IMPACTS ASSESSMENT

RANCHERO BRIDGE REPLACEMENT OVER THE CALIFORNIA AQUEDUCT PROJECT

CITY OF HESPERIA

SAN BERNARDINO COUNTY, CALIFORNIA

LSA

June 2018

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CITY OF HESPERIA

SAN BERNARDINO COUNTY, CALIFORNIA

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LSA Project No. ATH1502

LSA

June 2018

MANAGEMENT SUMMARY

LSA conducted an impacts assessment for Ranchero Bridge Replacement over the California Aqueduct Project located in the City of Hesperia (City), San Bernardino County, California. The assessment included archival research, a field survey, and this report. The project proposes to replace the existing two-lane, two-span structure (Ranchero Road Bridge 54C0449) over the California Aqueduct with a new seven-lane, single-span structure. The City as Lead Agency for the project required this study as part of the environmental review process to comply with California Environmental Quality Act (CEQA).

The purpose of the study is to provide the City with the necessary information and analysis to determine whether the proposed project would cause substantial adverse changes to the significance of the California Aqueduct, as mandated by CEQA. This report is also part of the compliance process required under Public Resources Code (PRC) 5024, which requires State agencies to consult with the State Historic Preservation Officer (SHPO) to ensure preservation of state-owned properties that are eligible for listing in the National Register or as a California Historical Landmark. In this case, it is the responsibility of the Department of Water Resources (DWR) to initiate and complete the SHPO consultation.

According to the California Department of Transportation (Caltrans) Local Bridge Inventory the Ranchero Road Bridge (54C0449), which was built in 1971 and is not yet 50 years of age, is not individually eligible for listing in the National Register of Historic Places (National Register). However, it is a feature of the California Aqueduct, which was evaluated in 2011 as eligible for listing in the National Register and California Register of Historical Resources (California Register) under Criteria A/1 and C/3 at the State level of significance "for its representation as a comprehensively planned and publicly sanctioned water conveyance public works project to facilitate development throughout the state and its complex design necessary to redistribute water throughout the state of California on such a massive level" (Ambacher 2011:6). Features of the Aqueduct include bridges that cross the aqueduct, control facilities, canals, siphons, and drains. The period of significance is 1960–1974, which are the years the Aqueduct was constructed and the Ranchero Road Bridge (54C0449) falls within this period.

To determine whether the proposed project would result in any substantial adverse changes to the significance of the historical resource (the Aqueduct), an impacts analysis pursuant to *CEQA Guidelines* Section 15064.5(b)(3) using the *Secretary of the Interior's Standards (SOIS) for the Treatment of Historic Properties* (Rehabilitation) was completed. Based on that analysis, it was determined that the replacement of this bridge (54C0449) is consistent with the SOIS and will not result in any substantial adverse changes to the significance of the California Aqueduct. Therefore, LSA recommends to the City a finding of *Less Than Significant Impact* for this project with regard to historical resources.

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INTRODUCTION

In May and June 2018, at the request of TranSystems, LSA performed a impacts assessment for the Ranchero Bridge Replacement over the California Aqueduct Project in the City of Hesperia, San Bernardino County, California (Figures 1 and 2). The project area is located on the boundary line for Townships 3 and 4 North in Range 4 West, San Bernardino Baseline and Meridian, as depicted on the United States Geological Survey (USGS) *Hesperia, California* 7.5-minute topographic quadrangle map (United States Geological Survey 1970). The study is part of the environmental review process for the proposed bridge replacement. The City, as Lead Agency for the project, required the study in compliance with the California Environmental Quality Act (CEQA; PRC § 21000, et seq.) because the bridge is a contributing feature to the California Aqueduct, which is a historical resource as defined by CEQA.

LSA performed the present study to provide the City with the necessary information and analysis to determine, as mandated by CEQA, whether the proposed project would cause substantial adverse changes to the historical resource (the Aqueduct). In order to accomplish this, LSA conducted historical background research, carried out an intensive-level field survey, and completed an analysis using the *Secretary of the Interior's Standards (SOIS) for the Treatment of Historic Properties* (Rehabilitation). This report is a complete account of the methods, results, and final conclusion of the study.

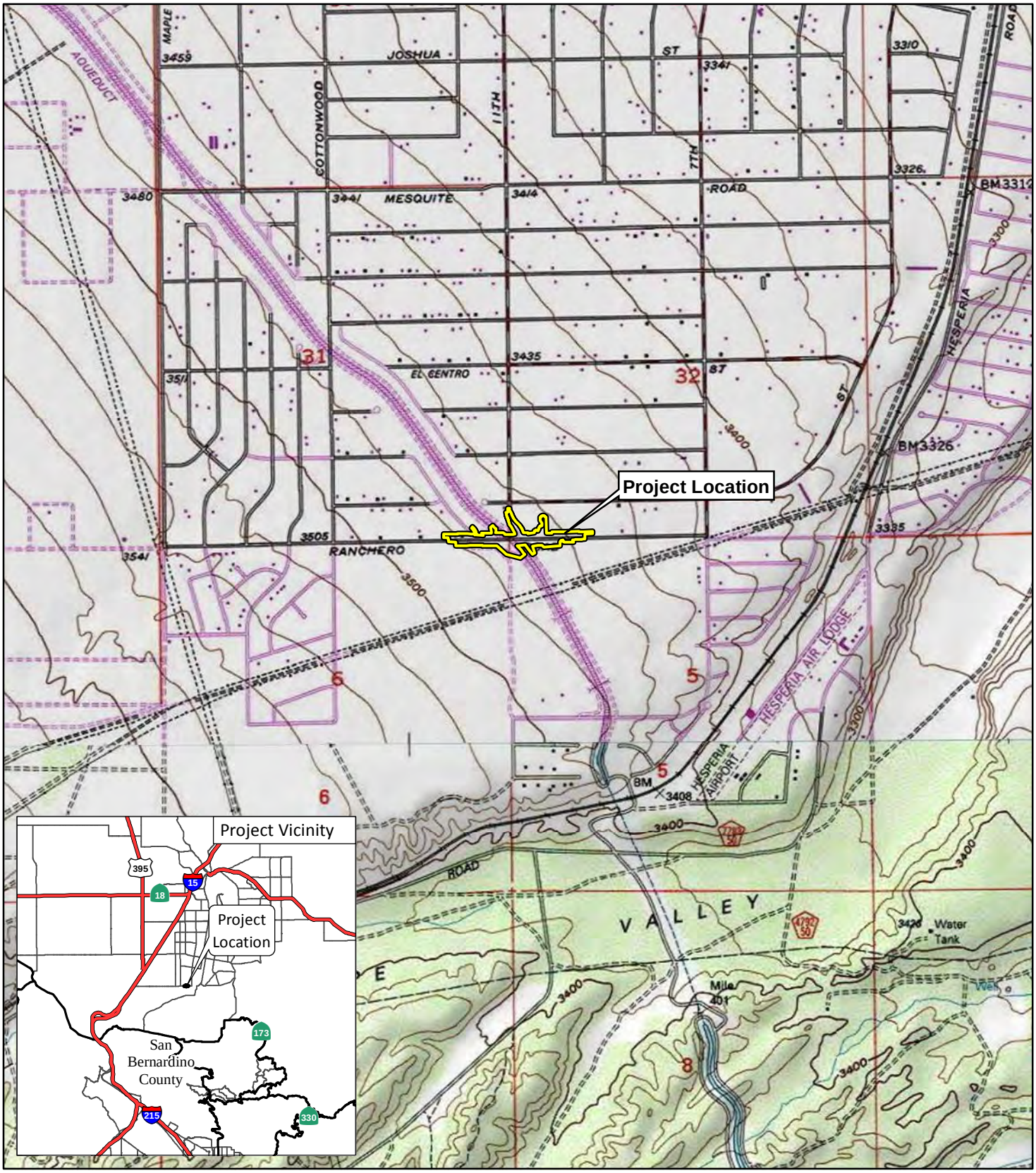

FIGURE 1

Ranchero Road Bridge Replacement
Over the California Aqueduct Project

Project Location

SOURCE: USGS 7.5' Quad - Hesperia (1980)

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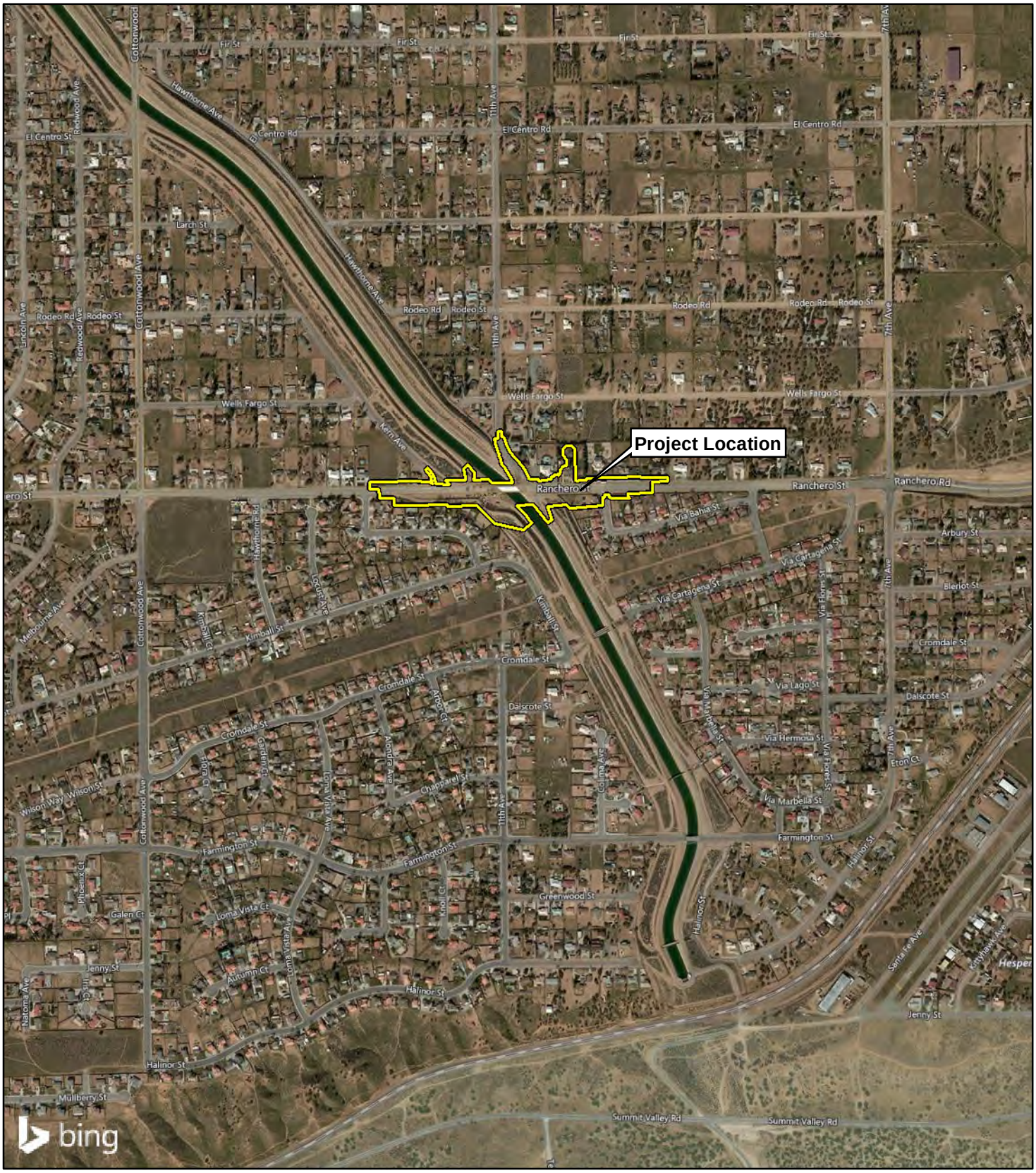

LSA

LEGEND

Project Location

FIGURE 2

N

0 500 1000

FEET

SOURCE: Bing (2015)

Ranchero Road Bridge Replacement
Over the California Aqueduct Project

Project Overview

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METHODS

ARCHIVAL RESEARCH

LSA completed archival research during the months of May and June 2018. Research methods focused on the review of a variety of primary and secondary source materials relating to the history and development of the project area. Sources included, but were not limited to, online sources, published literature in local and regional history, news articles, historic aerial photographs, and historic maps. Primary historical themes included development of Hesperia and the California Aqueduct.

