in the State organization has a History and Landmarks Committee. For Grace Parlor No. 242, the 1932 Committee was chaired by Mrs. Carrie Earl McFadden-Ford. Mrs. Ford was daughter of William M. McFadden (1842-1902) and Sarah Jane Earl McFadden (1846-1908), both teachers. Mr. McFadden's leadership and organizational skills are well documented in the founding of the city of Fullerton and Orange County.

   Mrs. Ford (1867-1961) was a prominent pioneer, a charter member of Grace Parlor No. 242 and Parlor President in 1930-1931. I have no doubt that Mrs. Ford participated in the research for the current location. She was quite well educated, had a good business sense, and was very active in social and civic circles.

   The original plan was to place the marker a little more to the east of the current location. However, having the monument on private property would not make it accessible for educational purposes, so it was decided to place it alongside the road.

While I understand the need to widen Brea Canyon Road, I do hope you will help to preserve the history of this location by maintaining the monument and marker. On behalf of Grace Parlor No. 242, Native Daughters of the Golden West, I would be happy to work with the County of Orange to re-locate and re-dedicate the monument somewhere in the same vicinity. With an organization of over 4,000 Members state wide, we would greatly

appreciate the help to maintain our efforts to preserve the history of this area and our beautiful golden State. Please don't hesitate to phone anytime. I can be reached at 714-920-8051.

With respect and appreciation for our consideration,
Sherry Farley, Past Grand President
Native Daughters of the Golden West
C: 714-920-8051
www.NDGW.org

From: Beherec, Marc [mailto:Marc.Beherec@aecom.com]
Sent: Friday, June 15, 2018 6:33 PM
To: sfarley@spritewater.com
Subject: NDGW Portola Monument

Dear Ms. Farley:

I am an archaeologist who was recently hired by the County of Orange to study potential impacts to cultural resources by a proposed widening of Brea Canyon Road from Canyon Country Road to the County line. I'm writing to you regarding the monument to the Portola expedition the Daughters erected there in 1932. I found your email address on the Native Daughters' website.

I'm hoping you may be able to help me answer these questions about the monument:

- Why that specific place was chosen for the monument? I found an article online that quotes a Sherry Farley, who I believe is you, saying that the spot was chosen for a grove of pepper trees on private land nearby. Where exactly were these trees, and were there other reasons why this particular location was chosen?
- The art on the plaque is signed RJT. Do you know the name of the artist who designed the monument?
- Who in your organization decided to erect the monument?

Thank you very much for your consideration and for any help you can give me in answering these questions.

Sincerely,

Marc

Marc A. Beherec, Ph.D., RPA
Archaeologist
AECOM
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
Office: 213-593-8481
Cell: 951-296-7561
www.aecom.com

AECOM

Distribution

Contact Report Form

AECOM Contact: Marc Beherec

Date: June 27, 2018

Project # 60492260

Individual Contacted: Sherry Farley

Phone # 951-735-1015

Contact Information

Subject of Contact: Brea Canyon Road Widening Portola Monument

Items Discussed

Ms. Farley called again and this time reached me.
We discussed the contents of her email of June 26. I asked her about what prompted the erection of the monument, and she said that NDGW and the California Federation of Women's Clubs conducted research to mark the route of El Camino Real in the early 20th century. In the process, they found that Portola had taken a different route on his first journey north than that which he followed on his return journey and which became El Camino Real. On the first journey north, they found Portola camped at a location to the east of what was marked, on private property, and the monument was erected beside the road near where he camped. I asked them what they relied on to come to this conclusion, and she said they examined old maps (currently in the Brea Museum) and also the diaries of Portola, Crespi, and Costanso. She said Native American and Spanish artifacts had also been found in the area. She said she had notebooks she was drawing on and also had historic photos of the monument. I asked her to email me whatever she could, particularly the photos. She also told me Carrie Earl McFadden Ford was Chair of the History and Landmarks Committee when the monument was erected, and she is certain Ford had a role in it.
I asked if NDGW visits the monument, and she said yes, that it plays a role in their Monument Search Scavenger Hunt, where they revisit the 13 monuments NDGW erected in Orange County.
She reiterated the NDGW desire to have the monument preserved, and if moved, kept as close as possible to the current location. They want to be kept informed about the project.

Follow Up

NDGW request to be kept informed regarding the project, and be involved if the monument is moved.

Beherec, Marc

From: Beherec, Marc
Sent: Wednesday, June 27, 2018 2:37 PM
To: 'Sherry Farley'
Subject: RE: NDGW Portola Monument

Hi, Sherry.

It was good talking with you today. Thanks very much for making the time, and for getting me this useful information.

Please do send me scans of the photographs, if you don't mind. Also, if you have a nomination form of any kind explaining why this property was picked, I would love a scan of that, too. With your permission, I will include your email and any documents you send me as an appendix to my report, so that the County can read what you have to say directly.

I will be certain to put in my report that the Native Daughters continue to visit this monument and wish to have it preserved in as close to the present location as possible. I will also let Orange County know you'd appreciate being kept informed as the project progresses.

Thanks again!

Marc

From: Sherry Farley [mailto:sfarley@spritewater.com]
Sent: Monday, June 25, 2018 4:38 PM
To: Beherec, Marc
Subject: RE: NDGW Portola Monument

Hello Marc,

My apology for the delay in responding. I was away on business.

Native Daughters of the Golden West is a fraternal organization of California born individuals dedicated to preserving the history of California. The organization began in 1886. Instituted June 2, 1927, Grace Parlor No. 242, Fullerton, is a local chapter of this organization. My grandmother, mother and multiple generations of cousins all belonged to this chapter too. I have been entrusted with the history of the landmarks dedicated by our local chapter.

Here are the answers to your questions:

1. In 1906 the Native Daughters of the Golden West and the Association of California Woman's Clubs began the research and marking of the El Camino Real (I have tons more history on this, but I won't bore you with the details). During this research, it was found that Portola's initial expedition did not follow the same path as the later "well-known" trail that was marked by mustard plants on each side. The research used translations of Don Gaspar Portola's diaries and diaries from Miguel Costansó and Frey Juan Crespi. The diaries led to placing an El Camino Real Bell in the middle of Harbor Blvd in Fullerton and the campsite in Brea Canyon. The diaries related camping near Indians and a small body of water. The monument site was chosen using early local maps (on display at the Brea museum). The chosen location was known to have a small body of water at the time and a grove of pepper trees, perfect for Portola's exhibition to establish a campsite. In addition, I am told Indian and Spanish artifacts were also recovered from this location. I have older photographs of the monument standing below the

pepper trees, surrounded by a simple white fence. The small body of water has long since dried up and the grove of pepper trees is almost gone. This was the first marking of a historic landmark by our chapter done June 2, 1932.

2. The plaque was contributed by a Member of the Native Daughters of the Golden West, Saddie Winn-Brainard from Sacramento. I do not have records for the name of the artist.
3. Each chapter in the State organization has a History and Landmarks Committee. For Grace Parlor No. 242, the 1932 Committee was chaired by Mrs. Carrie Earl McFadden-Ford. Mrs. Ford was daughter of William M. McFadden (1842-1902) and Sarah Jane Earl McFadden (1846-1908), both teachers. Mr. McFadden's leadership and organizational skills are well documented in the founding of the city of Fullerton and Orange County.

   Mrs. Ford (1867-1961) was a prominent pioneer, a charter member of Grace Parlor No. 242 and Parlor President in 1930-1931. I have no doubt that Mrs. Ford participated in the research for the current location. She was quite well educated, had a good business sense, and was very active in social and civic circles.

   The original plan was to place the marker a little more to the east of the current location. However, having the monument on private property would not make it accessible for educational purposes, so it was decided to place it alongside the road.

While I understand the need to widen Brea Canyon Road, I do hope you will help to preserve the history of this location by maintaining the monument and marker. On behalf of Grace Parlor No. 242, Native Daughters of the Golden West, I would be happy to work with the County of Orange to re-locate and re-dedicate the monument somewhere in the same vicinity. With an organization of over 4,000 Members state wide, we would greatly appreciate the help to maintain our efforts to preserve the history of this area and our beautiful golden State. Please don't hesitate to phone anytime. I can be reached at 714-920-8051.

With respect and appreciation for our consideration,
Sherry Farley, Past Grand President
Native Daughters of the Golden West
C: 714-920-8051
www.NDGW.org

From: Beherec, Marc [mailto:Marc.Beherec@aecom.com]
Sent: Friday, June 15, 2018 6:33 PM
To: sfarley@spritewater.com
Subject: NDGW Portola Monument

Dear Ms. Farley:

I am an archaeologist who was recently hired by the County of Orange to study potential impacts to cultural resources by a proposed widening of Brea Canyon Road from Canyon Country Road to the County line. I'm writing to you regarding the monument to the Portola expedition the Daughters erected there in 1932. I found your email address on the Native Daughters' website.

I'm hoping you may be able to help me answer these questions about the monument:

- Why that specific place was chosen for the monument? I found an article online that quotes a Sherry Farley, who I believe is you, saying that the spot was chosen for a grove of pepper trees on private land nearby. Where exactly were these trees, and were there other reasons why this particular location was chosen?
- The art on the plaque is signed RJT. Do you know the name of the artist who designed the monument?
- Who in your organization decided to erect the monument?

Thank you very much for your consideration and for any help you can give me in answering these questions.

Sincerely,

Marc

Marc A. Beherec, Ph.D., RPA
Archaeologist
AECOM
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
Office: 213-593-8481
Cell: 951-296-7561
www.aecom.com

Beherec, Marc

From: Sherry Farley <sfarley@spritewater.com>
Sent: Wednesday, June 27, 2018 4:53 PM
To: Beherec, Marc
Subject: RE: NDGW Portola Monument
Attachments: Portola_Plaque_1_0001.jpg; Portola_Plaque_1_0002.jpg

TKM Smith photo

Portolá monument in Brea Canyon

This is an old black and white image of the monument. Attached are color images showing the pepper trees.

Here is a list of plaques in Orange County placed by Native Daughters of the Golden West…

Don Gaspar Portola – Camping Place
Entrance to Brea Canyon
North bound journey – first expedition from San Diego to Monterey
Dedicated June 2, 1932 Grace No. 242

First Valencia Orchard in California
Campus of California State University, Fullerton East side of the Quad
Dedicated Feb. 1, 1934, Grace No. 242

Pioneer Mothers Sycamore Tree
2002 N Main, Base of tree
(Bower's Museum)
Tree planted May 12, 1934 in Memory of Pioneer Mothers of California
Mar 25, 1939 Santa Ana No. 235

Honoring William Spurgeon,
Founder of Santa Ana
NE corner of Broadway and 6th Sts., Santa Ana
Founder W.H. Spurgeon, reserved site of Court House
Dedicated April 24, 1950 Santa Ana No. 235

California State Landmark No. 201 Pioneer House of the Mother Colony
414 N West St near Sycamore St, Anaheim
Dedicated July 16, 1950, Grace No. 242

Knott's Berry Farm – Original Berry Stand, Ghost Town Historic Landmark
Located on the left side of the Gold Trails Hotel, Knott's Berry Farm, Buena Park
Dedicated Nov. 15, 1952, Grace No. 242

Orange Greenville Country Church
3501 Greenville St., Santa Ana
Oldest Protestant Church in use. (1953) Built 1878
Dedicated 1953 Santa Ana No. 235

Orange Clinton School Marker
1820 N Clinton St., Santa Ana
Named for Henry Clinton, early Pioneer
Dedicated 1956 Santa Ana No. 235

Morton Bay Fig Tree
566 S. Glassel St., Santa Ana
Henri F. Gardner, in Memory of wife Emma and newborn son. Planted 1875
Dedicated Apr 25, 1971 Santa Ana No. 235

California State Landmark No. 1004 Old Town Irvine
Sand Canyon Ave and Burt Rd, Irvine
Dedicated Feb. 9, 1987, Santa Ana No. 235

Orange County Park – Irvine Regional Park
Oldest park in the county
Dedicated Aug. 1, 1988, Grace No. 242

Anaheim Cemetery
1400 E. Sycamore St., Anaheim
Founded in 1866 by German Colonies
Dedicated June 14, 1990 Santa Ana No. 235

Maron Adobe, Carlsbad
Dedicated June 10, 2000, Grace No. 242

Thank you,
Sherry Farley, Past Grand President
Native Daughters of the Golden West
C: 714-920-8051
www.NDGW.org

From: Beherec, Marc [mailto:Marc.Beherec@aecom.com]
Sent: Wednesday, June 27, 2018 2:37 PM
To: Sherry Farley <sfarley@spritewater.com>
Subject: RE: NDGW Portola Monument

Hi, Sherry.

It was good talking with you today. Thanks very much for making the time, and for getting me this useful information.

Please do send me scans of the photographs, if you don't mind. Also, if you have a nomination form of any kind explaining why this property was picked, I would love a scan of that, too. With your permission, I will include your email and any documents you send me as an appendix to my report, so that the County can read what you have to say directly.

I will be certain to put in my report that the Native Daughters continue to visit this monument and wish to have it preserved in as close to the present location as possible. I will also let Orange County know you'd appreciate being kept informed as the project progresses.

Thanks again!

Marc

From: Sherry Farley [mailto:sfarley@spritewater.com]
Sent: Monday, June 25, 2018 4:38 PM
To: Beherec, Marc
Subject: RE: NDGW Portola Monument

Hello Marc,

My apology for the delay in responding. I was away on business.

Native Daughters of the Golden West is a fraternal organization of California born individuals dedicated to preserving the history of California. The organization began in 1886. Instituted June 2, 1927, Grace Parlor No. 242, Fullerton, is a local chapter of this organization. My grandmother, mother and multiple generations of cousins all belonged to this chapter too. I have been entrusted with the history of the landmarks dedicated by our local chapter.

Here are the answers to your questions:

1. In 1906 the Native Daughters of the Golden West and the Association of California Woman's Clubs began the research and marking of the El Camino Real (I have tons more history on this, but I won't bore you with the details). During this research, it was found that Portola's initial expedition did not follow the same path as the later "well-known" trail that was marked by mustard plants on each side. The research used translations of Don Gaspar Portola's diaries and diaries from Miguel Costansó and Frey Juan Crespi. The diaries led to placing an El Camino Real Bell in the middle of Harbor Blvd in Fullerton and the campsite in Brea Canyon. The diaries related camping near Indians and a small body of water. The monument site was chosen using early local maps (on display at the Brea museum). The chosen location was known to have a small body of water at the time and a grove of pepper trees, perfect for Portola's exhibition to establish a campsite. In addition, I am told Indian and Spanish artifacts were also recovered from this location. I have older photographs of the monument standing below the pepper trees, surrounded by a simple white fence. The small body of water has long since dried up and the grove of pepper trees is almost gone. This was the first marking of a historic landmark by our chapter done June 2, 1932.

2. The plaque was contributed by a Member of the Native Daughters of the Golden West, Saddie Winn-Brainard from Sacramento. I do not have records for the name of the artist.
3. Each chapter in the State organization has a History and Landmarks Committee. For Grace Parlor No. 242, the 1932 Committee was chaired by Mrs. Carrie Earl McFadden-Ford. Mrs. Ford was daughter of William M. McFadden (1842-1902) and Sarah Jane Earl McFadden (1846-1908), both teachers. Mr. McFadden's leadership and organizational skills are well documented in the founding of the city of Fullerton and Orange County.

   Mrs. Ford (1867-1961) was a prominent pioneer, a charter member of Grace Parlor No. 242 and Parlor President in 1930-1931. I have no doubt that Mrs. Ford participated in the research for the current location. She was quite well educated, had a good business sense, and was very active in social and civic circles.

   The original plan was to place the marker a little more to the east of the current location. However, having the monument on private property would not make it accessible for educational purposes, so it was decided to place it alongside the road.

While I understand the need to widen Brea Canyon Road, I do hope you will help to preserve the history of this location by maintaining the monument and marker. On behalf of Grace Parlor No. 242, Native Daughters of the Golden West, I would be happy to work with the County of Orange to re-locate and re-dedicate the monument somewhere in the same vicinity. With an organization of over 4,000 Members state wide, we would greatly appreciate the help to maintain our efforts to preserve the history of this area and our beautiful golden State. Please don't hesitate to phone anytime. I can be reached at 714-920-8051.

With respect and appreciation for our consideration,
Sherry Farley, Past Grand President
Native Daughters of the Golden West
C: 714-920-8051
www.NDGW.org

From: Beherec, Marc [mailto:Marc.Beherec@aecom.com]
Sent: Friday, June 15, 2018 6:33 PM
To: sfarley@spritewater.com
Subject: NDGW Portola Monument

Dear Ms. Farley:

I am an archaeologist who was recently hired by the County of Orange to study potential impacts to cultural resources by a proposed widening of Brea Canyon Road from Canyon Country Road to the County line. I'm writing to you regarding the monument to the Portola expedition the Daughters erected there in 1932. I found your email address on the Native Daughters' website.

I'm hoping you may be able to help me answer these questions about the monument:

- Why that specific place was chosen for the monument? I found an article online that quotes a Sherry Farley, who I believe is you, saying that the spot was chosen for a grove of pepper trees on private land nearby. Where exactly were these trees, and were there other reasons why this particular location was chosen?
- The art on the plaque is signed RJT. Do you know the name of the artist who designed the monument?
- Who in your organization decided to erect the monument?

Thank you very much for your consideration and for any help you can give me in answering these questions.

Sincerely,

Marc

Marc A. Beherec, Ph.D., RPA
Archaeologist
AECOM
300 S. Grand Ave., Suite 200, Los Angeles, CA 90071
Office: 213-593-8481
Cell: 951-296-7561
www.aecom.com


DON GASPAR PORTOLA
WITH 60 MEN CAMPED HERE
JULY 31 1769 ON HIS FIRST
EXPLORING MARCH FROM
SAN DIEGO TO MONTEREY.
DEDICATED JUNE 2 1932 BY
GRACE PARLOR NO 242
NATIVE DAUGHTERS
OF THE GOLDEN WEST.

