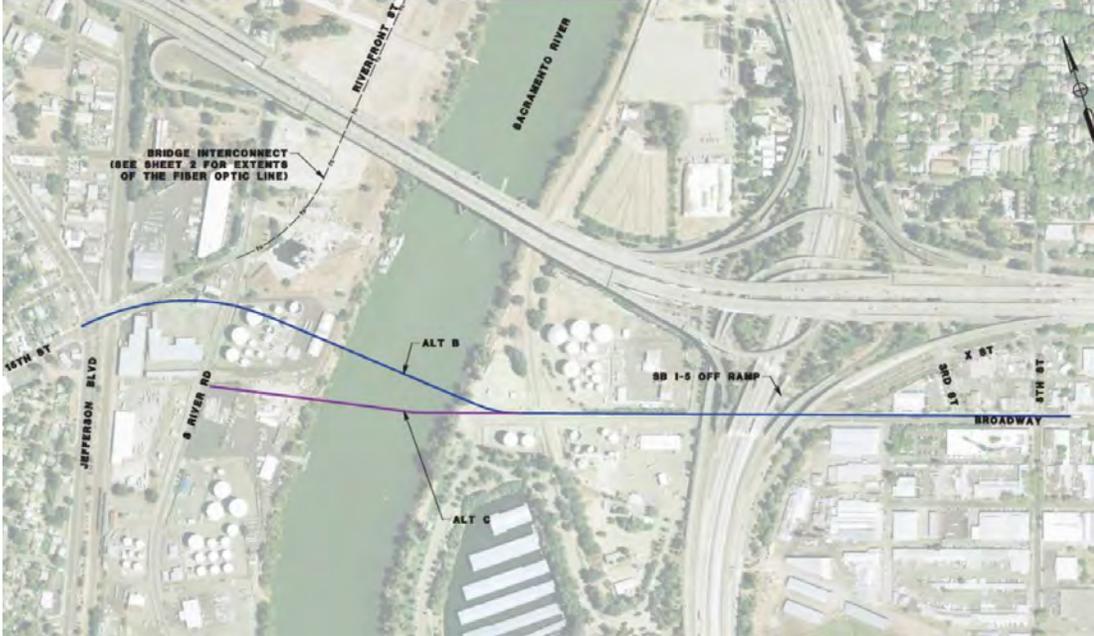


Water Quality Assessment Report

Broadway Bridge Project



Broadway Bridge Project

Yolo and Sacramento Counties

Federal Project No.: TGR2DGL 5447(043)

July 2020



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July 2020

STATE OF CALIFORNIA

Department of Transportation

Prepared By:  _____ Date: 07/01/2020

Patty Cubanski, Watershed Scientist
916-984-4651
Burleson Consulting, Inc.
Folsom, CA

Executive Summary

This Water Quality Assessment Report (WQAR) provides information concerning federal, state, and local permitting requirements related to hydrology and water quality for the Broadway Bridge Project (proposed project). The proposed project involves construction of a new bridge across the Sacramento River approximately 1,000 feet downstream of the Pioneer Bridge (Figures 1 and 2). The proposed project consists of two build alternatives.

The build alternatives under consideration are two alignments for the new bridge and approach roadways.

- Alternative B would realign 15th Street to connect to Jefferson Boulevard in West Sacramento and connect to Broadway at 5th Street in Sacramento. This alignment would require modification to the planned mobility network for South River Road and 15th Street in Pioneer Bluff.
- Alternative C (a modified Alignment C from the Broadway Bridge Feasibility Study) would connect as a “T” intersection to South River Road in West Sacramento and connect to Broadway at 5th Street in Sacramento. This alignment would require modification to the planned mobility network for South River Road in Pioneer Bluff.