FIELD SURVEY

On June 7 2018, LSA Architectural Historian Casey Tibbet conducted the intensive-level survey of the bridge. During the survey, Ms. Tibbet took numerous photographs of the bridge, as well as its setting. In addition, she made notations regarding the structural and architectural characteristics and current conditions of the bridge and associated features. She then conducted a brief reconnaissance survey of the vicinity to determine the condition and integrity of the setting.

RESULTS

RESEARCH

This section describes relevant previous studies and provides historical background information for the Ranchero Road Bridge (54C0449) and the Aqueduct.

Previous Studies

There have undoubtedly been several studies that have included all or portions of the Aqueduct, but two that are relevant to the subject project are the 2015 evaluation of the Ranchero Road Bridge over the Aqueduct, which was completed by Caltrans, and the 2011 evaluation of the entire Aqueduct water conveyance system, which was completed by AECOM (Appendices A and B).

The Ranchero Road Bridge (54C0449) over the Aqueduct was evaluated by Caltrans in 2015 as not eligible for individual listing in the National Register (Appendix A). Caltrans bridge inspection records indicate it is a two-lane bridge that was designed by Moffat & Nichol, Engineers out of Long Beach and built in 1971 (California Department of Transportation 1991). The 138-foot long, 32.5-foot wide bridge is described as "two simple PC/PS [precast/prestressed] "I" girder (5) spans with composite CIP/RC [cast-in-place/ reinforced concrete] deck (with one expansion joint at the pier) on two open end RC seated abutments and on one RC wall pier, all supported on RC spread footings" (California Department of Transportation 1991). The bridge is flanked by low metal guardrails and "earthquake restrainers have been installed at the pier cap" (California Department of Transportation 1991). The 2012 inspection report recommended "removal and replacement of the surface concrete layer at select location or over the entire deck area" and the 2016 inspection notes that the deck appears to be fairly new indicating rehabilitation work was completed (California Department of Transportation 2012 and 2016).

In 2011, the California Aqueduct was evaluated as eligible for listing in the National Register and the California Register at the State level of significance under Criteria A/1, C/3, and National Register Criterion Consideration G and the California Register special consideration for properties less than 50 years old (Appendix B). Under Criteria A/1 it represents "a comprehensively planned and publicly sanctioned water conveyance public works project to facilitate development throughout the state" (Ambacher 2011:5). Under Criteria C/3 it is significant for the "complex design necessary to redistribute water throughout the state of California on such a massive scale" (Ibid.). Features of the Aqueduct include bridges, siphons, culverts, and canal drains. The period of significance is 1960–1974, the years the Aqueduct was built.

Historical Overview

In California, the historic era is generally divided into three periods: the Spanish or Mission Period (1769 to 1821), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present). Because the resources being addressed by this report date to the mid-20th century, the earlier periods are not discussed.

American Period

The American Period, 1848–Present, began with the Treaty of Guadalupe Hidalgo. In 1850, California was accepted into the Union of the United States primarily due to the population increase created by the Gold Rush of 1849. The cattle industry reached its greatest prosperity during the first years of the American Period. Mexican Period land grants had created large pastoral estates in California, and demand for beef during the Gold Rush led to a cattle boom that lasted from 1849–1855. However, beginning about 1855, the demand for beef began to decline due to imports of sheep from New Mexico and cattle from the Mississippi and Missouri Valleys. When the beef market collapsed many California ranchers lost their ranchos through foreclosure. A series of disastrous floods in 1861–1862, followed by two years of extreme drought, which continued to some extent until 1876, altered ranching forever in the southern California area (Beattie and Beattie 1951; Cleland 1941).

The San Bernardino Baseline and Meridian was established in 1853 and the desert began to be mapped in earnest. This opened an opportunity for homesteaders to seek land in the Mojave and the San Bernardino County areas. The need to transport lumber and supplies between these areas resulted in a road being graded and built up the southern face of the San Bernardino Mountains in the early 1850s. Mining soon became an industry in the desert region; the Oro Grande Mining District, consisting of Hesperia, Victor, and Oro Grande, was mined for gold, silver, gem stones, marble, and limestone (Sturm 1993). In 1883, the California Southern Railroad, later to be the Atchison, Topeka, and Santa Fe Railroad (AT&SF) was built in the Cajon Pass (Sturm 1993).

Hesperia

Hesperia was established by German investors in 1869 and initially prospered by providing supplies for the surrounding mining communities. When the California Southern Railway depot was constructed in Hesperia in 1885, the amount and variety of goods available to local merchants increased greatly. The railroad also created additional depots and support towns in the region. During the early 1900s, with the advent of cross-country automobile travel, travelers passed directly through Hesperia (approximately 3.5 miles northeast of the project area), which was the last major stopping point for automotive services prior to crossing the Cajon Pass. However, the little community suffered a major blow in 1923 when Route 66 (now Interstate 15 [I-15]) was located several miles to the west, bypassing the little community (Drylie 2010; Figure 3). By 1926, Route 66 was paved from Victorville southwest to Los Angeles and plans were underway to install an upgraded gravel surface northeast from Victorville to Daggett (Mead & Hunt, Inc. 2011:17).

Hesperia's remote location kept development to a minimum through the 1920s, 1930s, and 1940s. A review of historic USGS maps reveals that Ranchero Road did not exist until sometime between 1936 and 1941, when it extended from 7th Avenue west, through the project area, to the California-Nevada Power Lines/Maple Avenue (United States Geological Survey 1942). During the 1950s, the area became popular with land speculators for its vast tracts of cheap real estate and development spread in all directions from the original core of the community near Main Street and First Avenue (United States Geological Survey 1956a). However, Ranchero Road did not extend to Route 66/I-15 until sometime between 1956 and 1968 (United States Geological Survey 1956b and 1968). Until subdivisions began to take shape in the 1980s, there was little to no development south of Ranchero Road and development north of the road was very sparse (Historicaerials.com var.). In fact, the area

was so sparsely developed that there was no freeway entrance or exit for Ranchero Road until after 2015 (United States Geological Survey 1956b, 1968, and 2015). The 1980s surge in development formed the foundation for the current community, which was incorporated in 1988 (McGinnis 2005).

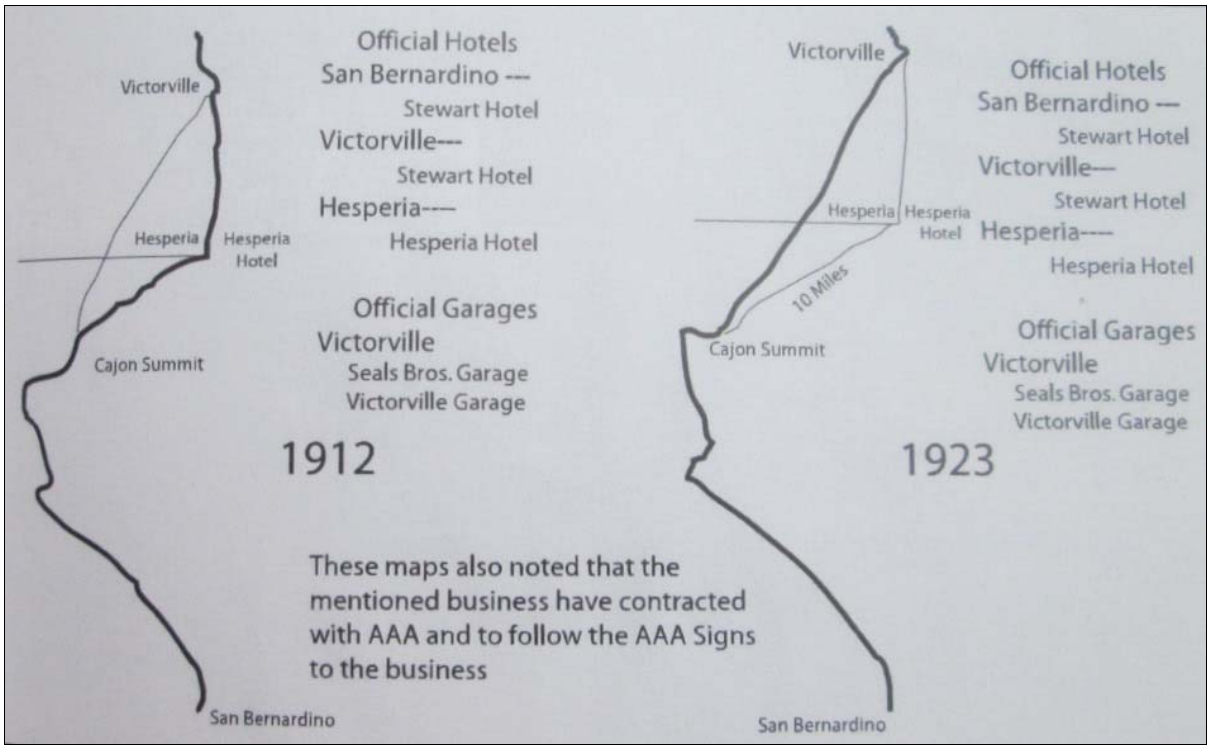


Figure 3: Depiction of 1912 and 1923 road alignments. (Source: Drylie 2010:55)

California Aqueduct

According to information in the Caltrans Historic Bridges and Tunnels Collection, "the Aqueduct was constructed by the Department of Water Resources (DWR) between 1960–1974 as part of the State Water Project (SWP), and is the largest and most significant of the water conveyance systems developed as part of the SWP. The Aqueduct is trapezoidal and lined with unreinforced concrete, and extends from the Sacramento-San Joaquin Delta in the north, to its southern terminus at Lake Perris in Riverside County. The Aqueduct is comprised of 444 miles of the 701 total miles of aqueducts, canals, and pipelines that make up the SWP. The Aqueduct helped shape the development of much of California following the mid-20th century. The American Society of Civil Engineers lists the Aqueduct as one of only 10 internationally ranked 'Monuments of the Millennium' for its remarkable engineering aspects, as well as for the positive impact it had on regional economic trade and development" (California Department of Transportation 2012). As previously noted, the Aqueduct was evaluated in 2011 as eligible for listing in the National Register and California Register of Historical Resources (California Register). The State Historic Preservation Officer formally concurred with this evaluation in 2012 (California Department of Transportation 2012).