APPENDIX D

PALEONTOLOGICAL RECORDS SEARCH RESULTS

AECOM Inc
300 South Grand Avenue, 8th Floor, Los Angeles, CA 90071
T 213.593.7700 www.AECOM.com

September 21, 2017

Dr. Sam McLeod
Natural History Museum of Los Angeles County
Vertebrate Paleontology
900 Exposition Boulevard, Los Angeles, CA 90007

Subject: Brea Canyon Road Widening Paleontological Records Search Request

Dear Dr. McLeod:

This letter is to request a paleontological resources check for the planned County of Orange Brea Canyon Road Widening Project. The proposed project is located within the City of Brea and unincorporated Orange County. The project area consists of approximately 1.75 miles along Brea Canyon Road and roughly bounded by Canyondale Drive in the southwest and the Los Angeles-Orange County Line in the northeast. It is located within Sections 2 and 12 of Township 3 South, Range 10 West of the La Habra U.S. Geological Survey (USGS) 7.5-minute quadrangle map, and Unsectioned Township 2 South, Range 9 West of the Yorba Linda 7.5-minute quadrangle map, as indicated on the enclosed map (Enclosure 1).

Project improvements have been proposed to enhance the Level of Service and improve traffic flow consistent with the goals set forth by Orange County Transportation Authority in its Measure M Regional Capacity Program, with a specific focus on Arterial Capacity Enhancements. The project improvements include widening Brea Canyon Roadway from 2 lanes to four lanes (two lanes in each direction), replacing three bridges over Brea Creek, installing a traffic signal at the intersection of Brea Canyon Road and Tonner Canyon Road, constructing retaining walls, improving and extending various drainage crossings and utility bank crossings, relocating utilities (power poles, oil lines, oil wells, telephone duct banks, etc.), and installing new striping and signing. The project will require a significant roadway slope cut of up to 50 feet or more in height, which will require a high retaining wall. Drive access points will also have to be maintained, modified, relocated, consolidated and/or otherwise enhanced.

Please direct bills to me at the above AECOM address. Feel free to call or email me if you have any questions or require further information.

Sincerely,

Marc A. Beherec, Ph.D., RPA
Archaeologist
300 S Grand Avenue, 8th Floor
Los Angeles, CA 90071
D 213.593.8481
marc.beherec@aecom.com

Enclosure:

1. Project Area Map

I:\BreaCanyonRd_Widening\MXD\Figure_BreaCanyon.mxd

N

Feet
0 325 650
1 inch = 650 feet

500-ft Buffer
Envrionmental Limits

Figure 1
Brea Canyon Road

Brea Canyon Road Widening

AECOM

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

tel 213.763.DINO
www.nhm.org

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Vertebrate Paleontology Section
Telephone: (213) 763-3325

e-mail: smcleod@nhm.org

6 October 2017

AECOM
300 South Grand Avenue, 8th Floor
Los Angeles, CA 90071

Attn: Marc A. Beherec, Ph.D., Archaeologist

re: Paleontological resources for the proposed Brea Canyon Road Widening Project, in the City of Brea, Orange County, project area

Dear Marc:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Brea Canyon Road Widening Project, in the City of Brea, Orange County, project area as outlined on the portion of the La Habra USGS topographic quadrangle map that you sent to me via e-mail on 22 September 2017. We do not have any vertebrate fossil localities that lie directly within the proposed project area boundaries, but we do have localities nearby from the same sedimentary deposits that occur in the proposed project area.

In the central portion of Brea Canyon, along Brea Boulevard in the proposed project area, there are surface deposits of younger Quaternary Alluvium, derived as fluvial deposits from the drainage. These deposits typically do not contain significant fossil vertebrate remains, at least in the uppermost layers, but they are underlain by older deposits at relatively shallow depth. In the middle portion of the proposed project area there are surface exposures of Quaternary Terrace deposits. Our closest fossil vertebrate locality from older Quaternary deposits is LACM 7508, just north of east of the northern-most portion the proposed project area in the uppermost reaches of Soquel Canyon, that produced fossil specimens of ground sloth, *Nothrotheriops*, and horse, *Equus giganteus*. Our next closest fossil vertebrate locality from older Quaternary deposits probably is LACM 4943, almost due south of the proposed project area east of the Santa Ana River and south of Lincoln Avenue between Batavia Street and Glassell Street, that produced specimens of fossil horse, *Equus*, at a depth of 8-10 feet below the surface.

The western portion of the proposed project area has exposures of the marine Pliocene Fernando Formation on the flanks of Brea Canyon and at depth beneath Quaternary Alluvium in the central portion of Brea Canyon. Our closest vertebrate fossil locality from the Fernando Formation is LACM 5557, just to the southeast of the proposed project area east of the Orange Freeway (Highway 57) and south of Tonner Canyon that, although obtained from a well core, produced a specimen of the fossil fish *Laytonia californica* figured in the scientific literature by L. R. David (1948. Halosauridae from the California Tertiary. Journal of Paleontology, 22(1):94-100). Our next closest vertebrate fossil locality form the Fernando Formation is LACM 1897, west-northwest of the proposed project area, that produced a fossil specimen of toothed whale, Odontoceti. Our other closest fossil vertebrate localities in the Fernando Formation are LACM 6350-6361, all from around the Puente Hills Landfill west of Hacienda Heights and northwest of the proposed project area. These localities have produced a suite of fossil marine vertebrates including great white shark, *Carcharodon carcharias*, herring, *Ganolytes*, hake, *Merluccius*, lanternfish, *Diaphus* and *Lampanyctus*, mackerels, Scombridae, swordfish, *Coelorhynchus scaphopsis*, flounder, Pleuronectidae and whale, Cetacea.

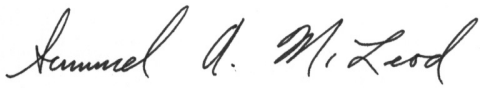
The eastern portion of the proposed project area has exposures of the marine late Miocene Puente Formation (also sometimes referred to as the Monterey Formation in this area) on the flanks of Brea Canyon and at depth beneath Quaternary Alluvium in the central portion of Brea Canyon. Our closest vertebrate fossil localities in the Puente Formation, LACM 5837, 6170, 6907-6908, and 7046, are situated in or north of Rowland Heights north-northwest of the proposed project area. These localities have produced a rich suite of fossil marine vertebrates including bonito shark, *Isurus oxyrinchus*, top smelts, *Atherinops barkeri* and *Atherinopsis*, sauries, Scomberesocidae, herrings, *Etringus scintillans* and *Ganolytes cameo*, cod, *Eclipes*, anglerfish, *Acentrophryne longidens*, lanternfish, Myctophidae, jack, *Decapterus*, snake mackerel, *Thyrsocles kriegeri*, croakers, *Seriphus lavenbergi* and *Lompoquia*, sanddab, Pleuronectiformes, deep sea smelt, Bathylagidae, viperfish, *Chauliodus eximius*, bristlemouth, *Cyclothone*, pipefish, *Syngnathus emeritus*, and whale, Cetacea. The fossil pipefish, *Syngnathus emeritus*, from locality LACM 7046 were published in the scientific literature by R. A. Fritzsche in 1980 (Revision of the eastern Pacific Syngnathidae (Pisces: Syngnathiformes), including both Recent and fossil forms. Proceedings of the California Academy of Science, 42(6):181-227). The fossil anglerfish, *Acentrophryne longidens*, from locality LACM 6908 was figured in the scientific literature by T. W. Pietsch and R. J. Lavenberg in 1980 (A fossil ceratoid anglerfish from the Late Miocene of California. Copeia, 1980(4):906-908). The fossil croaker, *Seriphus lavenbergi*, from locality LACM 6907 is a holotype (a specimen that is used as a name bearer for a species new to science) described by R. W. Huddleston and G. T. Takeuchi in 2006 (A New Late Miocene Species of Sciaenid Fish, Based Primarily on an in situ Otolith from California. Bulletin of the Southern California Academy of Sciences, 105(1):30-42).

Very shallow excavations in the younger Quaternary Alluvium in the proposed project area along Brea Boulevard are not likely to uncover significant vertebrate fossil remains, especially if they have been disturbed by previous construction activities. Deeper excavations in those areas that extend down into older sedimentary deposits, however, as well as any excavations in the exposures of older Quaternary Terrace, the Fernando Formation, or the Puente Formation in the proposed

project area may well encounter significant to very significant fossil vertebrate remains. Any substantial excavations in the proposed project area, therefore, should be closely monitored to quickly and professionally collect any vertebrate fossils without impeding development. Also, 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, Ph.D.
Vertebrate Paleontology

enclosure: invoice

APPENDIX E

DPR FORMS

State of California — The Resources Agency	Primary #
DEPARTMENT OF PARKS AND RECREATION	HRI #
PRIMARY RECORD	Trinomial
	NRHP Status Code
Other Listings	
Review Code	Reviewer Date

 ***Resource Name or #:** Brea Canyon Road

P1. Other Identifier: Brea Boulevard

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted** ***a. County:** Orange

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** La Habra **Date:** **T** 3S; **R** 10W; **Sec** 2 & 12**;** **B.M.**

AND USGS 7.5' Quad: Yorba Linda **Date:** **T** 2S; **R** 9W; **Sec** Unsectioned**;** **B.M.**

c. Address: Brea Canyon Road **City:** Brea **Zip:** 92821

d. UTM: Zone: 11; **mE/** **mN** (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation:
The surveyed section of road is located between Canyondale Drive and the Orange County border. The southern part of the surveyed road segment is located in the City of Brea, where it is known as Brea Bouevard. The majority of the recorded part of the resource is located in unincorporated Orange County, where it is known as Brea Canyon Road.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Brea Canyon Road is a 30-foot-wide, two-lane, undivided highway (one lane in each direction) with portions of the roadway having no curb or gutter, and unpaved, earthen shoulders, and with other portions of the roadway improved with curb, gutter, and sidewalk. The existing right-of-way varies from 60 to 100 feet wide. Associated with the road are various utilities. Most of the utilities are subsurface, but they also include an abandoned metal sewer line that runs above-ground parallel to the east of the road, south of the curve.

See Continuation Sheet.

***P3b. Resource Attributes:** (List attributes and codes) HP37. Road. HP19. Bridges.

***P4. Resources Present:** ☐Building ■Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Brea Canyon Road east of Bridge #55C0123. Note Culvert and Geodetic Benchmark on Shoulder. View West.

***P6. Date Constructed/Age and Sources:** ■Historic
☐Prehistoric ☐Both
Ca. 1928-1930 (County of Orange)

***P7. Owner and Address:**
County of Orange, OC Public Works
300 North Flower Street
Santa Ana, CA 92703

***P8. Recorded by:** (Name, affiliation, and address)
Marc A. Beherec, Ph.D, RPA, and Jennifer Redmond, MA, RPA
AECOM, 300 South Grand Avenue, Suite 200, Los Angeles, CA 90071

***P9. Date Recorded:** May 29-30, 2018

***P10. Survey Type:** (Describe) Intensive pedestrian survey.

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Beherec, Marc A. 2018. *Cultural Resources Assessment, Brea Canyon Road Widening, County of Orange, California.* Report prepared by AECOM for the County of Orange.

***Attachments:** ☐NONE ■Location Map ■Sketch Map ■Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Brea Canyon Road has essentially remained intact since the roadway was realigned to its present configuration between 1928 and 1930. However, it has been resurfaced and otherwise maintained since that time. The current project will widen the existing road, demolishing most of its existing features.

There are approximately 13 existing culvert crossings (for drainage or oil lines or both). These features were not documented individually. The culverts were all constructed of poured-in-place concrete. The imprints of wooden forms were observed on these features.

Three bridges crossing Brea Creek within the project limits will be removed and replaced: a double span bridge culvert constructed, circa 1920 and modified in 1929 (Bridge 1 [#55C0121]) and two reinforced-concrete bridges constructed circa 1930 (Bridges 2 [#55C0122] and 3 [#55C0123]). These bridges have all been evaluated by Caltrans and found not eligible for inclusion in the NRHP.

In addition, Bridge #55 0602K over Brea Canyon Channel was within the survey area but will not be impacted by the project. This bridge has also evaluated by Caltrans and found not eligible for inclusion in the NRHP.

Three USGS benchmarks were observed in association with the road. One benchmark was observed at the turnout near the Portola Monument. The other two were observed in proximity east of Bridge 55C0123. The benchmarks consist of brass medallions set in concrete bases. All three benchmarks bear the basic legend, "U.S. COAST & GEODETIC SURVEY / BENCHMARK / ELEV FEET / ABOVE MEAN SEA LEVEL / $250 FINE OR IMPRISONMENT / FOR DISTURBING THIS MARK." Added to this, the benchmark near the Portola Monument is marked "L351 / 1949" in the center of its medallion. The two markers east of the bridge are labeled "X423 / 1935" and "B351 / 1949."

An abandoned weigh station platform is on the south side of the road, near two Stearns oil pumpjacks. The weigh station consists of two concrete drives (one for the left truck wheels and one for the right truck wheels), each 3 feet wide, and measures approximately 106 feet, 6 inches long. It is interrupted approximately midway along its length by a pad measuring approximately 6 feet 7 inches long and 14 feet wide, which probably houses the scale.

In addition to the existing roadway, one abandoned road surface was observed towards the southwest end of the project area. Part of the abandoned road surface is within the boundaries of the planned road realignment, and part of the resource is within Possible Staging Area 1. The abandoned street surface is west of and parallel to the existing road way, extending roughly north-south for approximately 750 feet, from a point south of Canyon Country Road in the south to a point where it rejoins the existing Brea Canyon Road at a gate. The abandoned road is situated at a lower elevation than the existing roadway (Plate 8). The abandoned road surface measures approximately 17 feet, 8 inches wide. It is composed of concrete measuring approximately 8 inches thick (Plate 9). This road surface probably dates to 1920–1923 when Brea Canyon Road was first paved, and was probably abandoned (except for local access) when the roadway was realigned to its present configuration between 1928 and 1930.

Associated with the abandoned road surface is an abandoned bridge leading to private property. The bridge is constructed of wooden decking held up by I-beam construction mounted on metal pylons. The central portion of the bridge has collapsed into the river. A riveted metal plate retaining wall supports the east river bank.

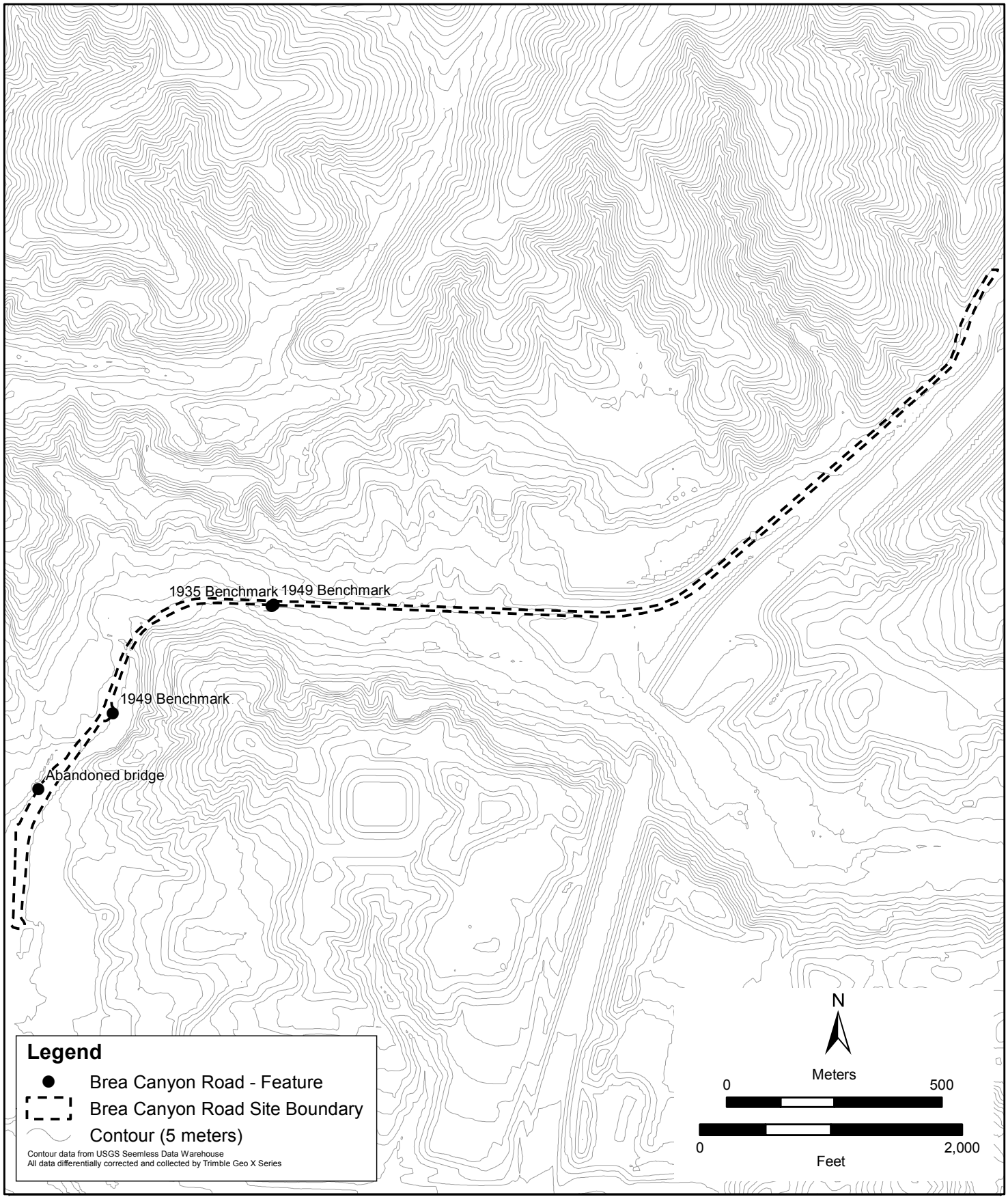
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary #
HRI#
Trinomial