The project is located on the Sacramento River within the northern portion of the Sacramento-San Joaquin River Delta in the Lower Sacramento Valley Watershed and the Sacramento Valley Groundwater Basin. The Sacramento River (Knights Landing to the Delta) is impaired for chlordane, DDT (dichlorodiphenyltrichloroethane), dieldrin, mercury, PCBs (polychlorinated biphenyls), and unknown toxicity. The Sacramento River (Delta Waterways [northern portion]) is impaired for chlordane, DDT, dieldrin, Group A pesticides, invasive species, mercury, PCBs, and unknown toxicity.

Potential impacts of the proposed project on existing water quality conditions in the Sacramento River include temporary increases in sediments, oil, grease, and chemical pollutants during construction, as well as potential long-term discharges of sediments and other pollutants collected in storm water runoff. Short-term or temporary construction impacts on water quality have the potential to occur during land disturbance activities, material and equipment use and storage at staging areas, and in-water construction activities. Long-term impacts on water quality could occur from increased impervious area, roadway operations, and operation and maintenance activities such as bridge construction maintenance, inspections, and landscaping maintenance.

Impacts from these activities would be avoided or minimized because all construction activities within the Sacramento River would comply with a variety of permits and requirements from agencies, including the Central Valley Regional Water Quality Control Board, U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and the Cities of West Sacramento and Sacramento.

In addition to agency coordination and permit compliance, the proposed project design includes drainage improvements, such as rock slope protection, and improved storm drainage facilities. These measures will maintain pre-project drainage patterns (i.e., flows and rates) and minimize the potential for discharges of pollutants to the Sacramento River.

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Attachment B Project Schedule

LIST OF ABBREVIATED TERMS

401 Certification	Section 401 Water Quality Certification
AASHTO	American Association of State Highway and Transportation Officials
AEP	Azimuth-over-Elevation Positioning
AGR	Agricultural
Basin Plan	Fifth Edition of the Water Quality Control Plan
BMPs	best management practices
Caltrans	California Department of Transportation
Caltrans MS4 Permit	NPDES Statewide Storm Water Permit Waste Discharge Requirements State of California Department of Transportation
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CGP	Construction General Permit
Construction General Permit	NPDES Permit for Stormwater Discharges Associated with Construction Activities
CSS	combined sewer system
CVFMP	Central Valley Flood Management Program
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CWA	Federal Clean Water Act
DDT	Dichlorodiphenyltrichloroethane
DSA	Disturbed Soil Area
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
ER	Environmental Resources
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRMs	Flood Insurance Rate Maps
GHG	greenhouse gas

HUC	Hydrologic Unit Code
I-5	Interstate 5
I-80	Interstate 80
IND	Industrial Service Supply
IRR	Irrigation
Ksat	saturated hydraulic conductivity
LID	Low Impact Development
Limited Threat Discharge Permit	Waste Discharge Requirement Limited Threat Discharges to Surface Water
MS4	Municipal Separate Storm Sewer Systems
MS4 Permit	NPDES General Permit for Municipal Separate Storm Sewer Systems
MTP/SCS	Metropolitan Transportation Plan/Sustainable Communities Strategy
MUN	municipal and domestic
NEPA	National Environmental Policy Act
NES	Natural Environment Study
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
OHWM	ordinary high water mark
PCBs	polychlorinated biphenyls
Porter-Cologne Act	Porter Cologne Water Quality Control Act
PROC	industrial process
proposed project	Broadway Bridge Project
Q100	100-year flood
Q200	200-year flood
Q50	50-year flood
Regional Water Board	Regional Water Quality Control Board
RFMP	Regional Flood Management Plans