A review of the Caltrans State and local-agency bridge inventories indicates there are approximately 125 bridges that are identified as California Aqueduct bridges (California Department of Transportation 2018a and 2018b). Of those, 17 are in San Bernardino County and six are in the City of Hesperia with dates of construction ranging from 1968 to 1971 (Ibid.). The design of the Aqueduct called for access roads along both sides of the concrete-lined canal and bridges at approximately four-mile intervals (Ambacher 2011). The Aqueduct is a vast, multi-featured structure of special importance to the history of the state. Even features of the Aqueduct that are not 50 years old contribute to its ability to convey its historic significance. The Ranchero Road Bridge (54C0449), which was built in 1971, falls into this category. The bridge is an associated resource whose demolition affects physical features of the historical resource (the Aqueduct).

FIELD SURVEY

On June 7, 2018, architectural historian Casey Tibbet, M.A., conducted a field survey of the Ranchero Road Bridge. During the survey, Ms. Tibbet took photographs of the bridge and its setting.

The bridge is located in a semi-rural setting characterized by modern single-family homes, undeveloped land, and the Aqueduct. The low-profile bridge is relatively utilitarian and nondescript and has no decorative elements or unique architectural features (Figures 4 through 7).

Figure 4: View of the bridge deck from the centerline of Ranchero Road facing west (6/7/18)

Figure 5: Overview of the bridge, view to the north (6/7/18)

Figure 6: Overview of the bridge, view to the south (6/7/18)

Figure 7: Detail of the center pier, view to the south (6/7/18)

IMPACTS ASSESSMENT

As previously discussed, in 2011 the California Aqueduct was evaluated as eligible for listing in the National Register and California Register under Criteria A/1 and C/3 at the State level of significance "for its representation as a comprehensively planned and publicly sanctioned water conveyance public works project to facilitate development throughout the state and its complex design necessary to redistribute water throughout the state of California on such a massive level" (Ambacher 2011:6; Attachment B). Features of the Aqueduct include bridges that cross it, control facilities, canals, siphons, and drains. The period of significance is 1960–1974, which are the years the Aqueduct was constructed and the Ranchero Road Bridge (54C0449) falls within this period. As such, the Aqueduct, along with its features, is a "historical resource" as defined by CEQA. Therefore, the potential project impacts to the historical resource must be assessed.

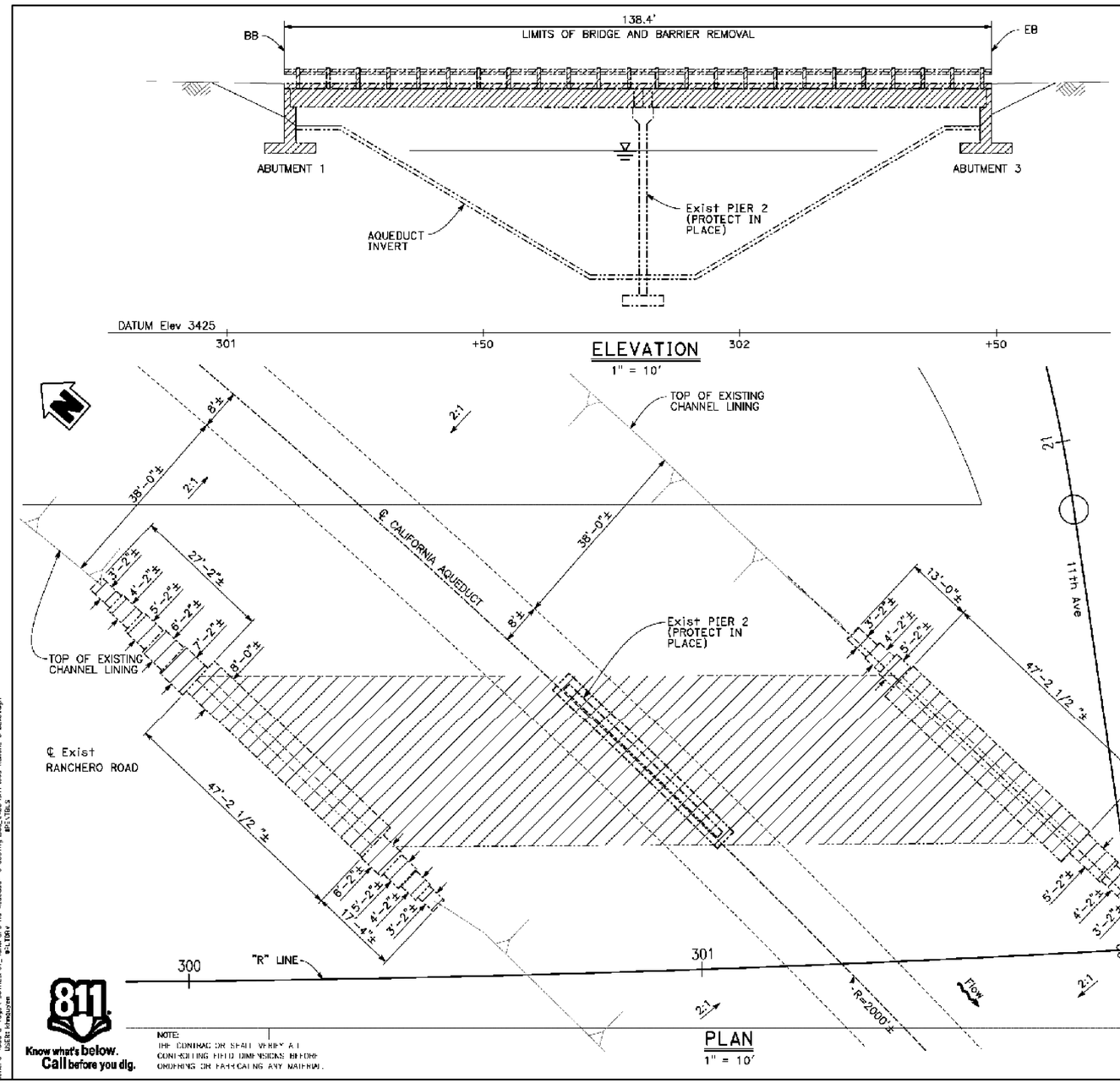
Section 15064.5(b)(1) of the *CEQA Guidelines* provides that "[s]ubstantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." Pursuant to Section 15064.5, material impairment occurs when a project alters or demolishes in an adverse manner "those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in" a State or local historic registry.

DESCRIPTION OF PROPOSED PROJECT

The project proposes to replace the existing two-lane, two-span structure over the California Aqueduct with a new seven-lane, single-span structure that will be approximately 20 feet longer, 105 feet wider, and 15 feet higher than the existing bridge (Figures 8 through 10). The replacement bridge would be constructed for future accommodation of six lanes in support of the City's and County's "ultimate" build out of Ranchero Road as a six-lane *Special Major Arterial* roadway, but it would be striped as a four-lane roadway and include a median/left-turn lane and 16-foot shared pedestrian sidewalk/bike pathways to correspond with the anticipated capacity of Ranchero Road pursuant to the previously approved Ranchero Road Widening Project. The new structure is approximately 137 feet wide by 158 feet long. The project would also construct bridge approach roadway improvements, including drainage and utilities, to accommodate the raised profile for the proposed bridge.

The proposed bridge structure would be constructed in one stage. The existing crossing would need to be temporarily shut down to accommodate bridge removal and one-stage new bridge construction. A detour route around the construction zone would be posted and motorists would be advised to use the Cottonwood Avenue and/or Mesquite Street Bridge during construction.

The proposed improvements also include realignment of 11th Avenue, a new cul-de-sac street on city-owned APN 412-182-26, and realignment of Ranchero Road to optimize geometrics and maximize the constructability of a single-span precast girder bridge to comply with DWR Encroachment Permit Guidelines. The design speed is 55 mph.



LSA

FIGURE 8

Ranchero Road Bridge Replacement
Over the California Aqueduct Project

Existing Bridge Elevation

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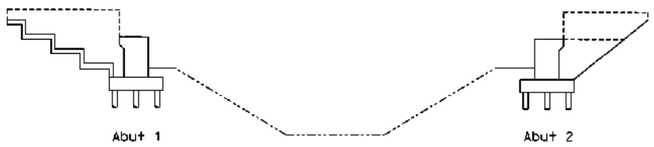
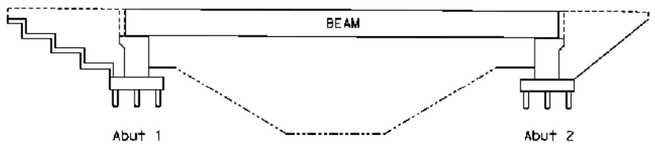


STEP 1

STEP 1

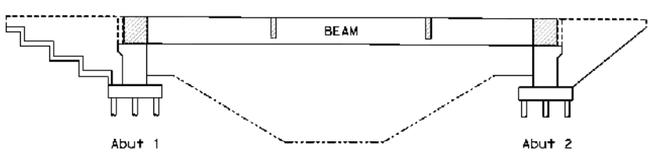
Construct abutment footing and abutment wall up to abutment seat, backwall will be poured later.



STEP 2

STEP 2

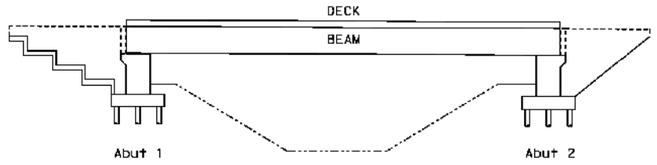
Erect girders on abutments.



STEP 3

STEP 3

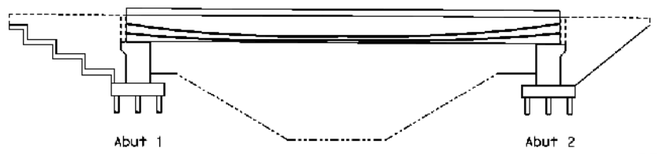
Form and pour the cast-in-place abutment diaphragms, and intermediate diaphragms.