Page 3 **of 4** ***Resource Name or #** (Assigned by recorder) Brea Canyon Road

***Drawn By:** Alec Stevenson ***Date:** 8/2/2018



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

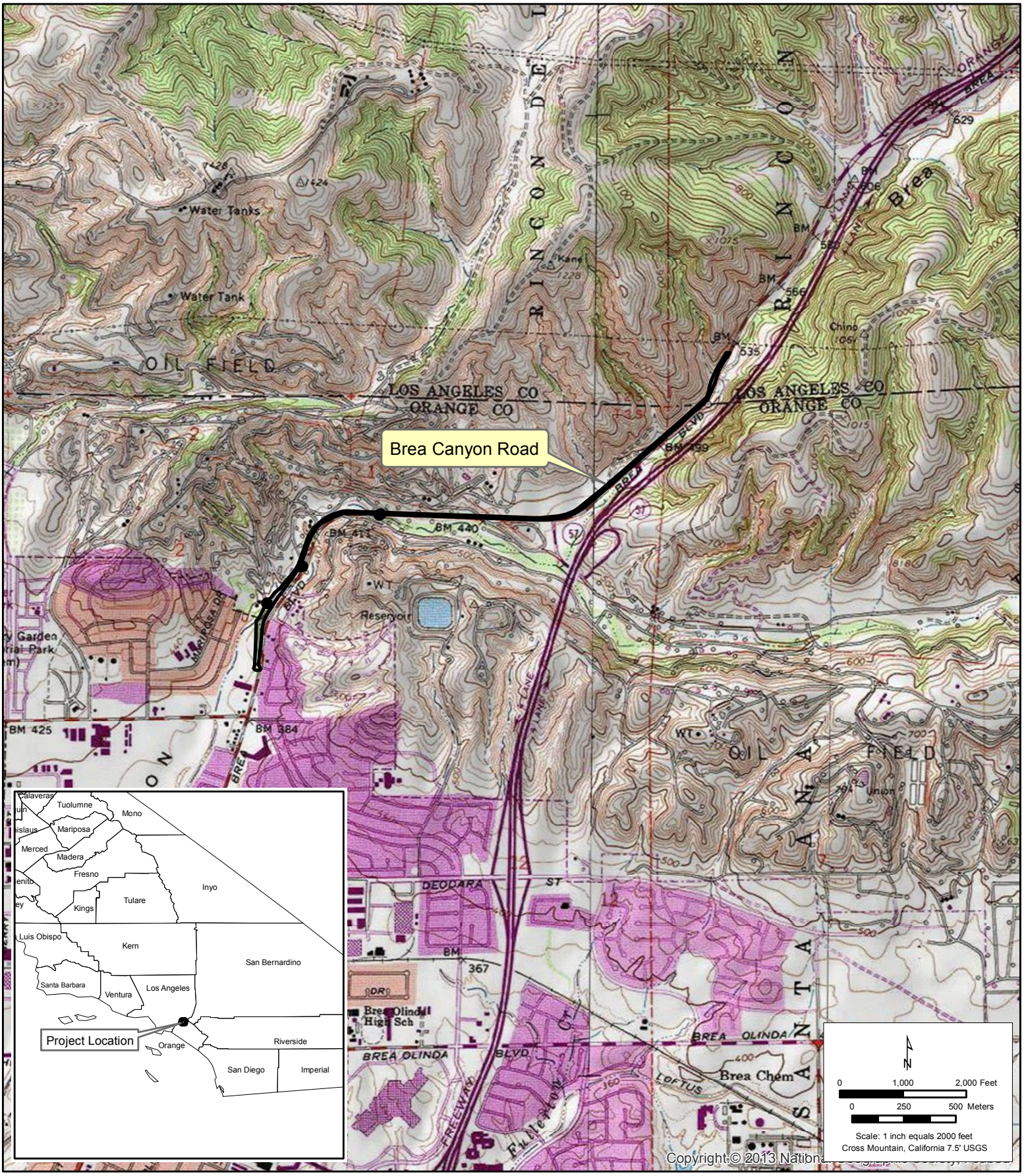
Page 4 of 4

*Resource Name or # (Assigned by recorder) Brea Canyon Road

*Map Name: La Habra

*Scale: 1:24,000

*Date of Map: 2015



DPR 523J (1/95)

*Required information

A portion of the Brea-Olinda Oil Field was encountered for the Brea Canyon Road Widening Project. The report citation for this study is as follows:

Beherec, Marc A. 2018. *Cultural Resources Assessment, Brea Canyon Road Widening, County of Orange, California.* Report prepared by AECOM for the County of Orange.

A collection of oil field structures were observed and documented at the segment of the Brea-Olinda Oil Field within the project area. These include seven pumpjacks (two on the Stearns lease and five on the Brea lease), an oil and gas separator, and a jackline support (Table). Some of these structures are functional, while others are clearly nonfunctional at this time. The earliest structure that could be dated with certainty dates to 1944, and the most recent dates to 2006. However, each of these structures is composed of interchangeable parts, and most appear updated and repaired over time, such that all of these structures appear modified over time. Each of the pumpjacks in the project area is likely to have been repeatedly repaired and updated with replacement parts. The site boundary of the Brea-Olinda Oil Field was extended as a result of the project (see attached map).

Table: Brea-Olinda Oil Field Structures Within the Project Area.

Structure	UTM
Stearns 103	418273 / 3755929
Stearns 104	418167 / 3755936
Brea Well #14	417757 / 3755872
Brea Well #34	418054 / 3755922
Brea Well #53	417956 / 3755930
Brea Well #71	417775 / 3755845
Brea Well #80	417991 / 3755915
Jackline Support	417875 / 3755960

Elements of at least two different leases were observed, although both leases are now owned by Bridge Energy. The two leases are the Stearns Lease and the Brea Lease. The structures observed in connection with the oil field included oil pumpjacks, a jackline support, and a bridge. Dirt roads were also observed. Both active and inactive pipelines were observed, many of which appeared recent, and none of which were formally recorded. Tall oil derricks dominate the skyline on the ridge overlooking the road, but none of these structures were within the permitting area. All except one of the pumpjacks were within locked chainlink fences and were therefore inaccessible; they were documented to the extent possible from outside the fence. Most of the pumpjacks appeared unused, and several appeared inoperable.

Stearns Lease
The segment of the Stearns Lease, which is within the project area, was encountered on the south side of the road west of the bend, within Possible Staging Area No. 2. Two pumpjacks were observed here. The pumps, both of which appear abandoned, stand at the southern end of the project area, outside the planned roadway but inside the possible staging area. These pumps are Stearns No. 103 and Stearns No. 104.

Stearns 103
Stearns 103 is a well with an inoperable pumpjack unit. The pumpjack bears two manufacturer's plaques on one Samson beam of the pump. Both plaques indicate that the structure was constructed by Emsco Manufacturing Company of Los Angeles, California, and Houston and Garland, Texas. One of the plaques indicates it was inspected in 1944. Stearns 103 is powered by a Continental-Emsco Co. Green Triangle Motor, manufactured by Marathon Electric Manufacturing Company.

Stearns 104
The Stearns 104 pumping unit was constructed of Lufkin parts, including Lufkin part numbers 435W, 2706W, and 2954W, and a Ratigan 219L 20-ton clamp. Like Stearns 103, Stearns 104 was powered by a Continental-Emsco Co. Green Triangle Motor, manufactured by Marathon Electric Manufacturing Company. Lufkin was founded in 1869 and is still active; it has passed through a number of hands since its founding and is now a brand of Apex Tool Group. J.P. Ratigan, Inc., was founded in 1915. An undated, but recent online Ratigan Oilfield Equipment brochure describes the Ratigan 219 Wire Line Clamp as "our latest development in clamping devices" (J.P. Ratigan, Inc. n.d.). Both Stearns 103 and Stearns 104 were inactive at the time of visit, but the Stearns 104 pumpjack is in better condition and may be slightly later in age than Stearns 103. No dates were observed on the Stearns 104 pumpjack, and a manufacturer's plate could not be read from outside the fenced area.

Brea Well #14
Brea Well #14 is on a concrete pad supported by a concrete retaining wall on the hillside, with an iron railing protecting edge around the pad. Brea Well #14 utilizes a National Supply Company pumping unit structure type EX-11SN-57DP, serial #1481G. The name NATIONAL appears in black capital letters on a yellow background on the walking beam. Brea Well #14 includes a pumping unit gear reducer manufactured by the National Supply Company of Gainesville, Texas. The engine is a General Electric Motor, 193482.

Brea Well #34
Brea Well #34 appeared constructed using the same construction methods as Brea Well #14 and was probably also manufactured by National at about the same time.

Brea Well #53
Brea Well #53 is an active, recent well within the project area. This well is a modern well, without a pumpjack, mounted on a new concrete pad inside a secondary containment. It uses an electric pump that appears to pump oil into a subsurface tank. Summit Brandon monitoring equipment and pipeline are used by this well. This recent pump most likely totally replaced an earlier pump in this location.

Brea Well #71
Brea Well #71 was operated by an Industrial Electric Motor, model number WWE5-18-184T, Serial No. 12408 GEJ, made in China, with Date Code 2006 G5. The unit is inoperable and its horsehead, which bore no visible writing, was detached and laying on the ground some distance away.

A short distance from Well #71 is an oil and gas separator. This unit bears a manufacturer's plaque that states that it is Model 41C220 and was built by Superior Tank and Construction Co. in March 1954.

Brea Well #80
No dates were observed on Brea Well #80, but this active well appears outfitted with a newer model pump and motor. The pumpjack appears to predate the pump and motor but nevertheless is one of the younger structures in the field.

Jackline Support
A jackline support stands next to the road at its curve and appears connected to the Brea wells. The support measures 7 feet 6 inches tall and 1 foot in diameter, and is constructed of cast iron. It once served to support a jackline attached to an oil jackline pump, but no remains of the rest of the structure were observed in the vicinity. No maker's marks or other diagnostic characteristics were observed on the support.

Individual pumpjacks within the Brea-Olinda Oil Field were first recorded and evaluated in 2000. At that time, the pumpjacks were found not eligible for inclusion in the CRHR (Ashkar and Lassell 2000).

In 2007, James W. Steely of SWCA mapped the oil field to extend within the Brea Canyon Road Widening Project area. Steely evaluated the Wildcatter's Park portion of the resource and recommended it as eligible for the NRHP and the CRHR under Criterion A/1 because of its association with UNOCAL and under Criterion B/2 because of its association with UNOCAL President Reese Taylor, who apparently ordered its construction (Steely 2007).

The resource was revisited in 2012 by Teri Fulton of LSA Associates. At the time the site was revisited, approximately 50 percent of the area within the site's boundaries as defined by Steely had been developed or was in the process of development for residential and commercial uses. The Wildcatter's Park segment of the resource had been completely destroyed. Noting that Steely's recommendation of eligibility applied primarily to the Wildcatter's Park portion of the site, Fulton recommended the resource no longer be considered eligible for the NRHP or CRHR under any criteria because of the destruction of Wildcatter's Park and other impacts to the site (Fulton 2012).

This study extends the site boundaries of the Brea-Olinda Oil Field to include more property within the project area. Each structure within this site boundary was recorded.

Neither the segment of the Brea-Olinda Oil Field surveyed nor any of the individual structures within the project area appear eligible for listing in the CRHR. The portion of the Brea-Olinda Oil Field encountered for the Brea Road Widening Project includes portions of the Stearns Lease and the Brea Lease, both currently operated by Bridge. No link to UNOCAL was uncovered during archival research. The segment of oil field encountered during the survey is part of the early Brea-Olinda Oil Field, which was first exploited in the late nineteenth century and which played an important role in the development of Southern California oil. But the hardware observed during the survey all post-dates World War II. None of the hardware dates to the period of significance for the development of the oil field. The oil field segment as encountered cannot be said to have a significant association with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1). The segment of oil field encountered is not associated with UNOCAL President Reese Taylor. Historic research did not identify any association with the life or career of any important individuals or groups (Criterion 2). The structures documented consisted of standard engineering structures composed of mass-produced parts typical of the second half of the twentieth century. They are not exemplars of construction or design and do not have high artistic value, nor are they the work of particular creative individual (Criterion 3). The standard post-World War II engineering structures within this segment of the Brea-Olinda Oil Field have not, and are unlikely to, yield data important to history or prehistory (Criterion 4). Finally, each of the structures appears extensively modified. Many of the structures are inoperable, and parts have been removed from these structures. Parts were replaced during the course of regular maintenance on most of the structures, such that some pumpjacks dating to the middle twentieth century are outfitted with electronic pumps from the early twenty-first century. None of the structures retains its integrity of materials, design, or workmanship. This segment of the Brea-Olinda Oil Field, including the seven pumpjacks, the oil and gas separator, and the jackline support, taken individually or as a whole, does not appear eligible for inclusion in the CRHR under any criteria.

References

Ashkar, S., and L. Fryman
2000 DPR 523 forms for Air-Balance Pump Jack and Counterbalance Pump Jack within P-30-177012. Document on file, SCCIC.

Ashkar, S., and S. Lassell
2000 DPR 523 forms for Counterbalance Pump Jack within P-30-177012. Document on file, SCCIC.

Fulton, Terri
2012 *Archaeological Survey Report for the State Route 57/Lambert Road Interchange Improvement Project, City of Brea, County of Orange, California.* Document on file, City Clerk's Office, City of Brea. Online: http://weblink.cityofbrea.net/WebLink/0/doc/72158/Page19.aspx. Accessed June 21, 2018.

J.P. Ratigan, Inc.
n.d. Oilfield Equipment. Online: https://www.upcoglobal.com/images/brochures/Brochure-Ratigan-Web.pdf. Accessed June 14, 2018.

Steely, James W.
2007 California DPR 523 Forms, 30-177012. Document on file, South Central Coastal Information Center, California State University, Fullerton.

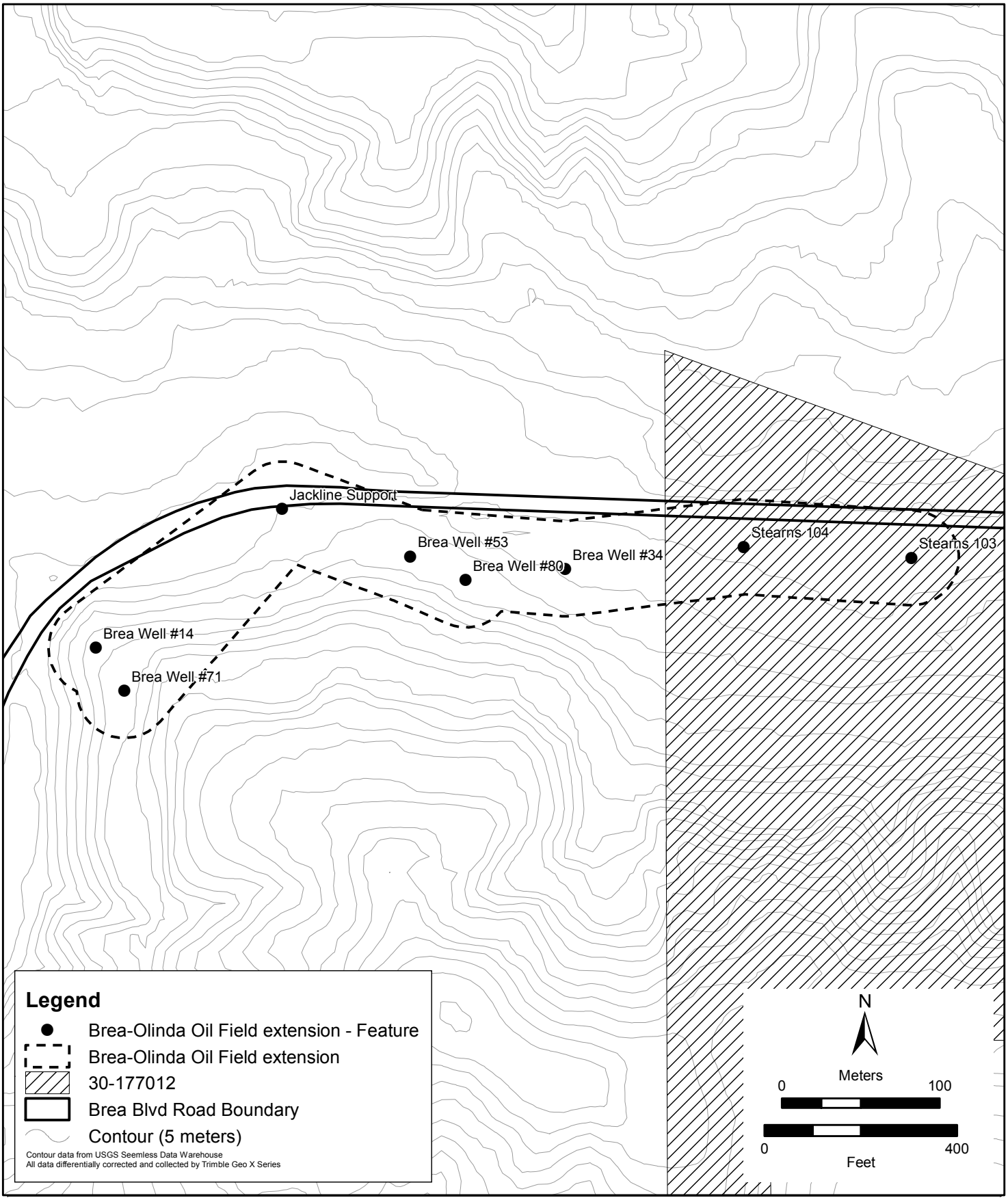
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary # P-30-177012
HRI#
Trinomial

Page 4 **of** 5 ***Resource Name or #** (Assigned by recorder) Brea-Olinda Oil Field extension