STEP 4

STEP 4

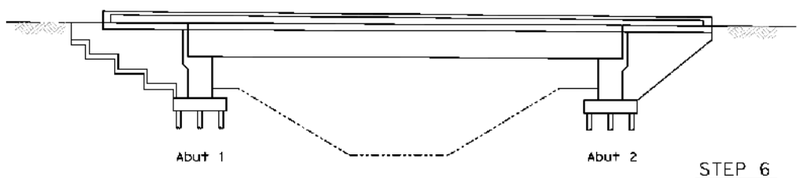
Install stay-in-place deck forms, pour cast-in-place deck.



STEP 5

STEP 5

Apply post-tensioning and grout tendons.



STEP 6

STEP 6

Place backwall and backfill. Install median curb, barriers, railing, utilities and other deck fixtures.

811 Know what's below. Call before you dig.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

BRIDGE CONSTRUCTION SEQUENCE
NO SCALE

NOTE:
The construction sequence shown is for information only and was the sequence used in the design process. This does not relieve the contractor of the responsibility to submit a construction plan.

65% SUBMITTAL
NOT FOR CONSTRUCTION

LSA

FIGURE 9

Ranchero Road Bridge Replacement
Over the California Aqueduct Project
Proposed Bridge Construction Sequence

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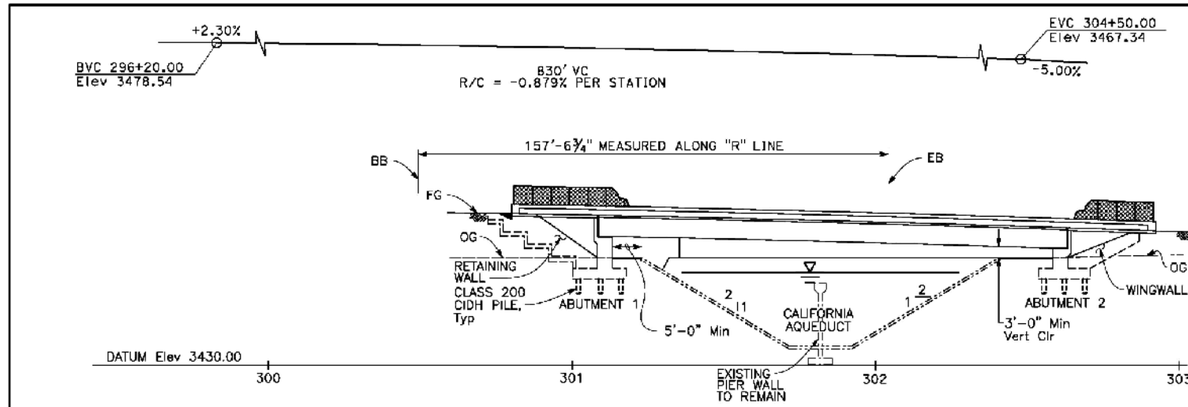
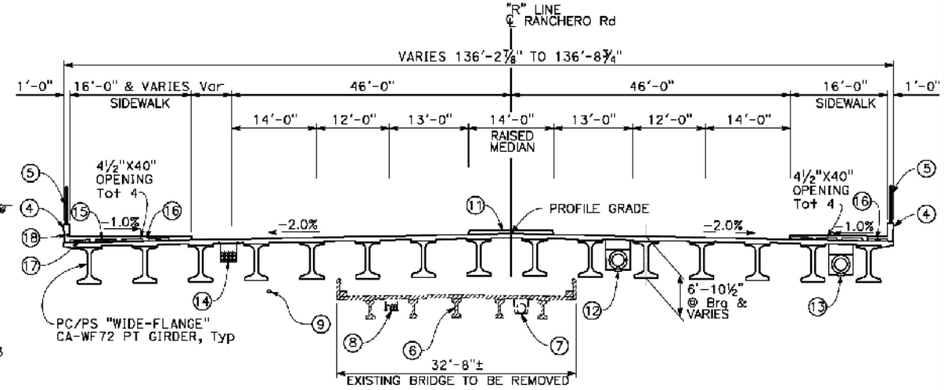


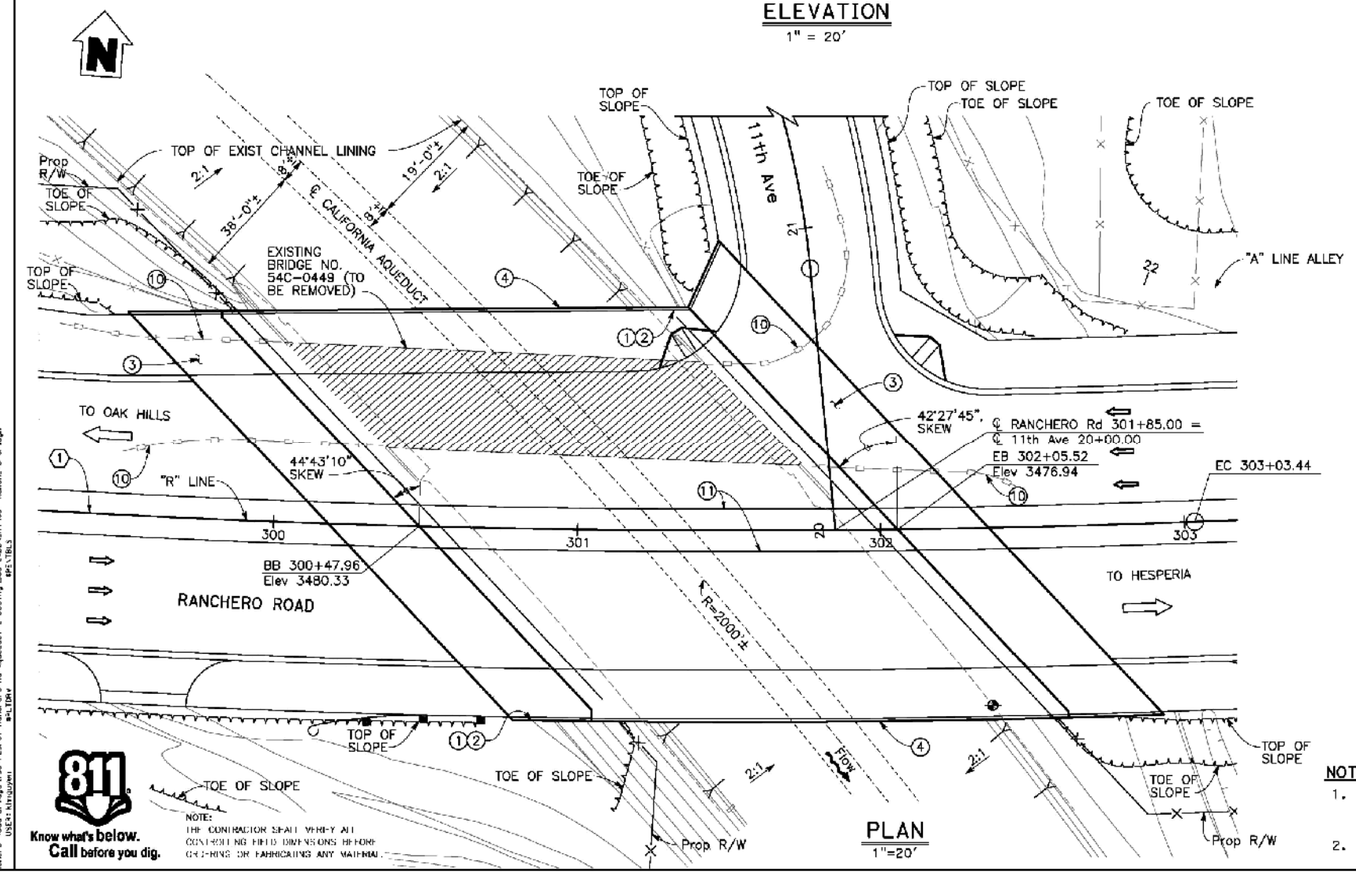
ELEVATION

1" = 20'



TYPICAL SECTION

1" = 10'



PLAN

1"=20'

NOTES:

1. Paint Br No. 54C-0449
2. Paint "Ranchero Road Aqueduct Crossing".
3. Approach Slab Type N(30S).
4. Concrete Barrier, Type 732SW (Mod).
5. Chain Link Railing, Type 7.
6. Existing PC "I" Girders, Bridge to be Removed.
7. Existing 18" "WATER" Utility line, to be Relocated.
8. Existing 4-5"ø & 1-8"ø Utilities, to be Removed.
9. Existing "TV-Cable" Utility line, to be Relocated.
10. Existing Guard Rail to be Removed.
11. 14'-0" Wide Raised Median.
12. 24"ø Waterline in 36" Casing.
13. 24"ø HDPE Storm Drain Pipe in 36"ø Casing.
14. 2-6"ø and 6-5"ø SCE Conduits.
15. 2-3"ø Charter Communicationsconduits, Location to be Verified by the Utility Owner.
16. 2-4"ø Future Utility Conduits.
17. 4-4"ø Frontier Communications Conduits.
18. 1-4"ø Verizon Business Conduit.

CURVE DATA
⟨1⟩
R = 4000'
Δ = 10°54'14"
L = 761.24'
T = 381.77'

LEGEND

- Indicates bridge removal
- Indicates direction of traffic
- Indicates existing structure
- Indicates new structure
- Indicates direction of water flow
- Indicates point of minimum clearance
- Top of existing channel

NOTES:

1. For Index to Plan, see "GENERAL NOTES" sheet and for Approximate Quantities, see "DECK CONTOURS" sheet.
2. For existing Right-of-Way see Road Plans.

65% SUBMITTAL
NOT FOR CONSTRUCTION

LSA

FIGURE 10

Ranchero Road Bridge Replacement
Over the California Aqueduct Project

Proposed Bridge Elevation

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The proposed Ranchero Road profile starts ascending from west side at 2.3 percent grade over the Aqueduct and descending at 5 percent with an 830-foot crest vertical curve and touchdown west of the Via Antiqua intersection. The proposed profile grades are 5 percent or less to comply with Americans with Disabilities Act (ADA) sidewalk requirements. The raised profile is necessary in order to meet the latest requirements imposed by the State of California and DWR, which include:

- New bridge crossings shall be single-span design.
- The minimum vertical clearance between the bottom of the girders and the top of the canal lining shall be 3 feet.
- The minimum horizontal clearance from the face of the abutment to the top of the canal lining shall be 5 feet.

A 240-foot-long Type 1 retaining wall is proposed along the property line between APNs 405-841-07 and 405-841-08. The wall is constructed of concrete supported by footing extending a minimum of 2 feet below finished grade. In addition, a 6-foot property wall on Type 736S (modified) concrete barrier is provided on top of the retaining wall to create privacy for the residences. The exposed wall face varies in height between 10.8 feet and 14.6 feet from the top of finished grade. The project would also construct four utility driveways, two on the south side of Ranchero Road, one on the north side of Ranchero Road, and one off of the realigned 11th Avenue roadway, to facilitate DWR access to both sides of the California Aqueduct.

PROJECT ANALYSIS

The *Secretary of the Interior's Standards (SOIS) for the Treatment of Historic Properties* are typically used to analyze project impacts. Projects that meet the SOIS are considered to be mitigated to a level that is less than significant. The SOIS are divided into four categories: preservation, restoration, rehabilitation, and reconstruction. Because the bridge replacement project is essentially a rehabilitation project to improve the function of the crossing, which is a feature of the Aqueduct, the SOIS for Rehabilitation are most appropriate.

Standards for Rehabilitation

1. *A property shall be used for its historic purpose or be placed in a new use that requires minimal change to its distinctive materials, features, spaces, and spatial relationships.*

   The California Aqueduct will continue to be used for its historic purpose. The Ranchero Road Bridge is not integral to the function of the Aqueduct and its replacement will not change the use of the historical resource in any way. Therefore, the project is in compliance with this Standard.

2. *The historic character of a property shall be retained and preserved. The removal of distinctive materials or alteration of features, spaces, and spatial relationships that characterize a property will be avoided.*

   The historic character of the Aqueduct at this location is that of an open concrete trapezoidal channel with a bridge crossing. The demolition of the existing bridge will not alter the historic character of the Aqueduct because the project proposes to replace the bridge and will leave the

existing pier wall that acts as the center support for the existing bridge. Therefore, the project is in compliance with this Standard.

3. *Each property will be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or elements from other historic properties, will not be undertaken.*

   No elements that change the place or use of the Aqueduct or that create a false sense of its historical development are proposed. The single-span replacement bridge will be constructed to meet modern design and safety requirements. These design features will identify it as a modern structure while maintaining its historically important function as one of the many Aqueduct crossings. Therefore, the project is in compliance with this Standard.

4. *Changes to a property that have acquired historic significance in their own right will be retained and preserved.*

   Not applicable. There are no apparent changes to the resource at this location.

5. *Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property will be preserved.*

   The Aqueduct is significant in part for the innovative machinery used to construct the concrete-lined trapezoidal channel. Neither the product of these innovative construction techniques nor any distinctive materials or features will be affected by the proposed bridge replacement. Therefore, the project is in compliance with this Standard.

6. *Deteriorated historic features will be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature will match the old in design, color, texture, and where possible, materials.. Replacement of missing features will be substantiated by documentary and physical evidence.*

   Not applicable.

7. *Chemical or physical treatments, if appropriate, will be undertaken using the gentlest means possible. Treatments that cause damage to historic materials will not be used.*

   Not applicable.

8. *Archeological resources will be protected and preserved in place. If such resources must be disturbed, mitigation measures will be undertaken.*

   The project area has been extensively disturbed by previous construction activities, including excavation for the channel. Therefore, sensitivity for archaeological resources within the project area is extremely low and no mitigation measures are recommended.

9. *New additions, exterior alterations, or related new construction will not destroy historic materials, features, and spatial relationships that characterize the property. The new work shall be differentiated from the old and will be compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment.*

   The Aqueduct is a water conveyance system and any addition to it would relate to that function. The proposed bridge replacement does not relate to that function and is not considered an addition. However, the proposed project will alter a feature of the Aqueduct and slightly change

the spatial relationships that characterize it. Specifically, the new bridge will be larger and higher than the existing bridge and a proposed wall along the property line of two residences may obstruct the view of the Aqueduct from those properties. These potential visual impacts will not impair the resource's ability to convey its historical significance. Therefore, the project is in compliance with this Standard.

10. *New additions and adjacent or related new construction will be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.*

    The proposed new bridge could be removed in the future in a manner that would preserve the essential form and integrity of the Aqueduct with only minor impairment to the immediate environment. Therefore, the proposed project is in compliance with this Standard.

ANALYSIS OF CUMULATIVE IMPACTS

Pursuant to the *CEQA Guidelines* Section 15355, cumulative impacts "refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." This includes the current project as well as any "foreseeable probable future projects" (*CEQA Guidelines* 2018).

According to the City of Hesperia's Development Activity Report, there is one other proposed project that could foreseeably affect the Aqueduct (City of Hesperia 2018). This is the Main Street Bridge Replacement Project, which is located approximately 4 miles northwest of the current project area. These two projects will result in the replacement of two of the Aqueduct's 17 bridge crossings in San Bernardino County. These two projects when considered together do not result in a considerable impact or compound previous environmental impacts.

RECOMMENDATIONS

The Ranchero Road Bridge (54C0449) has been evaluated as not individually eligible for listing in the National Register and is not old enough to be evaluated for listing in the California Register. However, it is a feature of the California Aqueduct, which is a "historical resource" as defined by CEQA. As indicated by the impacts assessment in the previous section, it appears the proposed project will not result in a substantial adverse change to the significance of the historical resource. Therefore, LSA recommends to the City a finding of *Less Than Significant Impact* for this project with regard to historical resources.

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1956b *Baldy Mesa, California* 7.5-minute topographical map, field checked in 1956.
1968 *Baldy Mesa, California* 7.5-minute topographical map, field checked in 1956 and photorevised in 1968.
1970 *Hesperia, California* 7.5-minute topographical map, field checked in 1956 and photorevised in 1968.
2015 *Baldy Mesa, California* 7.5-minute topographical map

APPENDIX A

CALTRANS BRIDGE INVENTORY

Structure Maintenance & Investigations

SM&I

Historical Significance - Local Agency Bridges

October 2017

District 08

San Bernardino County

Bridge Number	Bridge Name	Location	Historical Significance	Year Built	Year Wid/Ext
54C0423	TWIN WARM CREEK	0.25 MI E WATERMAN AVE	5. Bridge not eligible for NRHP	1961	
54C0426	DEL ROSA CHANNEL (PUMALO ST)	0.1 MI E OF DEL ROSA AVE	5. Bridge not eligible for NRHP	1950	
54C0427	MISSION ZANJA	0.5 MI N BARTON RD	5. Bridge not eligible for NRHP	1964	
54C0428	MISSION ZANJA	0.5 MI N BARTON RD	5. Bridge not eligible for NRHP	1963	
54C0429	ZANJA DRAINAGE DITCH	0.6 MI N BARTON RD	5. Bridge not eligible for NRHP	1969	
54C0430	MOREY ARROYO	0.45 MI N BARTON RD	5. Bridge not eligible for NRHP	1933	1945
54C0432	MISSION ZANJA	0.3 MI N RTE FAI-10	5. Bridge not eligible for NRHP	1937	
54C0434	MISSION STORM DRAIN	0.1 MI E OF CALIFORNIA ST	5. Bridge not eligible for NRHP	1935	1955
54C0435	MISSION STORM DRAIN (RICHARDSON ST)	0.5 MI N OF I-10	5. Bridge not eligible for NRHP	1968	
54C0436	SAN TIMOTEO CREEK	0.3 MI S OF REDLANDS BLVD	5. Bridge not eligible for NRHP	1980	
54C0439	WILSON CREEK	0.15 MI N/W AVE 'F'	5. Bridge not eligible for NRHP	1950	
54C0441	MOJAVE RIVER	0.75 MI N OF NAT TRA HWY	5. Bridge not eligible for NRHP	1950	
54C0443	DEL ROSA STORM DRAIN	0.3 MI W OF DEL ROSA AVE	5. Bridge not eligible for NRHP	1940	1967
54C0444	CITY CREEK CHANNEL	100' N OF THIRD ST	5. Bridge not eligible for NRHP	1968	
54C0445	WARM CREEK	700' N BASELINE RD	5. Bridge not eligible for NRHP	1948	1958
54C0448	CALIFORNIA AQUEDUCT	0.3 MI W OF 7TH AVE	5. Bridge not eligible for NRHP	1971	
54C0449	CALIFORNIA AQUEDUCT	0.95 MI E MAPLE AVE	5. Bridge not eligible for NRHP	1971	
54C0450	CALIFORNIA AQUEDUCT	2.3 MI S OF MAIN ST	5. Bridge not eligible for NRHP	1971	
54C0451	CALIFORNIA AQUEDUCT	0.1 MI E MAPLE AVE	5. Bridge not eligible for NRHP	1971	
54C0452	CALIFORNIA AQUEDUCT	1.8 MI S OF MAIN ST	5. Bridge not eligible for NRHP	1971	
54C0453	CALIFORNIA AQUEDUCT	2.4 MI N OF PHELAN RD	5. Bridge not eligible for NRHP	1971	
54C0454	CALIFORNIA AQUEDUCT	3.3 MI N OF PHELAN RD	5. Bridge not eligible for NRHP	1971	
54C0455	LAKE GREGORY SPILLWAY	1.7 MI E RTE 138	5. Bridge not eligible for NRHP	1972	
54C0456	TWIN WARM CREEK	0.3 MI E WATERMAN AVE	5. Bridge not eligible for NRHP	1961	
54C0457	EAST TWIN CREEK CHANNEL (GILBERT ST)	0.75 MI E WATERMAN AVE	5. Bridge not eligible for NRHP	1961	
54C0458	DEL ROSA STORM DRAIN	0.2 MI E TIPPECANOE AVE	5. Bridge not eligible for NRHP	1974	
54C0460	DEER CREEK CHANNEL	0.4 MI W HAVEN AVE	5. Bridge not eligible for NRHP	1982	
54C0461	DEER CREEK CHANNEL	0.4 MI W HAVEN AVE	5. Bridge not eligible for NRHP	1982	
54C0462	DEER CREEK CHANNEL	0.4 MI W HAVEN AVE	5. Bridge not eligible for NRHP	1982	
54C0463	DEER CREEK CHANNEL	0.4 MI W HAVEN AVE	5. Bridge not eligible for NRHP	1982	
54C0464	DEER CREEK CHANNEL	0.4 MI W HAVEN AVE	5. Bridge not eligible for NRHP	1975	
54C0465	SAN ANTONIO CREEK CHANNEL	0.2 MI N MISSION BLVD	5. Bridge not eligible for NRHP	1958	
54C0467	SAN ANTONIO CREEK CHANNEL	0.4 MI W OF CENTRAL AVE	5. Bridge not eligible for NRHP	1958	
54C0469	SAN ANTONIO CHANNEL (PHILADELPHIA AVE)	0.15 MI W OF EAST END ST	5. Bridge not eligible for NRHP	1958	
54C0470	SAN ANTONIO CHANNEL (COUNTY RD)	0.2 MI W EAST END ST	5. Bridge not eligible for NRHP	1958	
54C0472	SAN ANTONIO CHANNEL (CHINO AVE)	0.2 MI EAST OF ROUTE 71	5. Bridge not eligible for NRHP	1960	2001
54C0473	CYPRESS CHANNEL (CHINO AVE)	0.7 MI W OF 83 @ CYPRESS	5. Bridge not eligible for NRHP	1971	
54C0474	SAN ANTONIO CREEK CHANNEL (RAMONA AVE)	0.3 MI N CHINO HILLS PKWY	5. Bridge not eligible for NRHP	1958	1994
54C0475	CYPRESS CHANNEL (EDISON AVE)	0.7 MI W OF 83 @ CYPRESS	5. Bridge not eligible for NRHP	1969	2001
54C0478	REDHILL PARK RESERVOIR CHANNEL	0.4 MI N OF RTE 66	5. Bridge not eligible for NRHP	1936	1981
54C0479	SAN ANTONIO CREEK CHANNEL	0.3 MI E OF LA CO LINE	5. Bridge not eligible for NRHP	1958	
54C0480	SAN ANTONIO CREEK CHANNEL	0.25 MI E LA CO LINE	5. Bridge not eligible for NRHP	1958	
54C0481	SAN ANTONIO CREEK CHANNEL	0.25 MI E L A CO LINE	5. Bridge not eligible for NRHP	1958	