***Drawn By:** Alec Stevenson ***Date:** 8/2/2018



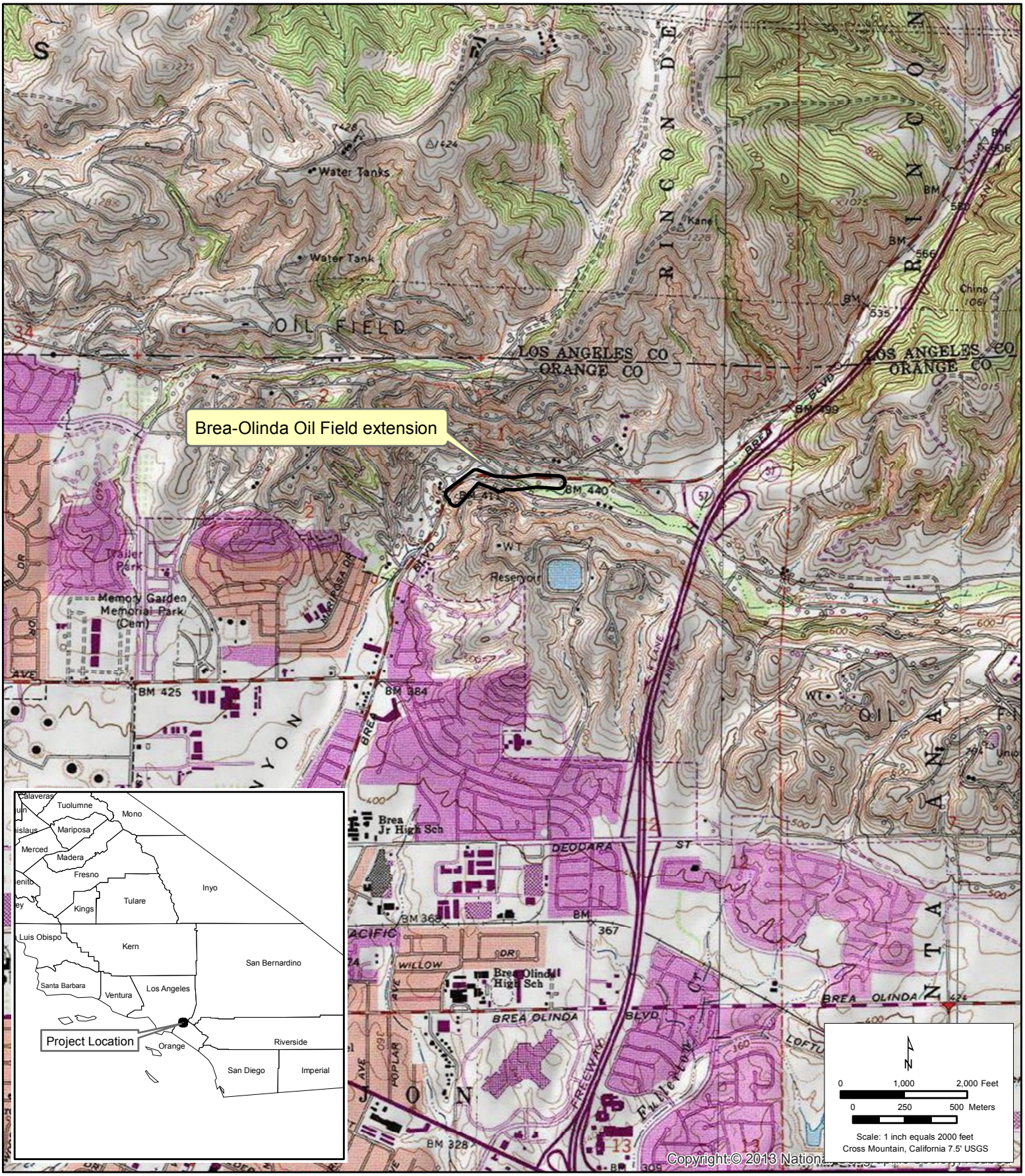
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P-30-177012
HRI#
Trinomial

***Resource Name or #** (Assigned by recorder) Brea-Olinda Oil Field extension

***Map Name:** La Habra ***Scale:** 1:24,000 ***Date of Map:** 2015



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 30-177012
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code _____ Reviewer _____ Date _____

Page 1 of 4 *Resource Name or #: (Assigned by Recorder) air-balance pump jack

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County Orange

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad Yorba Linda, PR 1981 Date 1964 T 3S ; R 9W ; ___ ¼ of ___ ¼ of Sec ___ ; _____ B.M.

c. Address _____ City Brea Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone: _____ ; _____ mE/ _____ mN

e. Other Locational Data: (e.g. parcel #, directions to resource, elevation, etc., as appropriate)

From Highway 57 South, take the Imperial Highway exit and proceed east. Turn left on Valencia Avenue and continue north past the "intersection" with Carbon Canyon Road. Just north of that intersection to the west is the Stearns property, where the pump jacks are located. Approximate UTMS: 419250mE/3755340mN; 419240mE/3754040mN; 420200mE/3754010mN/420210mE/3753870mN;421000mE/3753850mN; see cont. sheet

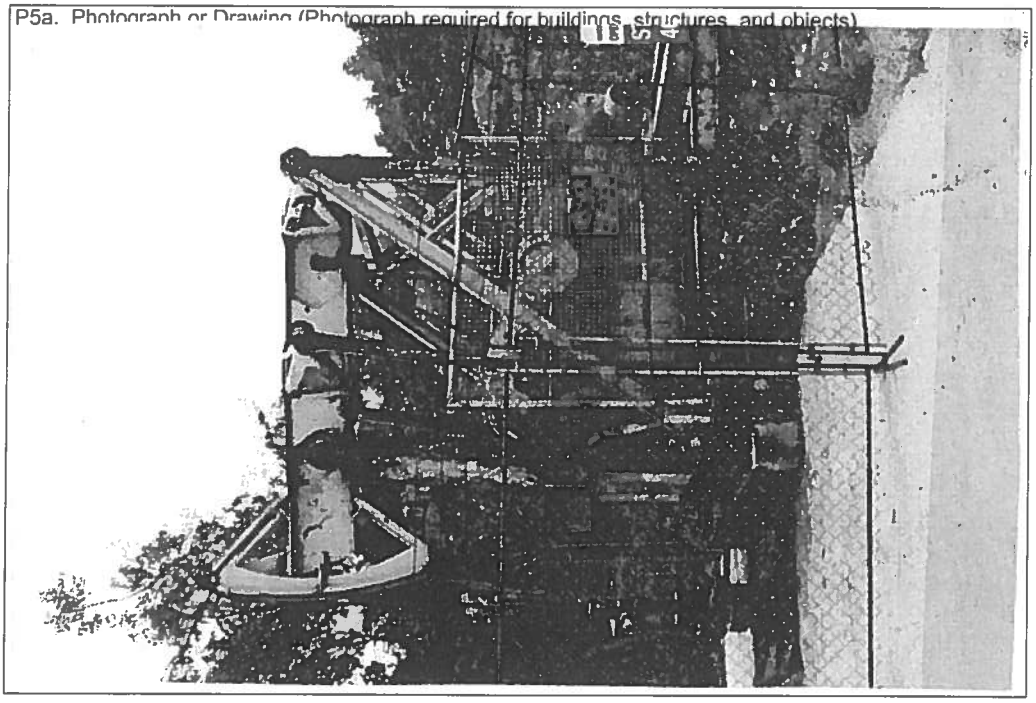
*P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The air-balanced pumps located on the property appear to be newer. They are constructed of bolted I-beams of newer steel. The horseheads are simply the top curve with braces. The Sampson post is located at the rear of the walking beam and braced with a right triangle. The pitman arms are located at the center of the walking beam and the compressed air rod is near the horsehead. The entire unit sits over with motor and gear reducer. The technology for these pumps was perfected in 1929. The pumps are in various states of repair. In virtually all cases, alterations have been made to the pumps, and parts added, in the course of their lifespans.

*P3b. Resource Attributes: (List attributes and codes) HP 11. Engineering Structure

*P4. Resources present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects)



P5b. Description of Photo: (View, date, accession #) Air-balanced pump jack

*P6. Date Constructed/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both
1894- present

*P7. Owner and Address:
Nuevo Energy

*P8. Recorded by: (Name, affiliation, and address)
S. Ashkar and L. Fryman
Jones & Stokes Associates, Inc.
2600 V Street Sacramento, CA 95818

*P9. Date Recorded: 5/12/00

*P10. Survey Type: (Describe)

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") Jones & Stokes Associates, Inc. 2000. CRHR Evaluation of Oil Wells on the Stearns Property within the sphere of influence of the City of Brea, Orange County, California. Prepared for the City of Brea

*Attachments: NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List): _____

DPR 523A (1/95) *Required Information

OR-3711

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # 30-177012
HRI #

BUILDING, STRUCTURE, AND OBJECT RECORD

*NRHP Status Code

*Resource Name or # (Assigned by recorder) air-balance pump jack

B1. Historic Name:

B2. Common Name:

B3. Original Use: Oil well B4. Present Use: Oil well

*B5. Architectural Style: N/A

*B6. Construction History: (Construction date, alterations, and date of alterations)
Constructed as early as 1894, altered and updated as necessary since initial construction

*B7. Moved? [X] No [ ] Yes [ ] Unknown Date: Original Location:

*B8. Related Features:
Other oil wells, including counterbalanced pump jacks, storage facilities (modern)

B9a. Architect: n/a b. Builder: unknown

*B10. Significance: Theme: Early Oil Industry Area: Southern California

Period of Significance: 1894-1920 Property Type: Applicable Criteria:

(Discuss imporance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Oil production was an important part of the economic development of Southern California. Some of the oil wells on the Stearns property were drilled as early as 1894.

Resources associated with the theme of the oil industry in Southern California that might be eligible for listing in the CRHR would include oil derricks, pumps, and wells, storage and processing facilities, oil pipelines, and associated buildings. Historic resources on the property consist of oil pumps. These oil pumps, individually, lack the context necessary to be representative of the early oil industry. Pumps are representative of only one part of the process of oil extraction and production. Other facilities, including derricks, storage and processing structures, pipelines and transportation facilities, and administrative and infrastructure facilities, are integral to the functioning of an operating oil field. Additionally, many of the oil pumps have been in continuous use since the well was drilled. These pumps have been updated as time progressed, making them an amalgam of the changes in technology that have occurred throughout the years, rather than representative examples of the significant time period (1894 to 1920s). Therefore, the pumps are recommended not eligible for listing in the CRHR for their association with the theme of the development of the early oil industry because they lack context and integrity.
(See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes)

*B12. References:

B13. Remarks:

(Sketch Map with north arrow required.)

*B14.Evaluat S. Ashkar and S. Lassell, Jones & Stokes
2600 V Street, Suite 100 Sacramento, CA 95818-1914

*Date of

(This space reserved for official comments.)

*Required Information

P2e. Locational Data: UTMs, continued: 421010mE/ 3754040mN; 421700mE/3754050mN; 421630mE/3755010mN

B10. Significance:

In order to be eligible for listing in the CRHR for its association with a person important in history, a resource must be representative of the theme, activities, or endeavors for which that individual is historically important. While Doheny was active in the oil industry, and brought about the construction of a rail line to the Olinda oil fields, his association with the Stearns Lease is peripheral to his importance as the primary developer of the Olinda oil field to the east or as a prominent Los Angeles land holder. The pumps are not representative of the activities for which Edward L. Doheny is historically significant. Stewart's historical importance stems from his early association with the Union Oil Company. The oil pumps remaining on this property are not a good example of the oil fields that Stewart's company established, because they represent only one facet of oil extraction. Oil fields consist of other facilities in addition to oil wells. The pumps are not representative of the activities of Stewart because without the remainder of the facilities, they lack context. Therefore, the pumps are recommended not eligible for CRHR listing for their association with historically significant individuals.

Oil wells from the period of significance may be said to embody the technological characteristics of early oil production if they have remained basically unchanged since that time period. The oil field on the Stearns Lease has been in constant operation since its establishment. As technology changed, the pumps were updated. While some pumps retain some characteristics of their original design, other defining characteristics have been changed. Power plants (or motors) have been updated, as have pumping mechanisms in some cases. These pumps lack integrity due to their continuous maintenance. Therefore, the pumps are recommended not eligible for listing in the CRHR as examples of historic engineering or technology.

As individual resources, these pumps lack the context necessary to convey their significance, however, a number of resources considered as a district may be eligible. A representative array of resources sufficient to convey what the oil field or settlement was like between 1894 and the 1920s would need to be present for the resources to qualify for CRHR listing as a historic district. Historic photographs and archival research indicate that between 1894 and the 1920s, this oil field consisted of derricks, pumps, oil storage and processing facilities, and a camp which was composed of boarding houses, homes, warehouses, and administrative buildings. All that remains of the oil field today are the pumps. Therefore, as a district, the Stearns Lease lacks integrity and is recommended not eligible for listing in the CRHR.

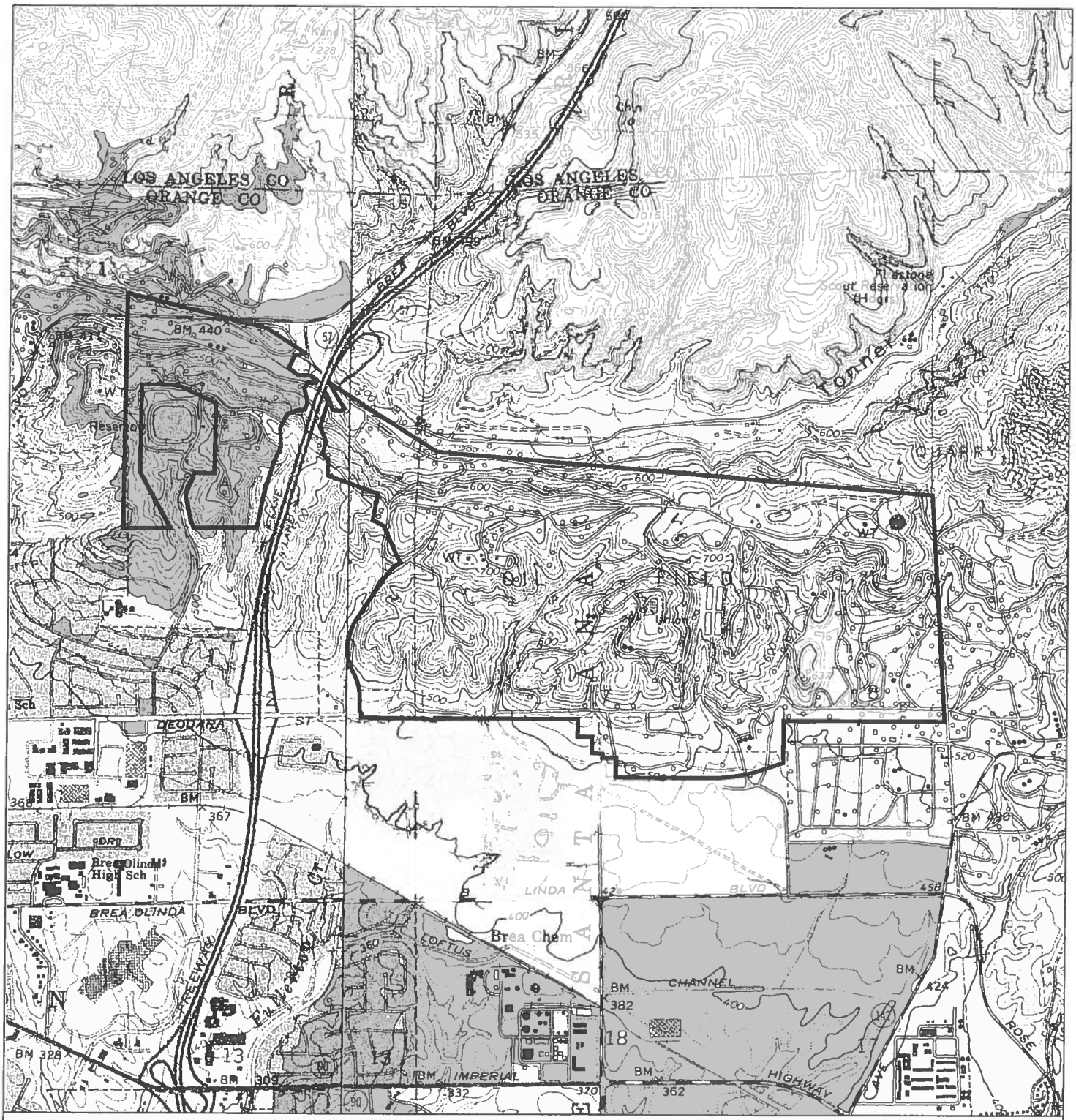
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 30-177012
HRI #
Trinomial

*Resource Name or #: Air Balance Pump Jack

*Map Name: La Habra &Yorba Linda Quadrangles *Scale: (see bar scale) *Date of Map: Pr 1981



0 1,000 2,000 3,000 4,000 5,000
feet
Scale = 1:24,000

Base map: Portions of USGS 7.5'-series Quadrangles
La Habra, California, 1964, Photorevised 1981 and
Yorba Linda, California, 1964, Photorevised 1981

14°
TN mN

*Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 30-177012
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code _____ Reviewer _____ Date _____

Page 1 of 5 *Resource Name or #: (Assigned by Recorder) counterbalance pump jack

P1. Other Identifier:

*P2. Location: ☐ Not for Publication ☒ Unrestricted *a. County Orange

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

*b. USGS 7.5' Quad Yorba Linda, PR1981 Date 1964 T 3S ; R 9W ; ___ ¼ of ___ ¼ of Sec ___ ; _____ B.M.

c. Address _____ City Brea Zip _____

d. UTM: (Give more than one for large and/or linear resources) Zone: 11 ; _____ mE/ _____ mN

e. Other Locational Data: (e.g. parcel #, directions to resource, elevation, etc., as appropriate)