DEPARTMENT OF TRANSPORTATION
Structure Maintenance & Investigations

Bridge Number : 54C0449
Facility Carried: RANCHERO ST
Location : 0.95 MI E MAPLE AVE
City : HESPERIA
Inspection Date : 01/24/2018

Bridge Inspection Report

Inspection Type

Routine	FC	Underwater	Special	Other
[X]	[ ]	[ ]	[ ]	[ ]

STRUCTURE NAME: CALIFORNIA AQUEDUCT

CONSTRUCTION INFORMATION

Year Built : 1971
Year Modified: N/A
Length (m) : 42.1

Skew (degrees): 46
No. of Joints : 1
No. of Hinges : 0

Structure Description: Two simple span PC/PS "I" girder (5) with composite CIP/RC deck (with one expansion joint at the pier) on an RC wall pier on RC seat type abutments with non-monolithic wingwalls , all supported on RC spread footings.

Span Configuration : 2 @ 68.0 ft

SAFE LOAD CAPACITY AND RATINGS

Design Live Load: MS-18 OR HS-20
Inventory Rating: RF= 0.60 Calculation Method: (LRFR) LD & RES FACT RATING
Operating Rating: RF= 0.77 Calculation Method: (LRFR) LD & RES FACT RATING
Permit Rating : 00000
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

DESCRIPTION ON STRUCTURE

Deck X-Section: 0.33 ft br, 30.0 ft, 0.33 ft br
Total Width: 10.0 m Net Width: 9.1 m No. of Lanes: 2 Speed: 50 mph
Min. Vertical Clearance: Unimpaired Overlay Thickness: 0.0 inches
Rail Code: 0110

Rail Type	Location	Length (ft)	Rail Modifications
MBBR	Right/Left	356	

DESCRIPTION UNDER STRUCTURE

Channel Description: Concrete lined, trapezoidal section.

NOTICE

The bridge inspection condition assessment used for this inspection is based on the American Association of State Highway and Transportation Officials (AASHTO) Bridge Element Inspection Manual 2013 as defined in Moving Ahead for Progress in the 21st Century (MAP-21) federal law. The new element inspection methodology may result in changes to related condition and appraisal ratings on the bridge without significant physical changes at the bridge.

The element condition information contained in this report represents the current condition of the bridge based on the most recent routine and special inspections. Some of the notes presented below may be from an inspection that occurred prior to the date noted in this report. Refer to the Scope and Access section of this inspection report for a description of which portions of the bridge were inspected on this date.

INSPECTION COMMENTARY

SCOPE AND ACCESS
The deck was inspected by walking on the structure. The soffit and visible substructure were inspected by walking along the shelf between the abutments and the top of the concrete lining. Water was flowing full in the channel at the time of the inspection. The California Aqueduct is not dewatered except for rare maintenance instances. Pier 2 and its foundation could not be accessed due to the water depth

INSPECTION COMMENTARY

An underwater inspection was performed on 05/07/2013 by the Underwater Investigations Team. The underwater portions of Pier 2 were looked at during this inspection. The pier wall showed light to moderate abrasion, most prevalent on the upstream nose. Refer to the 05/07/2013 underwater inspection report for further details.

MISCELLANEOUS

A routine underside photo is included with this report; refer to Photo No. 1.

SAFE LOAD CAPACITY

A Load Rating Summary Sheet dated 10/14/2013 is on file for this structure. While this report does not include a check of that analysis, it does verify that the structural conditions observed during this inspection are consistent with those assumed in that analysis. The current rating is based on BrR 6.5.0 AASHTO software output on 08/22/2013.

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
12			**Deck-RC**	2	410	sq.m	410	0	0	0
(12)										
There were no significant defects noted.										
109			**Girder/Beam-PS Conc.**	2	421	m	421	0	0	0
(109)										
There were no significant defects noted.										
182			**EQ Restrainer Cable-Other**	2	8	ea.	8	0	0	0
(182)										
There were no significant defects noted.										
210			**Pier Wall-RC**	3	14	m	8	6	0	0
	1130		**Cracking (RC and Other)**	3	3		0	3	0	0
	1190		**Abrasion (PS Conc./RC)**	3	3		0	3	0	0
(210)										
There were no significant defects noted.										
(210-1130)										
There are full height by 0.020 inch wide vertical cracks spaced 4 feet apart on the faces of the pier wall.										
(210-1190)										
An underwater inspection was performed on 05/07/2013 by the Underwater Investigations Team noted light to moderate abrasion, most prevalent on the upstream nose.										
215			**Abutment-RC**	2	28	m	21	7	0	0
	1130		**Cracking (RC and Other)**	2	7		0	7	0	0
(215-1130)										
There are full height vertical cracks measuring 0.020 inches wide and spaced 4 feet apart on the faces of both abutments.										

ELEMENT INSPECTION RATINGS AND COMMENTARY

Elem No.	Defect /Prot	Defect	Element Description	Env	Total Qty	Units	Qty in each Condition State St. 1	St. 2	St. 3	St. 4
302			Joint-Compression Seal	2	14	m	14	0	0	0
(302) There were no significant defects noted.										
312			Bearing-Enclosed	2	3	each	3	0	0	0
(312) The bearing element is included to indicate the presence of bearings on this structure. The bearings were not exposed for visual inspection. No indication of bearing distress was noted in any superstructure or substructure element.										
330			Railing-Metal	2	84	m	84	0	0	0
(330) There were no significant defects noted.										

WORK RECOMMENDATIONS - NONE

Team Leader : Jose P. Hernandez

Report Author : Jose P. Hernandez

Inspected By : JP.Hernandez/LD.Nash

3/4/2018

Jose P. Hernandez (Registered Civil Engineer) (Date)

CC: Ms. Sheree Edwards, Department of Water Resources

REGISTERED PROFESSIONAL ENGINEER
Jose P. Hemandez
No. 77698
06/30/2019
CIVIL
STATE OF CALIFORNIA

STRUCTURE INVENTORY AND APPRAISAL REPORT

********** IDENTIFICATION **********

(1) STATE NAME- CALIFORNIA 069
(8) STRUCTURE NUMBER **54C0449**
(5) INVENTORY ROUTE(ON/UNDER)- ON 150000000
(2) HIGHWAY AGENCY DISTRICT 08
(3) COUNTY CODE 071 (4) PLACE CODE 33434
(6) FEATURE INTERSECTED- CALIFORNIA AQUEDUCT
(7) FACILITY CARRIED- RANCHERO ST
(9) LOCATION- 0.95 MI E MAPLE AVE
(11) MILEPOINT/KILOMETERPOINT 0
(12) BASE HIGHWAY NETWORK- NOT ON NET 0
(13) LRS INVENTORY ROUTE & SUBROUTE
(16) LATITUDE 34 DEG 22 MIN 59.69 SEC
(17) LONGITUDE 117 DEG 19 MIN 44.98 SEC
(98) BORDER BRIDGE STATE CODE % SHARE %
(99) BORDER BRIDGE STRUCTURE NUMBER

******** STRUCTURE TYPE AND MATERIAL *********

(43) STRUCTURE TYPE MAIN:MATERIAL- PRESTRESS CONC
TYPE- STRINGER/MULTI-BEAM OR GDR CODE 502
(44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA
TYPE- OTHER/NA CODE 000
(45) NUMBER OF SPANS IN MAIN UNIT 2
(46) NUMBER OF APPROACH SPANS 0
(107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1
(108) WEARING SURFACE / PROTECTIVE SYSTEM:
A) TYPE OF WEARING SURFACE- NONE CODE 0
B) TYPE OF MEMBRANE- NONE CODE 0
C) TYPE OF DECK PROTECTION- NONE CODE 0

********** AGE AND SERVICE **********

(27) YEAR BUILT 1971
(106) YEAR RECONSTRUCTED 0000
(42) TYPE OF SERVICE: ON- HIGHWAY 1
UNDER- WATERWAY 5
(28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00
(29) AVERAGE DAILY TRAFFIC 7759
(30) YEAR OF ADT 2004 (109) TRUCK ADT 2 %
(19) BYPASS, DETOUR LENGTH 2 KM

********** GEOMETRIC DATA **********

(48) LENGTH OF MAXIMUM SPAN 20.7 M
(49) STRUCTURE LENGTH 42.1 M
(50) CURB OR SIDEWALK: LEFT 0.4 M RIGHT 0.4 M
(51) BRIDGE ROADWAY WIDTH CURB TO CURB 9.1 M
(52) DECK WIDTH OUT TO OUT 10.0 M
(32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 8.2 M
(33) BRIDGE MEDIAN- NO MEDIAN 0
(34) SKEW 46 DEG (35) STRUCTURE FLARED NO
(10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M
(47) INVENTORY ROUTE TOTAL HORIZ CLEAR 9.1 M
(53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M
(54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M
(55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M
(56) MIN LAT UNDERCLEAR LT 0.0 M

********** NAVIGATION DATA **********

(38) NAVIGATION CONTROL- NO CONTROL CODE 0
(111) PIER PROTECTION- CODE
(39) NAVIGATION VERTICAL CLEARANCE 0.0 M
(116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M
(40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

****

SUFFICIENCY RATING = 51.2
STATUS
HEALTH INDEX 99.5
PAINT CONDITION INDEX = N/A

********** CLASSIFICATION ********** CODE

(112) NBIS BRIDGE LENGTH- YES Y
(104) HIGHWAY SYSTEM- NOT ON NHS 0
(26) FUNCTIONAL CLASS- MINOR ARTERIAL URBAN 16
(100) DEFENSE HIGHWAY- NOT STRAHNET 0
(101) PARALLEL STRUCTURE- NONE EXISTS N
(102) DIRECTION OF TRAFFIC- 2 WAY 2
(103) TEMPORARY STRUCTURE-
(105) FED.LANDS HWY- NOT APPLICABLE 0
(110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0
(20) TOLL- ON FREE ROAD 3
(21) MAINTAIN- OTHER STATE AGENCY 21
(22) OWNER- OTHER STATE AGENCY 21
(37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

********** CONDITION ********** CODE

(58) DECK 7
(59) SUPERSTRUCTURE 7
(60) SUBSTRUCTURE 5
(61) CHANNEL & CHANNEL PROTECTION 9
(62) CULVERTS N

********* LOAD RATING AND POSTING ********* CODE

(31) DESIGN LOAD- MS-18 OR HS-20 5
(63) OPERATING RATING METHOD- (LRFR) LD & RES FA 8
(64) OPERATING RATING- RF= 0.77
(65) INVENTORY RATING METHOD- (LRFR) LD & RES FA 8
(66) INVENTORY RATING- RF= 0.60
(70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5
(41) STRUCTURE OPEN, POSTED OR CLOSED- A
DESCRIPTION- OPEN, NO RESTRICTION

********** APPRAISAL ********** CODE

(67) STRUCTURAL EVALUATION 4
(68) DECK GEOMETRY 3
(69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N
(71) WATER ADEQUACY 9
(72) APPROACH ROADWAY ALIGNMENT 8
(36) TRAFFIC SAFETY FEATURES 0110
(113) SCOUR CRITICAL BRIDGES 8

********** PROPOSED IMPROVEMENTS **********

(75) TYPE OF WORK- SUP/SUB REHAB CODE 35
(76) LENGTH OF STRUCTURE IMPROVEMENT 42.1 M
(94) BRIDGE IMPROVEMENT COST $418,000
(95) ROADWAY IMPROVEMENT COST $83,600
(96) TOTAL PROJECT COST $702,240
(97) YEAR OF IMPROVEMENT COST ESTIMATE 2017
(114) FUTURE ADT 9678
(115) YEAR OF FUTURE ADT 2038

********** INSPECTIONS **********

(90) INSPECTION DATE 01/18 (91) FREQUENCY 24 MO
(92) CRITICAL FEATURE INSPECTION: (93) CFI DATE
A) FRACTURE CRIT DETAIL- NO MO A)
B) UNDERWATER INSP- YES 72 MO B) 05/13
C) OTHER SPECIAL INSP- NO MO C)

54C0449 CALIFORNIA AQUEDUCT 0.95 MI E MAPLE AVE
135 - PHOTO-Routine-Underside View

01/24/2018 [AAAO]

Photo No. 1
Underside view looking East.

APPENDIX B

DEPARTMENT OF PARKS AND RECREATION (DPR) 523 FORMS

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code 3
Other Listings _____
Review Code _____ Reviewer _____ Date _____

***Resource Name or #** (Assigned by recorder) California Aqueduct

P1. Other Identifier: Map Reference No. 18
***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** See Continuation Sheet
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** See Continuation Sheet **Date** See Continuation Sheet **T** __; **R** __; ___ ¼ **of Sec** __; _____ **B.M.**
c. Address _____ City _____ 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)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The main line of the California Aqueduct is divided into five divisions: North San Joaquin, San Luis, South San Joaquin, Tehachapi, and the East Branch (previously the Mojave and Santa Ana Divisions) that are oriented in a general north to south direction. The aqueduct also features two main branches: the Coastal, which generally extends southwest from the main line at Milepost 184.63, 16 miles south of Kettleman City and terminates in San Luis Obispo and Santa Barbara Counties, and West which extends southwest from the Tehachapi Afterbay in Kern County to Castaic Lake, north of Santa Clarita in Los Angeles County. The entire main line of the aqueduct is 444 miles long. It begins in the Sacramento-San Joaquin Delta in the North San Joaquin Division, and terminates at the southern end of the state at Lake Perris, Riverside County, in the East Branch Division. Each division contains such features as bridges, siphons, culverts, and canal drains. The combination of these features and the canal itself forms a unified water conveyance system. (See Continuation Sheet)

***P3b. Resource Attributes:** (List attributes and codes) HP20. Canal/Aqueduct
***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) California Aqueduct, MP 117.5, October 21, 2011

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1960-1974 / Dept. of Water Resources

***P7. Owner and Address:**
California Department of Water Resources
1416 9th Street
Sacramento, CA 95814

***P8. Recorded by:** (Name, affiliation, address)
Patricia Ambacher
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2020 L Street, Suite 400
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***P9. Date Recorded:** October 21, 2011

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** *Historical Resources Evaluation Report: 17 Bridges Seismic Retrofit Project,* AECOM 2012
***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) _____

***NRHP Status Code** 3
***Resource Name or #** (Assigned by recorder) California Aqueduct

B1. Historic Name: California Aqueduct
B2. Common Name: California Aqueduct
B3. Original Use: Aqueduct B4. Present Use: Aqueduct
***B5. Architectural Style:** Utilitarian
***B6. Construction History:** (Construction date, alteration, and date of alterations) 1960-1974
***B7. Moved?** ☒ **No** ☐ **Yes** ☐ **Unknown** **Date:** _____ **Original Location:** _____
***B8. Related Features:** Bridges that cross the aqueduct, control facilities, canals, siphons, drains

B9. Architect: Unknown b. Builder: Unknown
***B10. Significance: Theme** Transportation and Water Conveyance **Area** California
Period of Significance 1960-1974 **Property Type** Aqueduct **Applicable Criteria** A,C
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

By the mid-1950s, the California Department of Water Resources (DWR) identified the primary water issue in California as one of maldistribution. According to the DWR, too much water was wasted in northern California, and too little rain fell in southern California (DWR 1957:10–11). Plans to rectify this maldistribution began in earnest after World War II during a period when California experienced a population surge and dramatic development throughout much of the state. Local governments and water officials quickly realized that their water supplies could not meet the growing demand of their communities. Farmers were also draining regional groundwater basins to irrigate their crops (DWR 2011). To rectify this issue, state engineer, Arthur D. Edmonston, published a proposal that suggested building a multipurpose dam, reservoir, and power plant on the Feather River, northeast of the small town of Oroville in the northern Sacramento Valley; an aqueduct to transport water from the Sacramento-San Joaquin Delta to Santa Clara and Alameda Counties; and a second aqueduct to serve the San Joaquin Valley and southern California (DWR 2011). The storage of water would reduce flooding hazards, and the stored water could be released into the Sacramento River at planned intervals and then deposited into the Sacramento–San Joaquin Delta. Here it would be able to check the flow of salt water from the San Francisco Bay, which during droughts had seeped as far inland as Sacramento. The project would be paid for in part by the electricity generated at the dam's power plant in Oroville. (See Continuation Sheet)

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:** See Continuation Sheet

B13. Remarks:

***B14. Evaluator:** Patricia Ambacher

***Date of Evaluation:** April 12, 2012

(This space reserved for official comments.)

(Sketch Map with north arrow required.)

See Location Map

County (cont)

Counties Listed From North to South

Aqueduct's Main Line	*Coastal Branch*	*West Branch*
Alameda County	Kern County	Los Angeles County
San Joaquin County	San Luis Obispo County	
Stanislaus County	Santa Barbara County	
Merced County		
Fresno County		
Kings County		
Kern County		
Los Angeles County		
San Bernardino County		
Riverside County		

USGS 7.5' Quad (cont)

Quads Listed from North to South

Aqueduct's Main Line

Clifton Court Forebay 1978	Calflax 1956 (R 1971)	Lake Hughes 1957 (R 1974)
Midway 1953 (R 1980)	Huron 1956 (R 1971)	Del Sur 1958 (R 1974)
Tracy 1954 (R 1981)	La Cima 1963 (R 1971)	Lancaster West 1958 (R 1974)
Vernalis 1991	Kettleman City 1963 (R 1981)	Ritter Ridge 1958 (R 1974)
Solyo 1991	Los Viejos 1954 (R 1981)	Palm Dale 1958 (R 1974)
Westley 1991	Avenal Gap 1954 (R 1973)	Littlerock 1957 (R 1974)
Patterson 1953 (R 1971)	Antelope Plain 1954 (R 1982)	Juniper Hills 1959 (R 1988)
Crows Landing 1952 (R 1980)	Los Hills NW 1954 (R 1973)	Valyermo 1958 (R 1988)
Newman 1952 (R 1971)	Los Hills 1953 (R 1973)	Mescal Creek 1956 (R 1988)
Howard Ranch 1953 (R 1971)	Belridge 1953 (R 1973)	Phelan 1956 (R 1988)
San Luis Dam 1969 (R 1978)	Lokern 1954 (R 1973)	Baldy Mesa 1956 (R 1988)
Volta 1960 (R 1971)	West Elk Hills 1954 (R 1973)	Hesperia 1956 (R 1980)
Ortigalita Peak NW 1969 (R 1984)	East Elk Hills 1954 (R 1973)	Silverwood Lake 1956 (R 1988)
Charleston School 1956 (R 1971)	Tupman 1954 (R 1968 and 1973)	San Bernardino North 1967 (R 1988)
Laguna Seca Ranch 1956 (R 1971)	Mouth of Kern 1950 (R 1968 and 1973)	San Bernardino South 1967 (R 1980)
Hammonds Ranch 1956 (R 1984)	Maricopa 1950 (R 1973)	Riverside East 1967 (R 1980)
Chounet Ranch 1956 (R 1971)	Pentland 1953 (R 1968 and 1973)	Sunnymead 1967 (R 1980)
Chaney Ranch 1955 (R 1971)	Conner SW 1955 (R 1968 and 1973)	Perris 1967 (R 1979)
Monocline Ridge 1955 (R 1971)	Coal Oil Canyon 1955 (R 1968 and 1973)	
Levis 1956 (R 1984)	Mettler 1955 (R 1968 and 1973)	
Cantua Creek 1956 (R 1984)	Grapevine 1991	
West Camp 1954 (R 1973)	Pastoria Creek 1991	
Tres Picos Farms 1956 (R 1971)	La Liebre Ranch 1965 (R 1974)	
Domengine Ranch 1956 (R 1979)	Neenach School 1965 (R 1974)	
Harris Ranch 1956 (R 1971)	Fairmont Butte 1965 (1974)	

Coastal Branch

Avenal Gap 1954 (R 1973)
Emigrant Hill 1953 (R 1973)
Sawtooth Ridge 1961 (R 1994)
Orchard Peak 1961 (R 1993)
Cholame 1961 (R 1993)
Camatta Canyon 1961 (R 1976)
Shedd Canyon 1961 (R 1993)
Wilson Corner 1966 (R 1976)
Santa Margarita 1965 (R 1993)
San Luis Obispo 1965 (R 1994)
Lopez Mountain 1965 (R 1993)
Arroyo Grande NE 1965 (R 1993)
Oceano 1965 (R 1979)
Nipomo 1965

West Branch

La Liebre Ranch 1965 (R 1974)
Lebec 1991
Black Mountain 1991
Liebre Mountain 1958 (R 1988)
Whitaker Peak 1958 (R 1988)
Warm Springs Mountain 1958 (R 1988)
Newhall 1952 (R 1988)

Description (cont)

The California Aqueduct is trapezoidal and lined with un-reinforced concrete. The depth, bottom width, and surface width of the canal vary slightly in each division. In the North San Joaquin Division, the aqueduct is approximately 33 feet deep and 40 feet wide at the bottom. This section of the canal is approximately 63 miles long with side slopes of 1½:1. In the San Luis Unit, the canal's depth and bottom width ranges between approximately 25 and 37 feet deep and 50 to 110 feet wide. The 103-mile-long canal has side slopes of 2:1. In the South San Joaquin Division, the aqueduct is 121 miles long and its depth ranges between approximately 21 and 26 feet. Its bottom width varies between 24 and 32 feet with a 2:1 and 2½:1 slope. The aqueduct is 24.5 feet deep with a bottom width of 10 feet in the Tehachapi Division. The side slopes are 2:1. In the East Branch, the aqueduct has an average depth of 20 feet, with a bottom width of between 12 and 16 feet. The East Branch's 98 mile-long segment has side slopes that vary between 2:1 and 3:1. The average surface width for the California Aqueduct is between 90 and 110 feet. The widest bottom width is 50 feet and the deepest section is approximately 33 feet (DWR 2010).