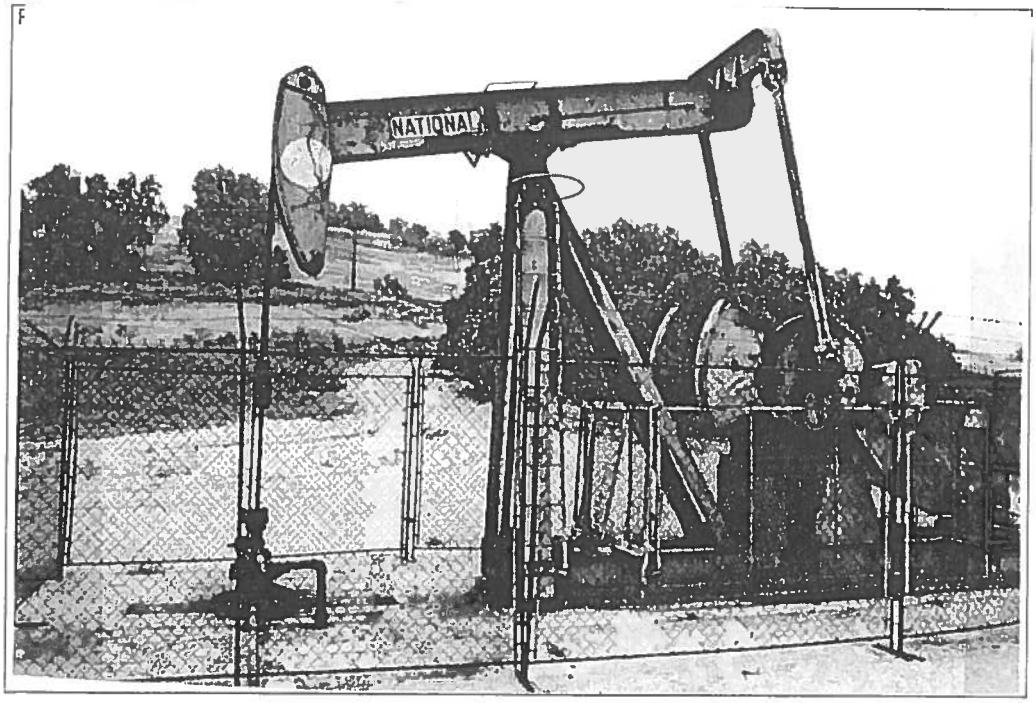
From Highway 57 South, take the Imperial Highway exit and proceed east. Turn left on Valencia Avenue and continue north past the "intersection" with Carbon Canyon Road. Just north of that intersection to the west is the Stearns property, where the pump jacks are located. Approximate UTMS: 419250mE/3755340mN; 419240mE/3754040mN; 420200mE/3754010mN/420210mE/3753870mN;421000mE/3753850mN; see cont. sheet

*P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The beam-balanced pumps located on the property appear to be older than the air-balanced pumps. They are constructed of welded I-beams. Some counterweights are made of wooden posts in a steel fitting, and others are steel with "Lufkin" (Lufkin Industries, Inc., founded 1902) embossed on the side (Lufkin Industries, n.d.). Bases are concrete, I-beams, or in some cases, both. On several of the pumps the horseheads are "skeletal," that is they consist of only the top curve. All these pumps are driven by electric motors, located on the opposite end of the walking beam from the horsehead. The equalizers vary in shape and placement; some are below the walking beam, and others are above it. Other brand names noted on the pumps included "National" embossed on a walking beam, and "Pacific Gear" embossed on a gear reducer. The pumps are in various states of repair. In virtually all cases, alterations have been made to the pumps, and parts added, in the course of their lifespans.

*P3b. Resource Attributes: (List attributes and codes) HP 11. Engineering Structure

*P4. Resources present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (isolates, etc.)



P5b. Description of Photo: (View, date, accession #) _____

*P6. Date Constructed/Age and Sources: ☒ Historic ☐ Prehistoric ☐ Both
1894- present

*P7. Owner and Address:
Nuevo Energy

*P8. Recorded by: (Name, affiliation, and address)
S. Ashkar and L. Fryman
Jones & Stokes Associates, Inc.
2600 V Street Sacramento, CA 95818

*P9. Date Recorded: 5/12/00

*P10. Survey Type: (Describe)

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") Jones & Stokes Associates, Inc. 2000. CRHR Evaluation of Oil Wells on the Stearns Property within the sphere of influence of the City of Brea, Orange County, California. Prepared for the City of Brea

*Attachments: NONE ☒ Location Map ☐ Sketch Map ☒ Continuation Sheet ☒ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other (List): _____

DPR 523A (1/95) *Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

30-177012

Primary # _____
HRI # _____

BUILDING, STRUCTURE, AND OBJECT RECORD

Page 2 of 5

*NRHP Status Code _____

*Resource Name or # (Assigned by recorder) counterbalance pump jack

B1. Historic Name: _____

B2. Common Name: _____

B3. Original Use: Oil well

B4. Present Use: Oil well

***B5. Architectural Style:** N/A

*B6. Construction History: (Construction date, alterations, and date of alterations)
Constructed as early as 1894, altered and updated as necessary since initial construction

***B7. Moved?** [X] No [ ] Yes [ ] Unknown **Date:** _____ **Original Location:** _____

***B8. Related Features:**
Other oil wells, including air balanced pump jacks, storage facilities (modern)

B9a. Architect: n/a

b. Builder: unknown

***B10. Significance: Theme:** Early Oil Industry **Area:** Southern California

Period of Significance: 1894-1920 **Property Type:** _____ **Applicable Criteria:** _____

(Discuss imporance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

Oil production was an important part of the economic development of Southern California. Some of the oil wells on the Stearns property were drilled as early as 1894.

Resources associated with the theme of the oil industry in Southern California that might be eligible for listing in the CRHR would include oil derricks, pumps, and wells, storage and processing facilities, oil pipelines, and associated buildings. Historic resources on the property consist of oil pumps. These oil pumps, individually, lack the context necessary to be representative of the early oil industry. Pumps are representative of only one part of the process of oil extraction and production. Other facilities, including derricks, storage and processing structures, pipelines and transportation facilities, and administrative and infrastructure facilities, are integral to the functioning of an operating oil field. Additionally, many of the oil pumps have been in continuous use since the well was drilled. These pumps have been updated as time progressed, making them an amalgam of the changes in technology that have occurred throughout the years, rather than representative examples of the significant time period (1894 to 1920s). Therefore, the pumps are recommended not eligible for listing in the CRHR for their association with the theme of the development of the early oil industry because they lack context and integrity.
(See continuation sheet.)

B11. Additional Resource Attributes: (List attributes and codes) _____

***B12. References:**

(Sketch Map with north arrow required.)

B13. Remarks:

***B14.Evaluator:** S. Ashkar and S. Lassell, Jones & Stokes Associates, Inc.
2600 V Street, Suite 100 Sacramento, CA 95818-1914

***Date of Evaluation:** _____

(This space reserved for official comments.)

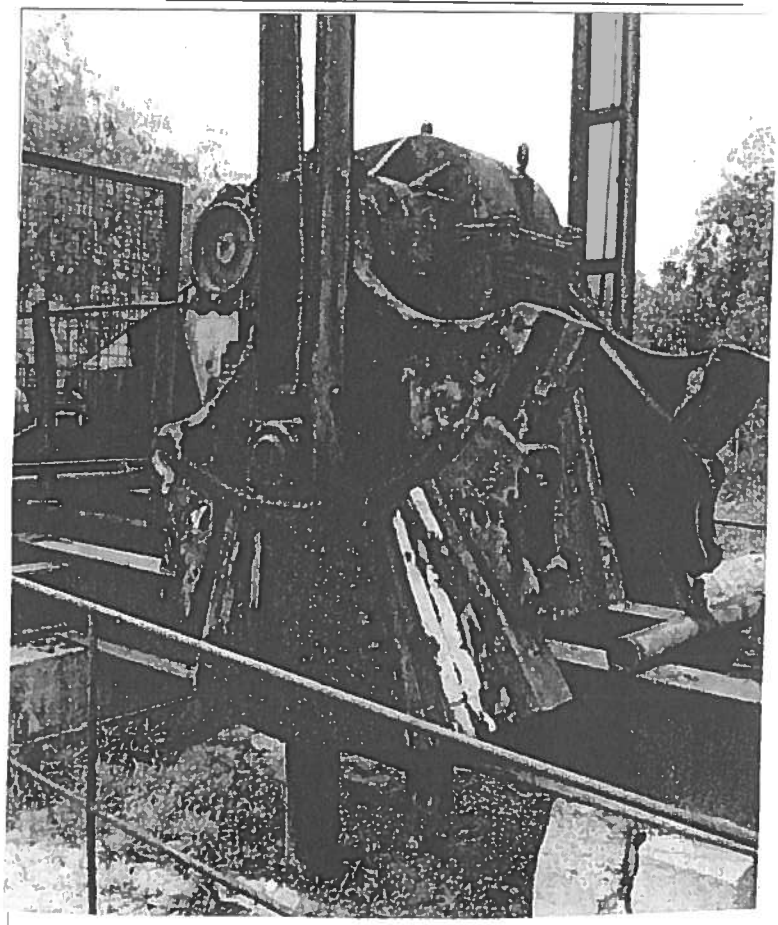
P2e. Locational Data: UTMs, continued: 421010mE/ 3754040mN; 421700mE/3754050mN; 421630mE/3755010mN

B10. Significance:

In order to be eligible for listing in the CRHR for its association with a person important in history, a resource must be representative of the theme, activities, or endeavors for which that individual is historically important. While Doheny was active in the oil industry, and brought about the construction of a rail line to the Olinda oil fields, his association with the Stearns Lease is peripheral to his importance as the primary developer of the Olinda oil field to the east or as a prominent Los Angeles land holder. The pumps are not representative of the activities for which Edward L. Doheny is historically significant. Stewart's historical importance stems from his early association with the Union Oil Company. The oil pumps remaining on this property are not a good example of the oil fields that Stewart's company established, because they represent only one facet of oil extraction. Oil fields consist of other facilities in addition to oil wells. The pumps are not representative of the activities of Stewart because without the remainder of the facilities, they lack context. Therefore, the pumps are recommended not eligible for CRHR listing for their association with historically significant individuals.

Oil wells from the period of significance may be said to embody the technological characteristics of early oil production if they have remained basically unchanged since that time period. The oil field on the Stearns Lease has been in constant operation since its establishment. As technology changed, the pumps were updated. While some pumps retain some characteristics of their original design, other defining characteristics have been changed. Power plants (or motors) have been updated, as have pumping mechanisms in some cases. These pumps lack integrity due to their continuous maintenance. Therefore, the pumps are recommended not eligible for listing in the CRHR as examples of historic engineering or technology.

As individual resources, these pumps lack the context necessary to convey their significance, however, a number of resources considered as a district may be eligible. A representative array of resources sufficient to convey what the oil field or settlement was like between 1894 and the 1920s would need to be present for the resources to qualify for CRHR listing as a historic district. Historic photographs and archival research indicate that between 1894 and the 1920s, this oil field consisted of derricks, pumps, oil storage and processing facilities, and a camp which was composed of boarding houses, homes, warehouses, and administrative buildings. All that remains of the oil field today are the pumps. Therefore, as a district, the Stearns Lease lacks integrity and is recommended not eligible for listing in the CRHR.



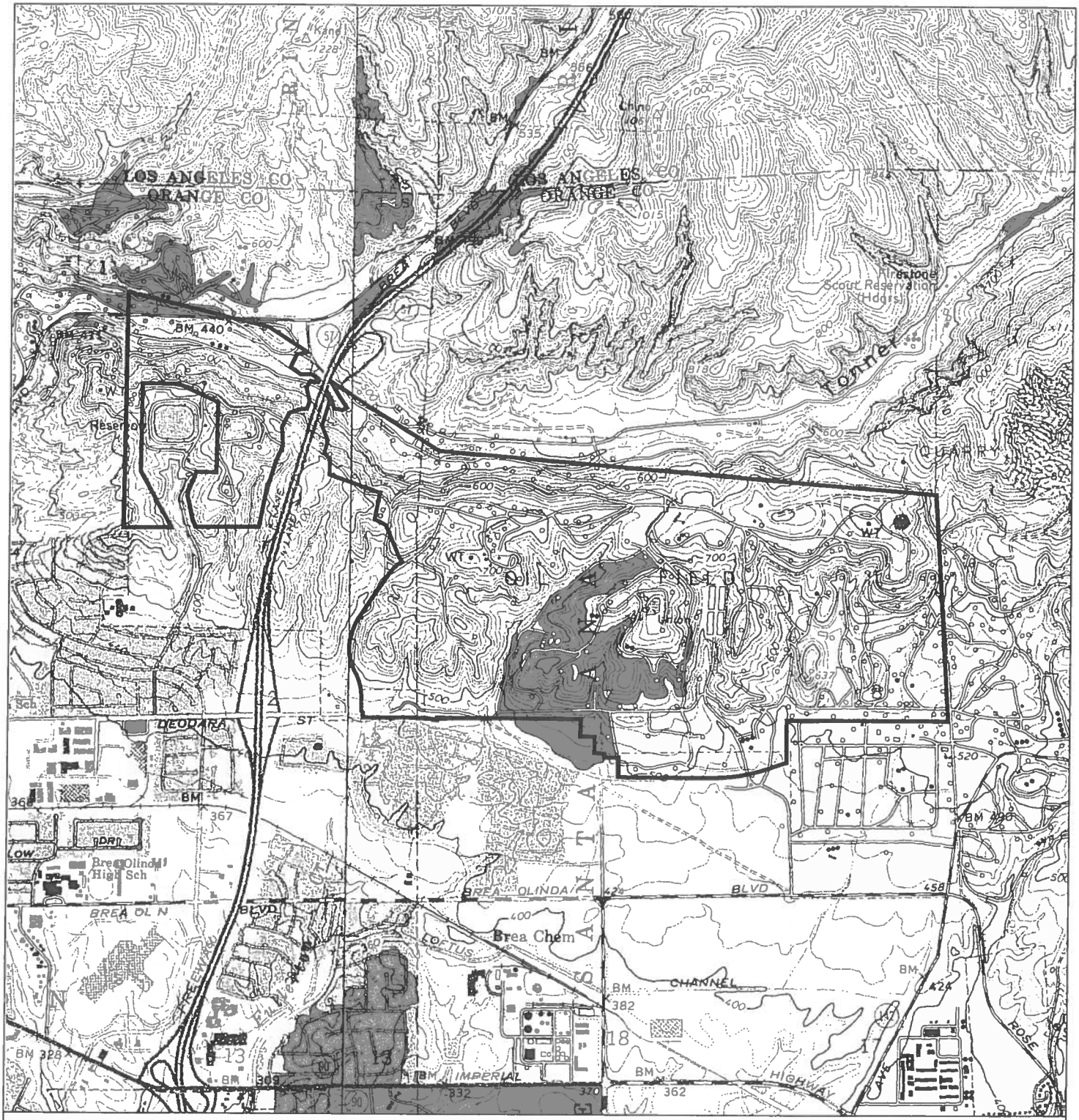
State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 30-177012
HRI #
Trinomial

*Resource Name or #: Counter Balance Pump Jack

*Map Name: La Habra &Yorba Linda Quadrangles *Scale: (see bar scale) *Date of Map: Pr 1981



Base map: Portions of USGS 7.5'-series Quadrangles
La Habra, California, 1964, Photorevised 1981 and
Yorba Linda, California, 1964, Photorevised 1981

*Required Information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code | Reviewer | Date

*Resource Name or #: Wildcatter's Park
P1. Other Identifier: Brea-Olinda Oil Field

***P2. Location:** ☐ **Not for Publication** ☑ **Unrestricted** ***a. County:** Orange
***b. USGS 7.5' Quad:** La Habra, Yorba Linda **Date:** both 1964, both photorevised 1981
Land Grant property, but parly surveyed as **T** 3S; **R** 9W **of Sec** 7 & 8, and **T** 3S; **R** 10W; **of Sec** 12**;** San Bernardino **B.M.**
c. Address: see boundaries in **P3a.** City: Brea Zip: 92821
d. UTM: Zone: 11; 421223 mE/ 3754314 mN (G.P.S.) (@ Stearns 71 Derrick in "Wildcatters Park")
e. Other Locational Data: Elevation: Ranges from approximately 450 to 765 feet above sea level.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The property is the northeast corner of the San Juan Cajon de Santa Ana Land Grant, in the rugged Chino Hills of Orange County. Its combined oilfield leases, with almost 200 active wells (in 1997) of more than 300 drilled here since 1894, cover approximately 820 acres of compact rolling hills south of Tonner Canyon and north of the Santa Ana River floodplain. The 1913 Landa Farmstead, home of a Basque sheepherder and family, once stood on a hilltop of the oilfield's northeast area, now the site of its natural gas processing plant. Historic wellhead steel derricks, reflecting early 20th century drilling and maintenance practices, have been removed, but one from the "Stearns 71" well is preserved at Wildcatters Park (see BSO Form, page 4) in a canyon at the property's southeast area. Throughout the oilfield, newer and older operating facilities present a catalog of pumping, storage, transport, and maintenance structures and buildings from the field's century of operation. The boundaries are roughly Valencia Avenue on the east, Lambert Road on the south, Brea Boulevared on the west and north, and Tonner Canyon Road on the north.

***P3b. Resource Attributes:** HP8. Industrial building, HP11. Engineering structure, HP19. Bridge, HP25 Amusement park, HP30. Trees / vegetation, HP32. Rural open space, HP43. Mine [oilfield] structure / building, HP46. Walls / gates / fences.
***P4. Resources Present:** ☑Building ☑Structure ☐Object ☐Site ☑District ☐Element of District ☐Other (Isolates, etc.)

P5a1. Photo or Drawing

P5b1. Description of Photo: Five oil pump jacks in close proximity, others on hills in background, facing N, 22 February 2007.

***P6. Date Constructed/Age and Sources:** ☑Historic ☐Prehistoric ☐Both
See Continuation Sheet, page 8.

***P7. Owner and Address:**
Shea Homes
1250 Corona Pointe Court, Ste. 600
Corona, CA, 92879

***P8. Recorded by:**
James W. Steely, SWCA Env Conslt
23392 Madero, Suite L
Mission Viejo, CA 92691

***P9. Date Recorded:** 2/22/06
***P10. Survey Type:**
Reconnaissance Level

***P11. Report Citation:** Backes, Clarus J. et al, 2010. *Archaeological Monitoring For The Tonner Hills Project Located In Brea, Orange County, California.* Report submitted to Shea Homes of Orange County. Copies on file at SWCA Environmental Consultants, Inc., South Pasadena, CA.

***Attachments:** ☐NONE ☑Location Map ☑Sketch Map ☑Continuation Sheet ☑Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

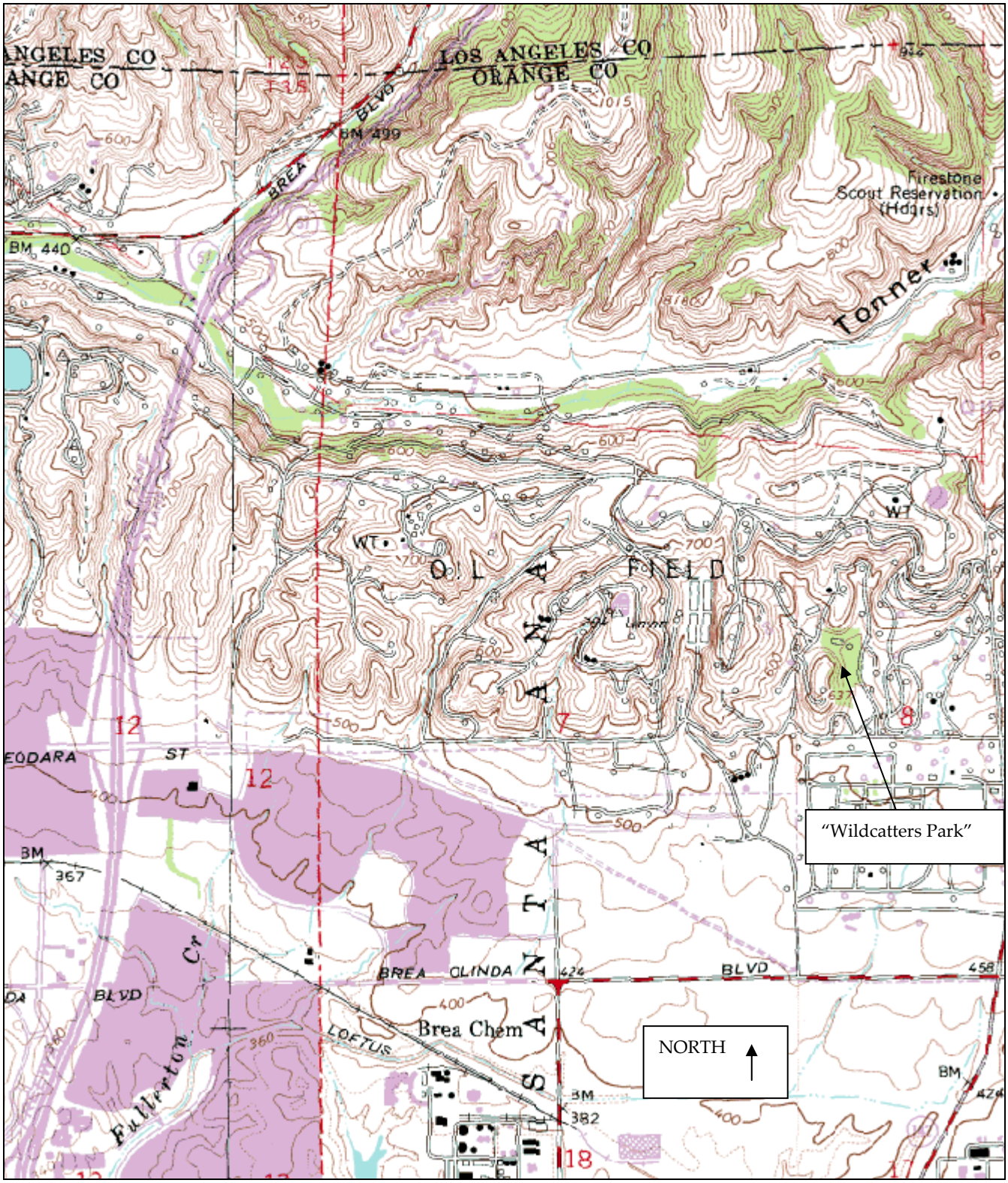
Primary #
HRI#
Trinomial

*Resource Name: **Wildcatter's Park, Brea-Olinda Oil Field**

*Map Name: Yorba Linda Quad

*Scale: 1:24000

*Date of Map: 1978



DPR 523J (1/95)

*Required information

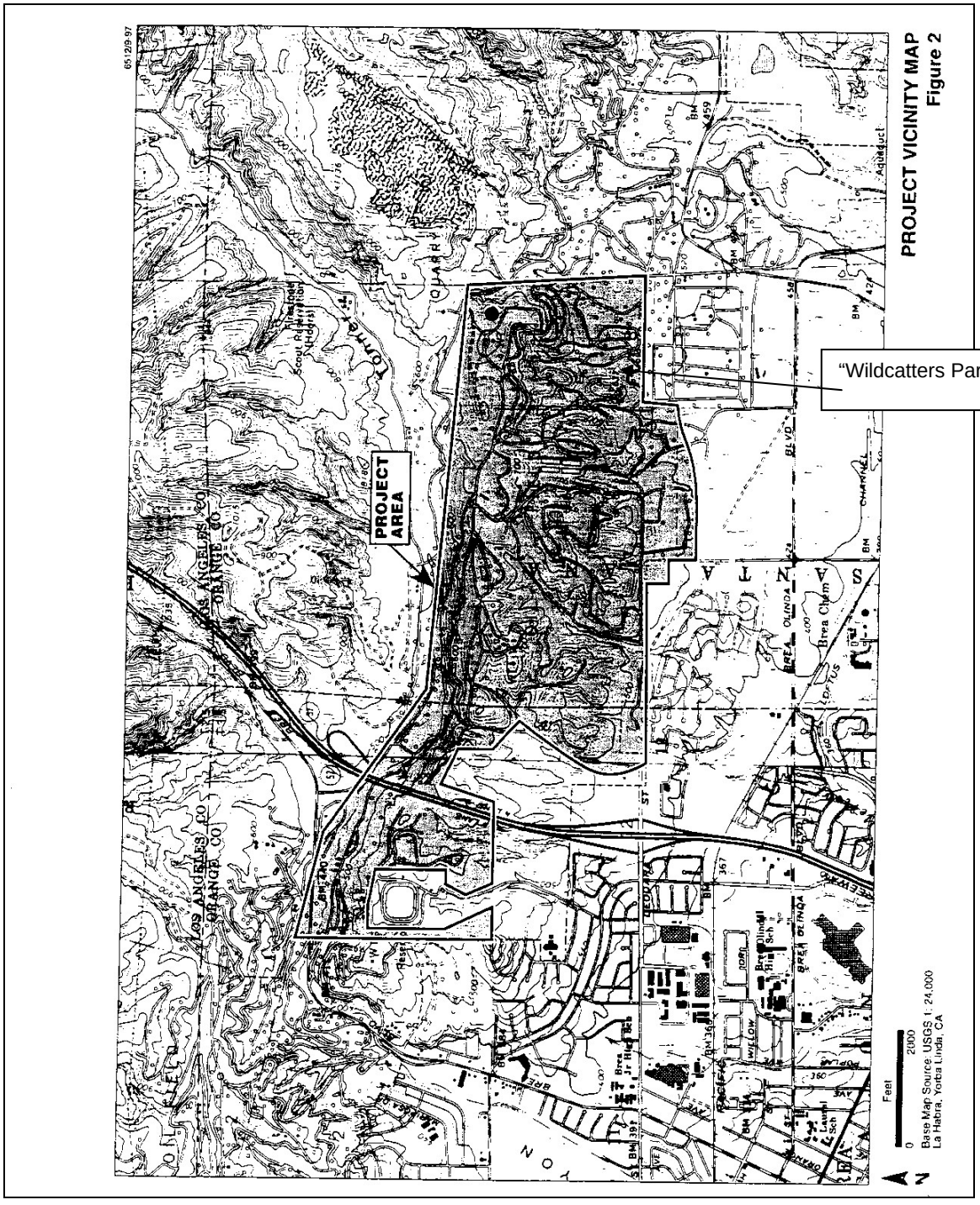
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name: **Wildcatter's Park, Brea-Olinda Oil Field**

*Drawn By: Shea Homes of Southern California

*Date: c. 2005



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
Primary #
HRI#

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code:** 3S (NRHP eligible), 3CS (CRHR eligible)
***Resource Name: "Wildcatters Park"**

B1. Historic Name: part of **Brea-Olinda Field, "Stearns Lease [or Fee]," Union Oil Corporation (UNOCAL)**
B2. Common Name: Oilfield employees' park
B3. Original Use: oilfield access roads; oilfield employees' park B4. Present Use: abandoned (in 2006)
***B5. Architectural Style:** Modern (concrete block restrooms building)
***B6. Construction History:** (Construction date, alterations, and date of alterations) This cluster of recreation buildings and structures appears to date from about 1960, based on the modern, utilitarian design and concrete-block construction of the restrooms building. A large open pavilion of fabricated metal sheltered occasional employee-event picnics and food preparation, and a small wooden kiosk perhaps housed event management and/or food sales. The "Stearns 71" fabricated-steel derrick is interpreted with a plaque explaining its original 1927 assignment to an oilwell about ½ mile to the northwest, and its move to this location in 1994.

***B7. Moved?** ☐No ☑Yes ("Stearns 71" derrick) ☐Unknown **Date:** 1994 **Original Location:** approximately ½ mile northwest
***B8. Related Features:** Large open pavilion of metal, restrooms building of concrete block, sales kiosk of wood, concrete pad marked for a ball court, and introduced plantings including mature California palms.

B9a. Architect: unknown b. Builder: Union Oil Corporation
***B10. Significance: Theme:** Corporate Employees' Recreation Facilties **Area:** Southern California Oilfields
Period of Significance: 1945-1962 **Property Type:** District **Applicable Criteria:**
NRHP A/CRHR 1: association with Union Oil employee largesse; NRHP B/CRHR 2: association with Reese Taylor, UNOCAL president and chairman 1938–1962.
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
"Wildcatters Park" is a recent residential developer's name for the c. 1960 employees' recreation park, including a commemorative historic oilwell derrick, apparently assembled by Union Oil Corporation (UNOCAL) as a benefit for employees of Union's Brea-area operations and their families. This lush, hidden, and exclusive island for recreation inside a large utilitarian oilfield was indicative of the paternal attitude of a large oil company toward its employees (Criterion A/1), and probably of the policies and attitude of UNOCAL's flamboyant and longtime leader Reese Taylor (Criterion B/2). The park retains integrity of location, design, materials, workmanship, feeling, setting, and association. It is recommended eligible for listing in the NRHP and CRHR.

B11. Additional Resource Attributes: HP8. Industrial building, HP11. Engineering structure, HP25 Amusement park, HP30. Trees / vegetation, HP32. Rural open space, HP43. Mine [oilfield] structure / building, HP46. Walls / gates / fences.

***B12. References:** See Continuation Sheet, page 8.

B13. Remarks: Effects of residential development for much of the historic Brea-Olinda Oilfield surrounding the park will be mitigated to less than significant with the proposed incorporation of the old UNOCAL park and its facilities into "Wildcatters Park" for the Tonner Hills and Walden Hills development.

***B14. Evaluator:**
James W. Steely, SWCA Environmental Consultants
23392 Madero, Suite L
Mission Viejo, CA 92691

***Date of Evaluation:**
22 February 2006, 5 March 2007

(Sketch Map with north arrow required.)
See Sketch Map, page 5.

(This space reserved for official comments.)

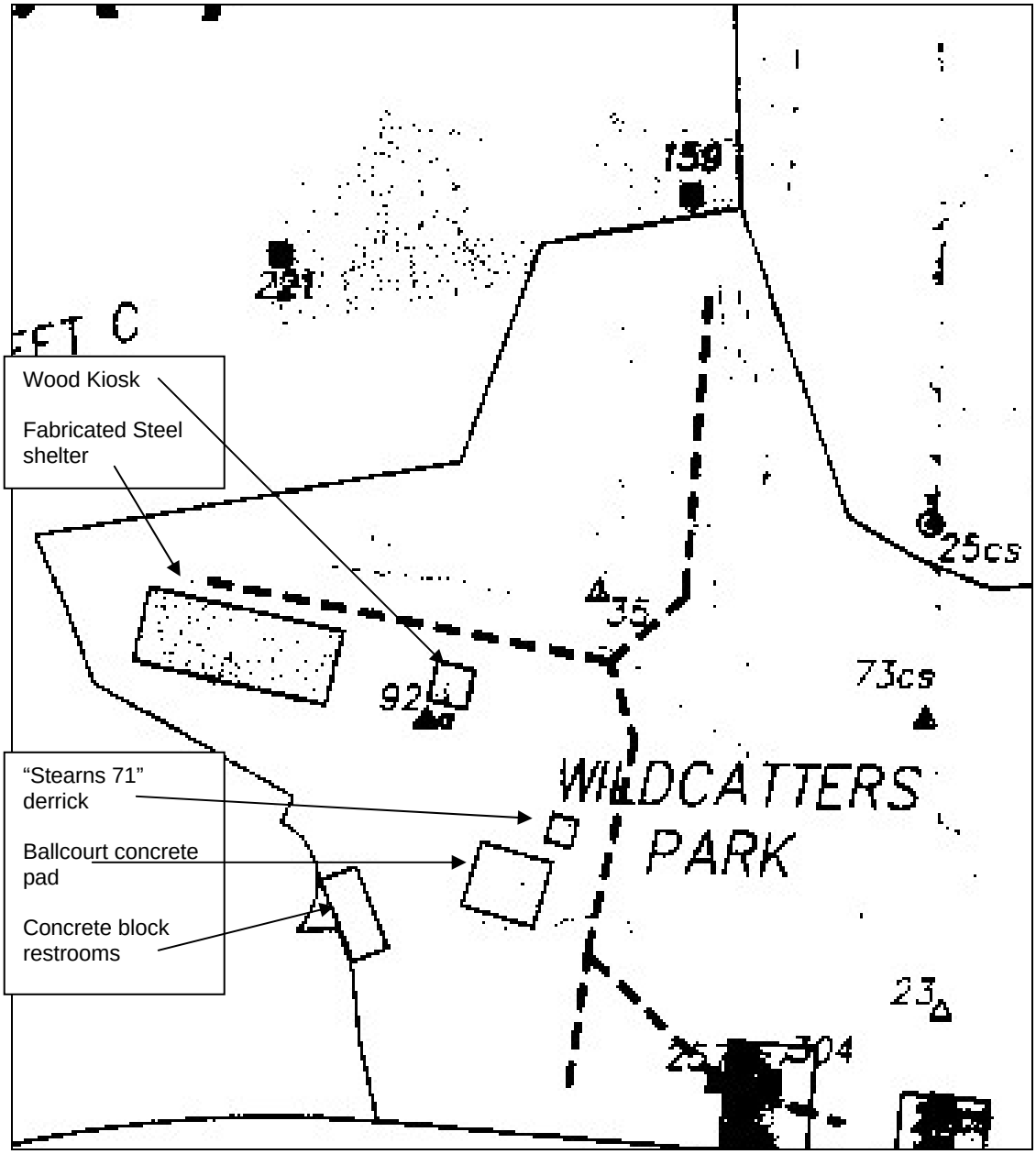
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI#
Trinomial

*Resource Name: **Wildcatter's Park, Brea-Olinda Oil Field**

*Drawn By: RBF Consulting, Irvine

*Date: 1 February 2005



*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI#
Trinomial

Page 6 **of** 8 ***Resource Name:** Wildcatter's Park, Brea-Olinda Oil Field
*Recorded by: James W. Steely, SWCA Environmental Consultants *Date: 2/22/06 ☑ **Continuation** ☐ **Update**

P5a2.

P5b2. Brea-Olinda Oilfield, facing WNW, 22 Febraury 2006. Derricks and truck survive from a century of oilfield operation.

P5a3.

P5b3. Brea-Olinda Oilfield, facing N, 22 February 2006. Derricks, surge tank, and piping carry 1930s builders' plates.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

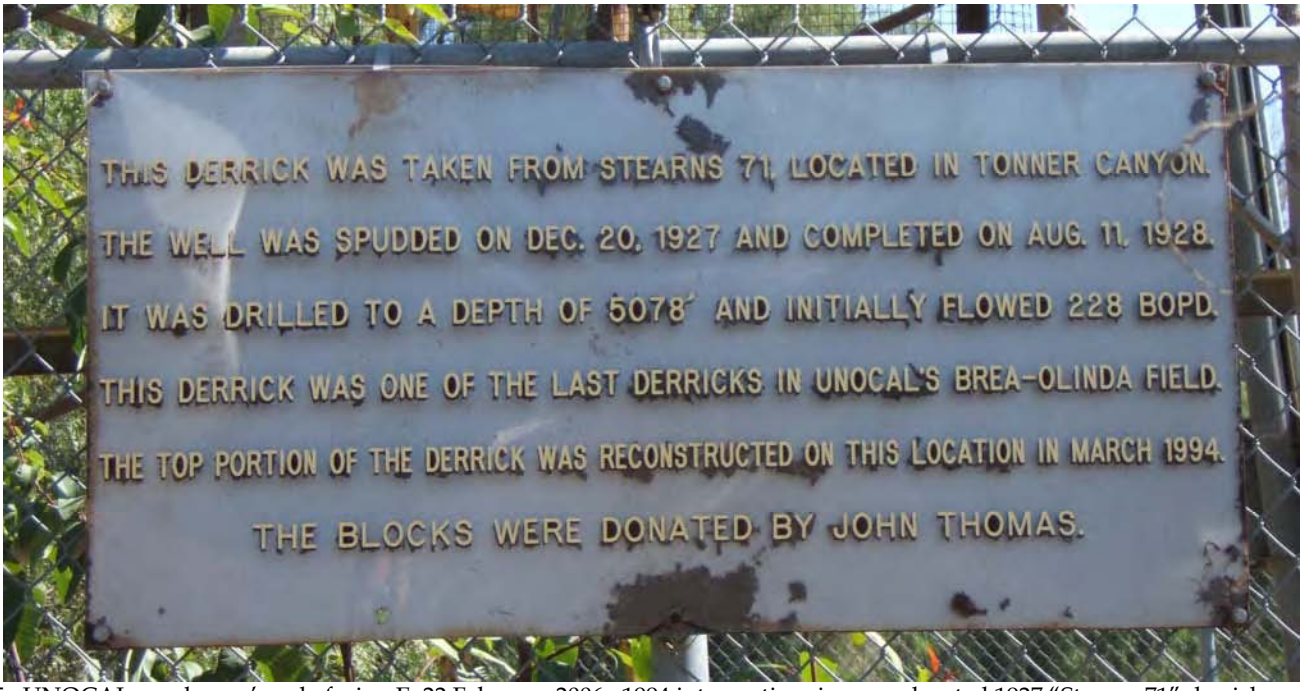
Primary #
HRI#
Trinomial

Page 7 **of** 8 ***Resource Name:** Wildcatter's Park, Brea-Olinda Oil Field
*Recorded by: James W. Steely, SWCA Environmental Consultants *Date: 2/22/06 ☑ **Continuation** ☐ **Update**

P5a4.