Significance (cont)

Edmonston also proposed constructing a giant aqueduct fed by massive, custom-designed pumps that would force the water from the Delta southward, where it could be used to water the dry southern valley and the cities of southern California after pumps moved it over the Tehachapi Mountains at the southern end of the San Joaquin Valley (DWR 1974:7). These planning efforts eventually came to fruition as the State Water Project (SWP). Financing for the SWP was approved by the voters of California in 1960 as a result of the Burns-Porter Act (DWR 2010). When brought to the voters as a referendum, the public which was divided along northern and southern California ideologies (both having concerns regarding loss of water), approved the bond measure by a narrow margin of 173,944 votes.

A key component of the SWP is the California Aqueduct, the primary delivery system of the SWP. It is the longest water conveyance feature of the SWP and its primary purpose is to transport water from the Delta to the San Joaquin Valley and Southern California. Branches of the aqueduct move water to the San Francisco Bay Area and Santa Barbara and San Luis Obispo counties. Construction on the California Aqueduct began in 1960 and the main line was completed in 1973 (Autobee 2011:8; Golze 1965:8).

Early in the planning and design phase for the California Aqueduct, the engineers decided that a lined canal would be more efficient than a compacted earthen lined canal. An earthen lined canal, while less expensive to build, would create a loss of water from seepage, higher head loss because of friction, and increased maintenance. The advantages of a lined canal included less seepage and maintenance, lower head loss, and greater reliability overall. Unreinforced concrete was selected for the lining because it would not be under stress that would necessitate reinforced concrete. The lining was intended to be a minimum of two inches thick, 3.5 inches for side slopes between 15 and 30 feet, and for longer slopes the thickness increased to four inches. A horizontal lip of 12 inches was placed at the top of the lining to help prevent seepage behind the lining (DWR 1974:8).

Engineers designed roads on each side of the California Aqueduct in sections where the area exceeded 36 feet between the inside edge of the roadway to the bottom of the far canal side. The roads were designed to drain away from the canal and be between two and four feet above the canal's lining. The primary road was planned for future use as an operating road for patrolling, canal maintenance, and through-traveling. These primary operating roads received better paving. At points subject to flooding, bridges were constructed on the primary operating roads if an alternative public bridge was not usable. On average, engineers constructed operational bridges or other vehicular crossings of the canal at four mile intervals (DWR 1974:11).

The San Luis Unit, which includes the San Luis Reservoir, located about 15 miles west of Los Banos, adjacent to State Route 152, was an outgrowth of the Bureau of Reclamation's 1949 Central Valley plan that called for additional storage capacity to alleviate record groundwater drawdowns (Autobee 2011:7; DWR 1974:49, 52). The San Luis Unit portion of the California Aqueduct is unique in that it is a joint project between the federal (Reclamation) and the state (DWR) governments, with the federal government responsible for 45% of the funds and California responsible for 55% (San Luis Unit Central Valley Project 1963:1, 4). The O'Neill Pumping Plant draws water from the San Luis Reservoir and pumps it south. The San Luis Unit extends from the O'Neill Forebay (created with the construction of the dam) nearly 100 miles to Kettleman City. DWR was responsible for constructing the segment from the Delta inlet to the San Luis Reservoir in Merced County. BOR constructed the next 102 miles of the aqueduct, which is identified as the San Luis Canal. The extended conveyance structure is again identified as the California Aqueduct after it passes the Westlands Water District to the south in Fresno and Kings counties (Garone 2011:209).

Today, the SWP provides drinking water for 25 million people; irrigates approximately 750,000 acres of crops; and features 34 storage facilities, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants, and 700 miles of open canals and pipelines.

The California Aqueduct appears to meet the criteria for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR) at the state level of significance under NRHP/CRHR Criterion A/1 representing a comprehensively planned and publicly sanctioned water conveyance public works project to facilitate development throughout the state. It also appears to meet the criteria under NRHP/CRHR C/3 for its complex design necessary to redistribute water throughout the state of California on such a massive level. The period of significance for the resource is 1960-1974, the years of construction.

The California Aqueduct was the largest and most significant of the water conveyances systems developed as part of the SWP California. The SWP includes 701 miles of aqueducts, canals and pipelines and the California Aqueduct comprises 444 miles of the system. The aqueduct was a critical component of the SWP and was an essential feature in the development of California. The water serves users in the San Joaquin Valley where the aqueduct allowed thousands of acres of new land to be cultivated, thereby dramatically increasing California's agricultural efforts in the region and propelling the state to the top in nationwide in agricultural production. In Southern California, the aqueduct serves municipal users by supplying drinking water. The aqueduct represents one of the most bold and successful public works projects ever initiated by a state government. The California Aqueduct profoundly altered the distribution of water resources across California. Without its construction, the maldistribution of water in California would likely have continued because Northern California still receives more rain than any other region in California. Without the SWP and the aqueduct, precious runoff would have drained into to the ocean unused. The forecasted population increases, particularly for Southern California and the San Francisco Bay Area necessitated a system of water redistribution. The aqueduct facilitated the agricultural development the San Joaquin Valley and Southern California. Therefore, it appears to meet NRHP/CRHR Criterion A/1.

The California Aqueduct is associated with many individuals who contributed to the planning and implementation of the project. Within certain contexts those individuals could be considered significant under NRHP/CRHR Criterion B/2. One notable person associated with the aqueduct is Governor Edmund G. "Pat" Brown. Brown was instrumental in spurring political and public support for the construction of the SWP, including the California Aqueduct, and its completion was one of his most significant accomplishments as governor. The aqueduct was one of several significant achievements of Brown's governorship. Brown was also responsible for the Fair Housing Act, Fair Unemployment Act, the master plan for higher education in California and the expansion of the state highway system. Each of these is also important for their association with Governor Brown. According to *National Register Bulletin 32: Guidelines for Evaluating and Documenting Properties Associated with Significant Persons*, an eligible property must be directly associated with the significant individual and be the

best property to represent the person's significance. The aqueduct does not appear significant under NRHP/CRHR Criterion B/2 for its association with Governor Brown because it is not the best representation of Brown's significance. His significance can be better tied to other properties, including places such as his former office or home. Those are the properties where Brown conducted his work, including the planning and drafting of critical legislation that brought the aqueduct to fruition. The aqueduct does symbolize Brown's dedication to California's development, but the symbolic value is not a substitute for direct association. Nor is it the best representation or only surviving property that can convey Brown's significance as governor.

As an engineering structure, the California Aqueduct appears to meet NRHP/CRHR Criterion C/3. The California Aqueduct introduced design innovations in the construction of the system. Within the context of water conveyance it is a significant and distinguishable engineering entity significant for its type, period and method of construction and is the largest water conveyance structure in California. The trapezoidal design and the concrete lining of the aqueduct allowed it to carry more water and reduce the loss of head water and seepage and made the aqueduct more efficient. Because the SWP operates on a controlled volume concept, the design for the aqueduct required more check structures that could accommodate change in flows during peak flows with a minimal surface fluctuation. The California Aqueduct was built as a utility system with the capacity for performance and a tremendous amount of structural integrity. The aqueduct is also distinguishable in its use of a high depth-width ratio which allowed for the reduction of adverse effects of alignment curvature on the flow.

Under NRHP/CRHR Criterion D/4 the California Aqueduct is not likely to yield information important to history because as a water conveyance system it is not the principal source of important information. Therefore, the aqueduct is not a contributor under this criterion.

Because completion of the aqueduct is less than 45 years old it is also evaluated under NRHP Criterion Consideration G and the CRHR special consideration for properties less than 50 years old. The California was a planned comprehensive water redistribution system that helped shape the development of much of California following the mid-20th century. Water development is an important and ongoing historic theme within the history of the west. Added to this is the magnitude of planned change to the California landscape brought about by this single engineered public works project and the ability for the California Aqueduct to meet the definition of "exceptional importance" at the statewide level is clear. The general understanding of the exceptional importance of this system is evidenced in the ASCE listing it as one of only 10 internationally ranked "Monuments of the Millennium" for its remarkable engineering aspects, as well as for the positive impact it had on regional economic trade and development.

In addition to being significant, the California Aqueduct also retains sufficient integrity to convey its significance. The aqueduct retains integrity of location because it exists in its original alignment and has not been redirected. Integrity of design is maintained and the aqueduct continues to reflect the historic functions as a water conveyance structure and its scale, proportion and relationship to other features of the SWP is maintained. The integrity of materials is also retained. The aqueduct has undergone routine maintenance, but its primary material of unreinforced concrete has not changed. The California Aqueduct continues to display integrity of workmanship and the construction techniques used on the aqueduct are still visible. Although the setting around the aqueduct is altered in places, the setting for the overall 444 miles is intact. The aqueduct was designed to blend into the landscape, which remains largely rural and agricultural. Thus, the California Aqueduct retains integrity of setting and expresses the basic physical conditions under which it was constructed. Lastly, the California Aqueduct retains integrity of feeling and association. The proximity to agricultural lands and Interstate 5 provides a sense of time and place for the aqueduct. The aqueduct's integrity of feeling and association is enhanced when combined with the control facilities, the maintenance roads, and the bridges that cross the aqueduct. The retention of integrity allows the aqueduct to express its significance as a water conveyance feature.

In summary, the California Aqueduct appears to meet the criteria for listing in the NRHP and the CRHR for its representation as a comprehensively planned and publicly sanctioned water conveyance public works project to facilitate development throughout the state and its complex design necessary to redistribute water throughout the state of California on such a massive level. The aqueduct also retains the aspects of integrity required to convey its significance.

References (cont)

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State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # _____
HRI # _____
Trinomial _____

***Resource Name or #** (Assigned by recorder) California Aqueduct

***Map Name** California Aqueduct

***Scale** 1 inch = 40 miles

***Date of Map** 2011