P5b4. UNOCAL employees' park, facing WNW, 22 February 2006. 1927 "Stearns 71" derrick preserved amid steel events shed (middle distance), wood kiosk (left of bare tree in foreground), and concrete-block restrooms (far left in trees).

P5a5.



P5b5. UNOCAL employees' park, facing E, 22 February 2006. 1994 interpretive sign on relocated 1927 "Stearns 71" derrick.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary #
HRI#
Trinomial

Page 8 **of** 8 ***Resource Name:** Wildcatter's Park, Brea-Olinda Oil Field

*Recorded by: James W. Steely, SWCA Environmental Consultants *Date: 5 March 2007 ☑**Continuation** ☐ **Update**

***B12. References:**

Becker, Kenneth M., and Juanita R. Shinn
1992 "Report on the Investigations at the "Landa House," an early Twentieth Century Basque Sheepherder's House near the City Brea, Orange County, California." Prepared for UNOCAL. Santa Fe Springs. Prepared by RMW Paleo Associates. Mission Viejo.

Brechbiel, Brant, Roger D. Mason, and Richard Cerreto
1997 "Cultural Resources Survey Report for the Stearns Property, City of Brea, Orange County." Prepared for Nuevo Energo Company. Prepared by Chambers Group, Inc. Irvine.

Brown, Joan C.
1989 "Cultural Resources Reconnaissance of the 600 Acre Stearns – UNOCAL Project Brea, California. Prepared for Planning and Design Solutions. Newport Beach. Prepared by RMW Paleo Associates. Mission Viejo.

RBF Consulting
2005 "Tonner Hills Stage 3 Grading." Engineering and topographical map. RBF Consulting, planning, design, construction. Irvine.

Unocal Corporation
2006 Encyclopedia of Company Histories. Answers.com. Electronic document: http://www.answers.com/topic/unocal-corporation-1. Accessed 2 March 2007. Discusses Reese Taylor, president and chairman 1938-1962.

State of California — The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI #**

PRIMARY RECORD

Trinomial
NRHP Status Code

Other Listings
Review Code **Reviewer** **Date**

 ***Resource Name or #:** *Sunburst*

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted** ***a. County:** Orange

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** La Habra **Date:** 1964 **T**; **R** ; **¼ of ¼ of Sec ; B.M.** Unsectioned former San Juan Cajon de Santa Ana Grant

c. Address: 13000 block Brea Boulevard **City:** Brea **Zip:** 92821

d. UTM: Zone: 11; 417509 **mE**/ 3755474 **mN** (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: 385 feet
The sculpture is located on a landscaped slope at the northeast corner of the intersection of Brea Canyon Road and Canyon Country Road in the City of Brea.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
Sunburst is a sculpture by Sergio O'Cadiz which was commissioned by Canyon Country Homes as part of the City of Brea Art in Public Places (APP) program. Commissioned in 1975, it is one of the first sculptures curated by APP.

The sculpture was created of formed concrete, probably on this location, and likely using O'Cadiz's characteristic method of ad hoc Styrofoam molds. Stubs of the reinforcing rebar jut out of the sculpture, contributing to its angular style. The sculpture depicts a sun with a human face emitting rays. The symbolism is evocative of Aztec motifs, but it is not a copy of Aztec sculpture. The sculpture measures 16 feet tall and 8 feet wide. The sculpture is in excellent condition.

***P3b. Resource Attributes:** (List attributes and codes) HP 28. Street Furniture.

***P4. Resources Present:** ☐Building ☐Structure ■Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

Intensive Pedestrian Survey.

P5b. Description of Photo: (View, date, accession #)

***P6. Date Constructed/Age and Sources:** ■Historic
☐Prehistoric ☐Both
1975 (Art in Public Places 2018)

***P7. Owner and Address:**
City of Brea, Art in Public Places Program, Community Services Department, Cultural Arts Division, Brea Civic & Cultural Center, 1 Civic Center Circle, Brea, CA 92821

***P8. Recorded by:** (Name, affiliation, and address) Marc A. Beherec, Ph.D., RPA, AECOM, 300 S. Grand Ave., Suite 200, Los Angeles, CA 90071

***P9. Date Recorded:**
May 30, 2018

***P10. Survey Type:** (Describe)

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")
Beherec, Marc A. 2018. *Cultural Resources Assessment for the Brea Canyon Road Widening Project.* Document prepared by AECOM for County of Orange.

***Attachments:** ☐NONE ■Location Map ☐Sketch Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3CS
***Resource Name or #** (Assigned by recorder) *Sunburst*

B1. Historic Name: *Sunburst*

B2. Common Name: Same

B3. Original Use: Sculpture

B4. Present Use: Sculpture

***B5. Architectural Style:** Modern sculpture

***B6. Construction History:** (Construction date, alterations, and date of alterations)

Commissioned in 1975 by Canyon Country Homes as part of the Art in Public Places (APP) Program of the City of Brea.

***B7. Moved?** ■ **No** □ **Yes** □ **Unknown** **Date:** **Original Location:**

***B8. Related Features:** Art in Public Places curates almost 200 sculptures throughout the City of Brea, constructed from 1975 to the present.

B9a. Architect: Sergio O'Cadiz **B9b. Builder:** Sergio O'Cadiz

***B10. Significance:** **Theme** Mexican-American Modern Sculpture **Area** Orange County
Period of Significance 1970s **Property Type** Public sculpture **Applicable Criteria** 3
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
Sergio O'Cadiz's sculpture *Sunburst* appears to be eligible for inclusion in the CRHR under Criterion 3 as the work of "an important creative individual." Sergio O'Cadiz was born in Mexico City in 1934. He studied architecture at the Universidad Nacional Autónoma de México, graduating in 1958, and began work designing buildings in Mexico City. In 1962 he relocated to Orange County to work for the architectural firm William Blurock Associates, and was active as an architect, muralist, sculptor, and painter in Orange County until his death in 2002. His architecture was a modified Brutalism. Although he did not consider himself part of the Chicano movement, his art is known for its use of Mexican historical and cultural themes. His public work contains great variety in both media and location, and includes golf course projects in Japan and Spain, the sculptural fountain at the Fountain Valley Civic Center, and murals at Oberlin College, Ohio (Arellano 2012).

See Continuation Sheet.

B11. Additional Resource Attributes: (List attributes and codes) HP36. Ethnic minority property (Mexican-American)

***B12. References:**
See Continuation Sheet.

B13. Remarks:

***B14. Evaluator:** Marc A. Beherec, Ph.D., RPA

***Date of Evaluation:** May 30, 2018

(Sketch Map with north arrow required.)

See attached form.

(This space reserved for official comments.)

***B12. References:**

Arellano, Gustavo
2012 Sergio O'Cadiz: El Artist. *OC Weekly.* 4 October. Online: https://www.ocweekly.com/sergio-ocadiz-el-artist-6424237/ Accessed May 30, 2018.

Art in Public Places Program
2013 *City of Brea Art in Public Places Policy Manual.* Online: http://www.ci.brea.ca.us/DocumentCenter/View/174/APPPolicyManual. Accessed May 30, 2018.

Emmons, Steve
1995 A Guide to Outdoor Sculpture. *Los Angeles Times,* Orange County Edition. 5 April. Los Angeles, California.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

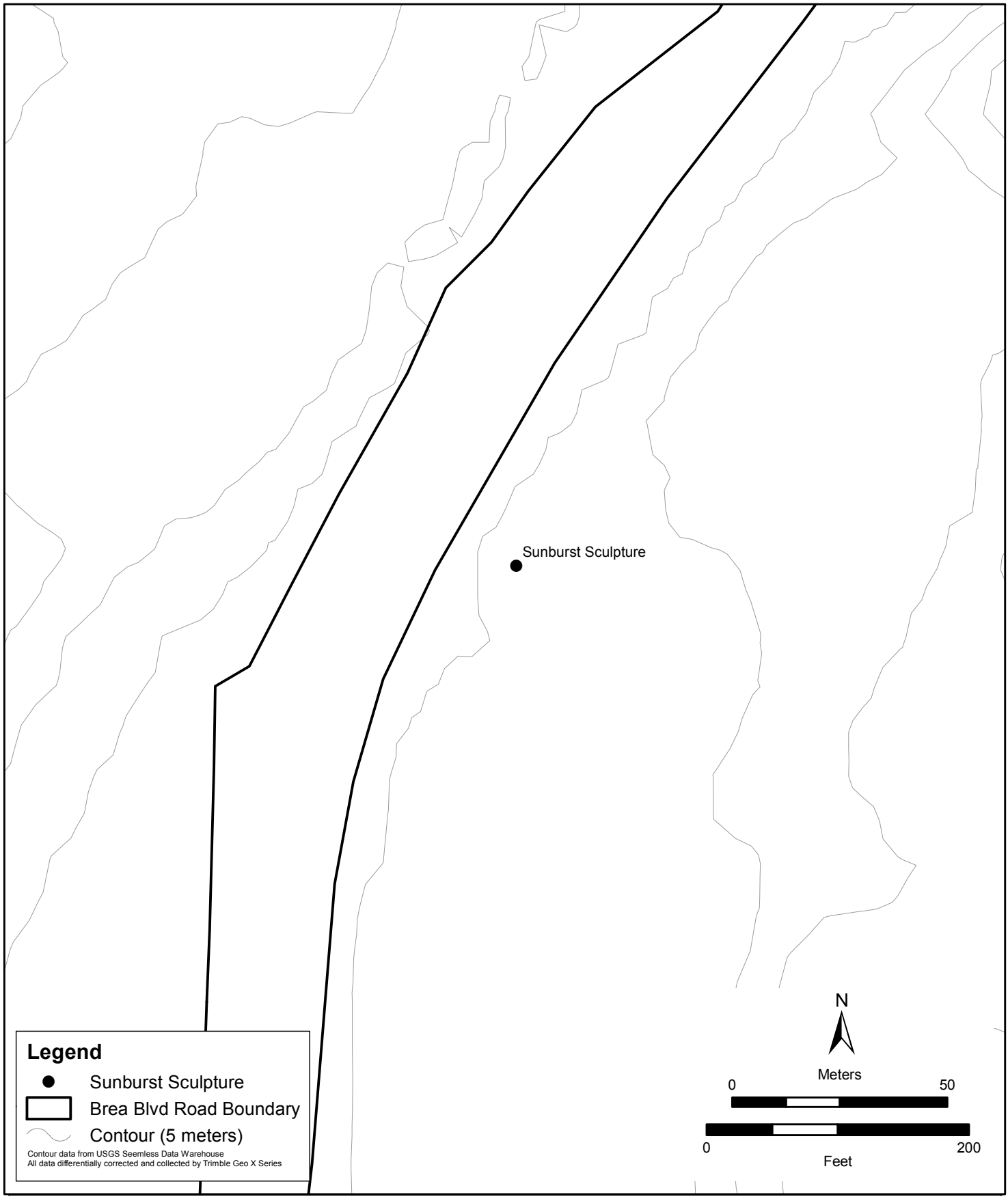
SKETCH MAP

Primary #
HRI#
Trinomial

***Resource Name or #** (Assigned by recorder) Sunburst Sculpture

***Drawn By:** Alec Stevenson

***Date:** 8/2/2018



State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

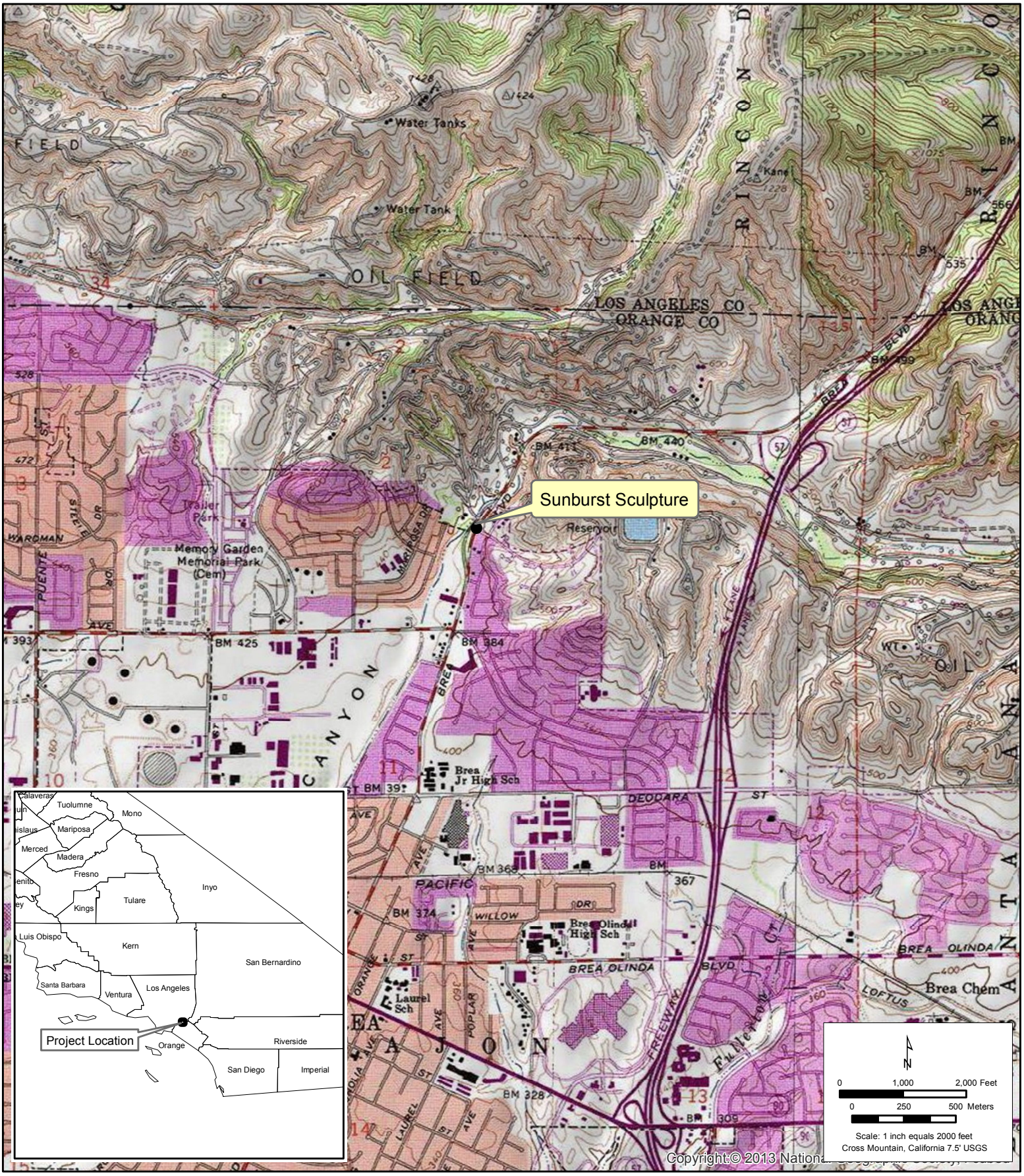
Page 5 of 5

*Resource Name or # (Assigned by recorder) Sunburst Sculpture

*Map Name: La Habra

*Scale: 1:24,000

*Date of Map: 2015



DPR 523J (1/95)

*Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code
Other Listings
Review Code Reviewer Date

***Resource Name or #:** Portola Monument

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**

***a. County:** Orange

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad:** La Habra **Date:** 1964 **T**; **R** ; **¼ of ¼ of Sec ; B.M.** Unsectioned former San Juan Cajon de Santa Ana Grant

c. Address: 13200 block Brea Canyon Road **City:** Brea **Zip:** 92821

d. UTM: Zone: 11; 417661 **mE**/ 3755714 **mN** (G.P.S.)

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: 385 feet

The monument is located on a flat gravel turnout on the east side of Brea Canyon Road, in unincorporated Orange County approximately 0.10-mile north of Brea city limits.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Portola monument consists of a bronze plaque mounted on a concrete obelisk that is set on a turnout on the east side of Brea Canyon Road, approximately 30 feet from the edge of the pavement.

See Continuation Sheet.

***P3b. Resource Attributes:** (List attributes and codes) HP 26. Monument.

***P4. Resources Present:** ☐Building ☐Structure ■Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Portola Monument, View South.

***P6. Date Constructed/Age and Sources:** ■Historic ☐Prehistoric ☐Both

Dedicated June 2, 1932 (plaque on monument)

***P7. Owner and Address:**

Grace Parlor No. 242, Native Daughters of the Golden West
Attention: Sherry Farley, History and Landmarks Chair
316 N. Woods Avenue
Fullerton, CA 92832

***P8. Recorded by:** (Name, affiliation, and address) Marc A. Beherec, Ph.D., RPA, and Jennifer Redmond, MA, RPA, AECOM, 300 S. Grand Ave., Suite 200, Los Angeles, CA 90071

***P9. Date Recorded:**

May 30, 2018

***P10. Survey Type:** (Describe)

Intensive Pedestrian Survey.

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.")

Beherec, Marc A. 2018. *Cultural Resources Assessment for the Brea Canyon Road Widening Project.* Document prepared by AECOM for County of Orange.

***Attachments:** ☐NONE ■Location Map ☐Sketch Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 3CS
***Resource Name or #** (Assigned by recorder) Portola Monument

B1. Historic Name: Portola Monument

B2. Common Name: Same

B3. Original Use: Monument

B4. Present Use: Monument

***B5. Architectural Style:** Art Deco

***B6. Construction History:** (Construction date, alterations, and date of alterations) Dedicated June 2, 1932.

***B7. Moved?** ■ **No** ☐ **Yes** ☐ **Unknown** **Date:** **Original Location:**

***B8. Related Features:** Monument was erected as part of a statewide program commemorating El Camino Real.

B9a. Architect: Unknown **B9b. Builder:** Unknown

***B10. Significance:** **Theme** Private Historic Monuments **Area** Orange County
Period of Significance 1930s **Property Type** Historic Monument **Applicable Criteria** 1, 2
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
The Portola Monument appears eligible for inclusion in the CRHR under Criterion 1 for its connection to the 1930s historic preservation campaign of the Native Daughters of the Golden West. The Monument also appears to be eligible for listing in the CRHR under Criterion 2 for its connection to Carrie Earl McFadden Ford and Native Daughters of the Golden West Parlor No. 242

See Continuation Sheet.

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:**
See Continuation Sheet.

B13. Remarks:

***B14. Evaluator:** Marc A. Beherec, Ph.D., RPA

***Date of Evaluation:** May 30, 2018

(Sketch Map with north arrow required.)

See attached form.

(This space reserved for official comments.)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The obelisk stands approximately 5 feet tall. It stands on a base measuring 2 feet 7 inches square. The base in turn stands on a concrete pad measuring approximately 3 feet 7 inches square. One corner of the back of this pad is cracked and broken, and may have been run over by heavy machinery. The four sides of the obelisk's base are recessed, but there is no evidence of writing or plaques ever having been mounted on the base. The obelisk is covered by many coats of white paint. The monument as a whole is in good condition.

The plaque is set in the concrete of the obelisk; it is not attached to the side of the obelisk. The plaque is made of bronze and measures approximately 1 foot wide and 14 inches tall. At the top of the plaque is a bas relief of a conquistador wearing a helmet and a sheathed sword standing on a hill. He holds a banner that blows behind him. The conquistador, probably Portola himself, faces left. Two other men stand downhill on either side of this central figure. To the right, behind Portola, another conquistador stands with his back to the viewer, holding a halberd. The depictions of the two Spaniards as conquistadors is anachronistic: they wear the high-crowned *morion*-style helmets and wear garb associated in the common mind with the conquistadors of the 16th and 17th centuries; they are not dressed after the manner of the leather jacket soldiers who accompanied Portola and colonized California in the eighteenth century. To the left of the central figure is a tonsured man wearing robes, representing a Franciscan friar. The friar stands lower than the two soldiers. He faces the central figure and holds up a crucifix towards him. This figure may represent one of the friars who accompanied Portola, who included Juan Crespi and Francisco Gomez. Alternatively, it may represent Junipero Serra, whom many Californians erroneously believe accompanied Portola. Or this figure may simply be an anonymous friar symbolic of the Christianization of California. The bas relief is signed in the lower with the initials R J T; the R and the T are connected with a crossbar over the J.

Beneath the pictorial relief is an inscription. The inscription reads, "DON GASPOR [*sic*] PORTOLA / WITH 60 MEN CAMPED HERE / JULY 31 1769 ON HIS FIRST / EXPLORING MARCH FROM / SAN DIEGO TO MONTEREY. / DEDICATED JUNE 2 1932 BY / GRACE PARLOR NO 242 / NATIVE DAUGHTERS / OF THE GOLDEN WEST." Grace Parlor No. 242, based in Fullerton, was founded June 2, 1927, and this monument was therefore erected on the fifth anniversary of its founding (Native Daughters of the Golden West 2017a).

The monument is surrounded with a bed of red scoria and rounded landscaping pebbles held in place with wooden beams. This landscaping does not appear to date to the original installation of the monument and is not well maintained.

The monument is on the edge a wide flat in Brea Canyon, measuring approximately 1,000 feet (north-south) by 700 feet (east-west). South of this flat, the hills on either side of Brea Canyon come together before the canyon opens up again in the flat expanse within which the City of Brea was built. The hills create a hidden space protected by the surrounding hills and invisible from the plains now occupied by housing tracts in the northern City of Brea. Most of this landform is outside the project area and is currently occupied by oil field facilities. It is presumed that somewhere on this flat is the location that the Daughters of the Golden West believed was Portola's actual campground and the Native American village that led them to camp there.

P5. Photo

P5b. Description of Photo: (View, date, accession #) Portola Monument Plaque.

***B10. Significance:**

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Portola Monument appears eligible for inclusion in the CRHR under Criterion 1 for its connection to the 1930s historic preservation campaign of the Native Daughters of the Golden West.

The monument notes that it was erected on June 2, 1932, by Native Daughters of the Golden West Parlor No. 242. More specifically, the monument was erected by the parlor's History and Landmarks Committee, which was chaired by Carrie Earl McFadden Ford, a noted philanthropist (Richey 2011). The Native Daughters of the Golden West is a women's fraternal and patriotic organization composed of women born in the State of California. The organization was founded in 1886, and soon after, it adopted as its founding principles "Love of Home, Devotion to the Flag of our Country, Veneration of the Pioneers of California, and an Abiding Faith in the Existence of God (Briggs 1953). Between 1886 and 2017, a total of 338 chapters of the organization, called parlors, were founded, although approximately 70 percent of them have disbanded or consolidated with neighboring parlors (Native Daughters of the Golden West 2017b). Grace Parlor No. 242 was founded in Fullerton on June 2, 1927, and named for Past Grand President of the Native Daughters Grace S. Stoermer. It is still in existence (Native Daughters of the Golden West 2017a). The Portola monument was erected on the fifth anniversary of the parlor's founding, and was the first monument erected by the Native Daughters in Orange County. The monument was donated by Native Daughters Member Saddie Winn Brainard of Sacramento. The artist signed the sculpture with the initials R J T. However, the artist's name is not documented in the records of the Grace Parlor, and the artist has not been identified.

The monument commemorates an event that made significant contribution to the broad patterns of California's history, the Portola Expedition. However, as explained in the historic background section above, it is not clear that this monument stands in the location of an actual Portola campsite. Most scholars argue that the closest Portola Expedition campsite is most likely in Hillcrest Park in the City of Fullerton, approximately 4 miles southwest of the project area.

However, the Portola Monument was erected during a period of intense interest in preserving the history of California, at a time when preservationists were fighting to save important places in California's past. The monument was erected as part of a state-wide effort of public and private groups, including the Native Daughters of the Golden West, to mark El Camino Real. At a time when automobiles made Californians increasingly mobile, these organizations sought to commemorate and romanticize California's past by marking historic spots (and in particular spots associated with California's Spanish past) in metal and stone and linking them by a road that was itself an attraction (Kropp 2008; Masters 2013). On June 1, 1932, just one day before the Brea Canyon Portola Monument was erected, the State of California designated California State Historical Landmark #2: Portola Journey's End, at the site of Portola's northernmost campsite in San Mateo County (Whittle 2016). The erection of the Brea Canyon Portola Monument was part of a statewide effort to preserve and commemorate California's past that appears to make it eligible for inclusion in the CRHR under Criterion 1.

The Portola Monument also appears to be eligible for listing in the CRHR under Criterion 2. Monuments are generally not considered to be significantly associated with the people they commemorate. The Portola Monument is not significantly tied to the man whose achievement it commemorates, Gaspar de Portola. However, the monument is closely tied to Carrie Earl McFadden Ford and Native Daughters of the Golden West Parlor No. 242. The Native Daughters of the Golden West are known throughout California for their placement of markers such as the Portola Monument, which is one way they practice their founding principle of "Veneration of the Pioneers of California." They are an important movement for historic preservation locally to Orange County and more broadly to California. Installation of this particular monument was overseen by History and Landmarks Committee Chair Carrie Earl McFadden Ford, a noted local philanthropist and historian whose home in Fullerton is Fullerton Local Landmark No. 85 (Richey 2011). Both as a Native Daughter and as a member of the Mojave Chapter of the Daughters of the American Revolution Ford played a role in commemorating important historical sites in Orange County. Before the Portola Monument, for example, she was responsible for marking the Santa Ana Valley School (*Santa Ana Daily Register* 1930). Research has not revealed additional information about Member Saddie Winn Brainard, who paid for the monument or its plaque, the name of the artist, or information about any other significant members of the Native Daughters whose lives and careers were tied to the monument. However, the roles of the Native Daughters as a whole, Grace Parlor No. 242, and Carrie McFadden Ford in the 1930s statewide movement to commemorate California's past appears to make the monument eligible for inclusion in the CRHR under Criterion 2.

***B12. References:**

Briggs, Bertha A.
1953 Founding of the Order fo Native Daughters of the Golden West. Online: http://www.ndgw.org/FoundingHistory.htm Accessed June 25, 2018.

Kropp, Phoebe S.
2008 *California Vieja: Culture and Memory in a Modern American Place.* Berkeley: University of California Press.

Farley, Sherry
2018 Personal communications. See Appendix C of the final report for this project.

Masters, Nathan
2013 How El Camino Real, California's 'Royal Road,' Was Invented. KCET Lost LA: 4 January. Online: https://www.kcet.org/shows/lost-la/how-el-camino-real-californias-royal-road-was-invented Accessed July 17, 2018.

Native Daughters of the Golden West
2017a Grace Parlor No. 242. Online: http://www.ndgw.org/242.htm Accessed June 15, 2018.

2017b Subordinate Parlors Instituted. Online: http://www.ndgw.org/FoundingHistory2.htm. Accessed June 15, 2018.

Richey, Debora
2011 Carrie E. Ford: Fullerton Pioneer, Historian, and Philanthropist. *Fullerton Heritage* 17(2): 1, 3-6.

Santa Ana Daily Register
1930 First Pupils Return to Old School House. 26 June: 2. Santa Ana, California.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

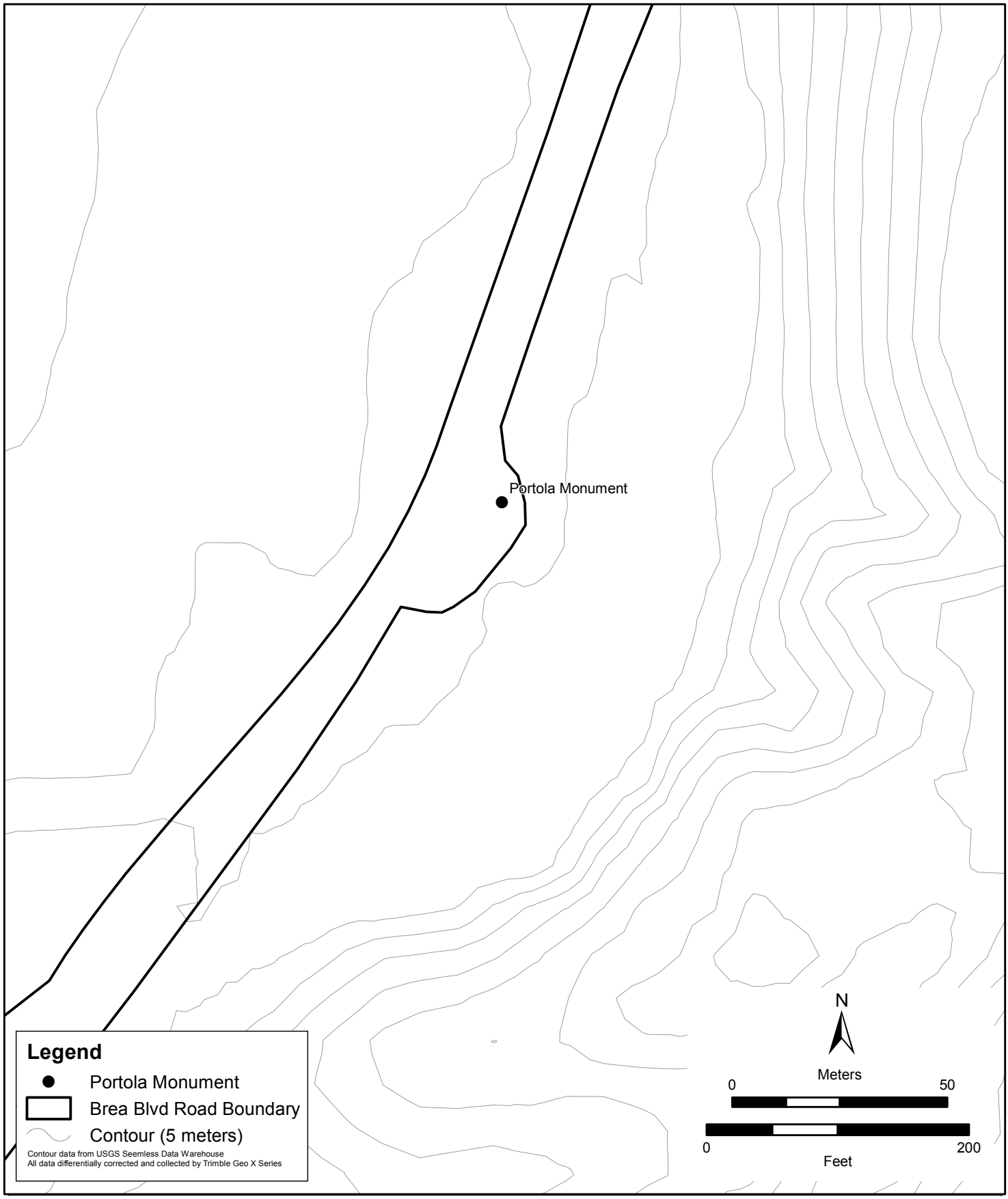
SKETCH MAP

Primary #
HRI#
Trinomial

***Resource Name or #** (Assigned by recorder) Portola Monument

***Drawn By:** Alec Stevenson

***Date:** 8/2/2018



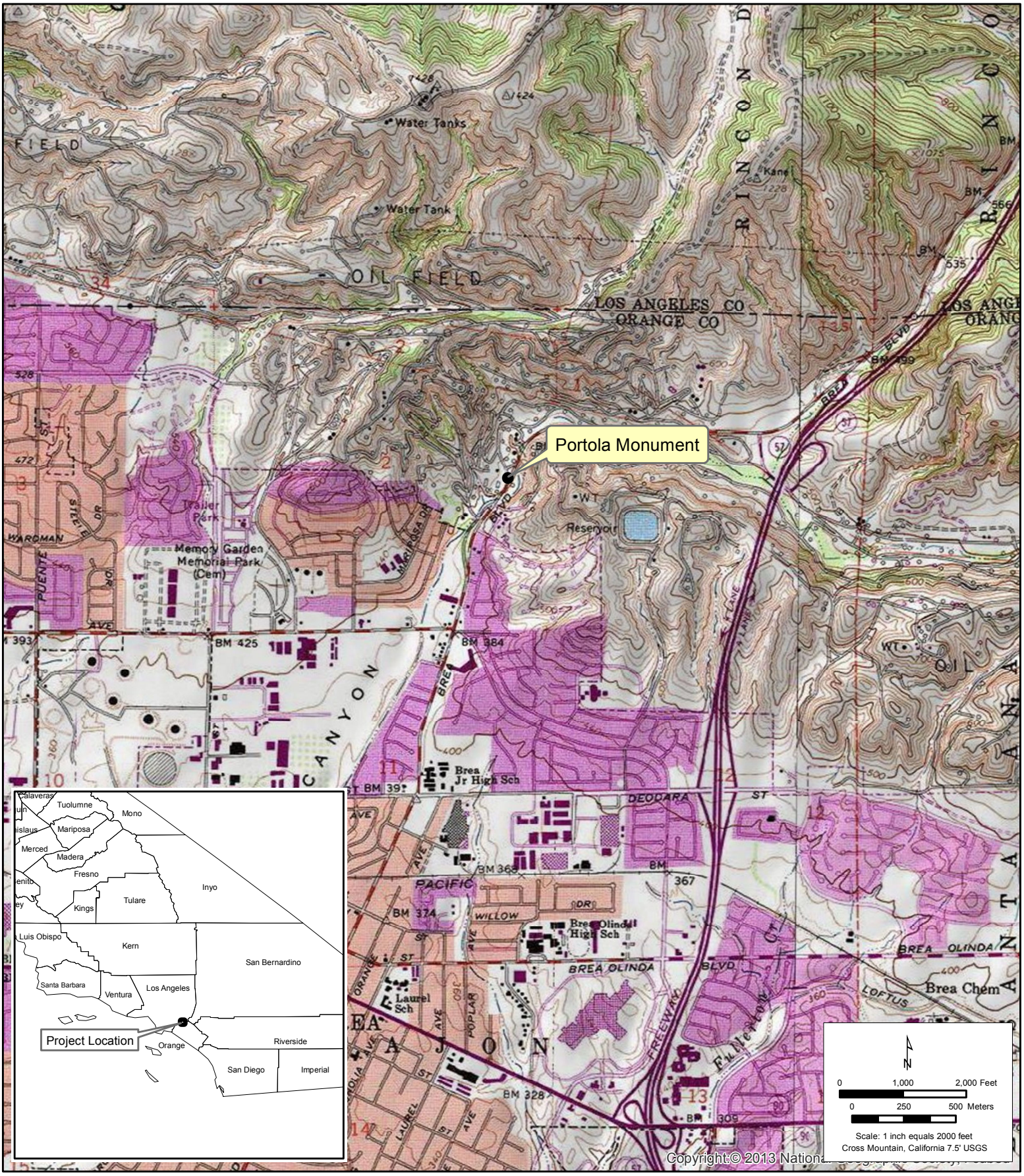
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial

Page 8 of 8 *Resource Name or # (Assigned by recorder) Portola Monument

*Map Name: La Habra *Scale: 1:24,000 *Date of Map: 2015



DPR 523J (1/95) *Required information