RSP	rock slope protection
RUSLE	Revised Universal Soil Loss Equation
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
Section 404 Permit	Section 404 Clean Water Act authorization for fill of waters of the United States
SFHA	Special Flood Hazard Area
SPCC	Spill Prevention, Control, & Countermeasure
SPFC	State Plan of Flood Control
SRBPP	Sacramento River Bank Protection Project
State Water Board	State Water Resources Control Board
Streambed Alteration Agreement	Section 1602 Department of Fish and Game Code Streambed Alteration Agreement
SWMP	Stormwater Management Program
SWPPP	Storm Water Pollution Prevention Plan
the Delta	Sacramento-San Joaquin River Delta
TIGER	Transportation Investment Generating Economic Recovery
TMDL	total maximum daily load
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCG	U.S. Coast Guard
USLE	Universal Soil Loss Equation
WDRs	Waste Discharge Requirements
WQAR	Water Quality Assessment Report
WSAFCA	West Sacramento Area Flood Control Agency
WSE	water surface elevation
WSE50	50-year floodwater surface elevation

1. INTRODUCTION

1.1 Approach to Water Quality Assessment

The purpose of the Water Quality Assessment Report (WQAR) is to fulfill the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and to provide information for National Pollutant Discharge Elimination System (NPDES) permitting. The document includes a discussion of the proposed project, the general environmental setting of the project area, and the regulatory framework with respect to water quality; it also provides data on surface water and groundwater resources within the project area and the water quality of these waters, describes water quality impairments and beneficial uses, and identifies potential water quality impacts/benefits associated with the proposed project, and recommends avoidance and/or minimization measures for potentially adverse impacts.

1.2 Project Overview

The City of West Sacramento, in cooperation with the City of Sacramento and the California Department of Transportation (Caltrans), proposes to construct a new bridge over the Sacramento River south of the Pioneer Bridge (US 50) to provide local interconnectivity across the river and between neighborhoods. The new connection would serve multiple modes of transportation and comply with current American Association of State Highway and Transportation Officials (AASHTO), Caltrans, and local agency design standards.

The project is subject to state and federal environmental review requirements because of use of 2014 Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants funds from the Federal Highway Administration (FHWA). Accordingly, project documentation is being prepared in compliance with both CEQA and NEPA. The City of West Sacramento is the lead agency under CEQA, with the City of Sacramento as a responsible agency, and Caltrans is the lead agency under NEPA. The FHWA's other responsibilities for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project will be carried out by Caltrans under its assumption of responsibility pursuant to 23 United States Code (USC) 327 and the Memorandum of Understanding dated December 23, 2016 and executed by FHWA and Caltrans.

This project is included in the Sacramento Area Council of Governments' (SACOG) 2016 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS).

1.2.1 Project Location

The proposed project is in both Yolo and Sacramento counties and would cross over the Sacramento River between the cities of West Sacramento and Sacramento. The project would be located approximately 1,000 feet south of the existing Pioneer Bridge (Figure 1). The project limits include the combined area of each of the proposed project alternatives. In general, the project limits start in West Sacramento, along 15th Street at Jefferson Boulevard continuing east and over the Sacramento River into the City of Sacramento along Broadway to the 5th Street

intersection. The project limits also extend along Jefferson Boulevard approximately 1,300 feet south of the 15th Street intersection to Alameda Boulevard; along South River Road approximately 1,300 feet south and 650 feet north of 15th Street, along Marina View Drive approximately 400 feet south of Broadway, along Front Street approximately 350 feet north and south of Broadway, along 3rd Street approximately 350 feet north of Broadway to X Street, and along 5th Street approximately 200 feet north and south of Broadway. The project limits include proposed improvements to the northbound Interstate 5 (I-5) off-ramp to Broadway.

The limits of the installation of a proposed fiber optic line that would be placed in West Sacramento to connect communications of the Broadway Bridge with the proposed replacement for the I Street Bridge—the future connection over the river between C Street and Railyards Boulevard—and the existing Tower Bridge are depicted on Figure 1 as extending north along Riverfront Street to Tower Bridge Gateway and 3rd Street, ending at the intersection of 3rd Street and C Street. Last, staging areas that would be accessed via South River Road in West Sacramento and Front Street in Sacramento also are proposed and included in the project limits.

1.2.2 Purpose and Need

1.2.2.1 Purpose

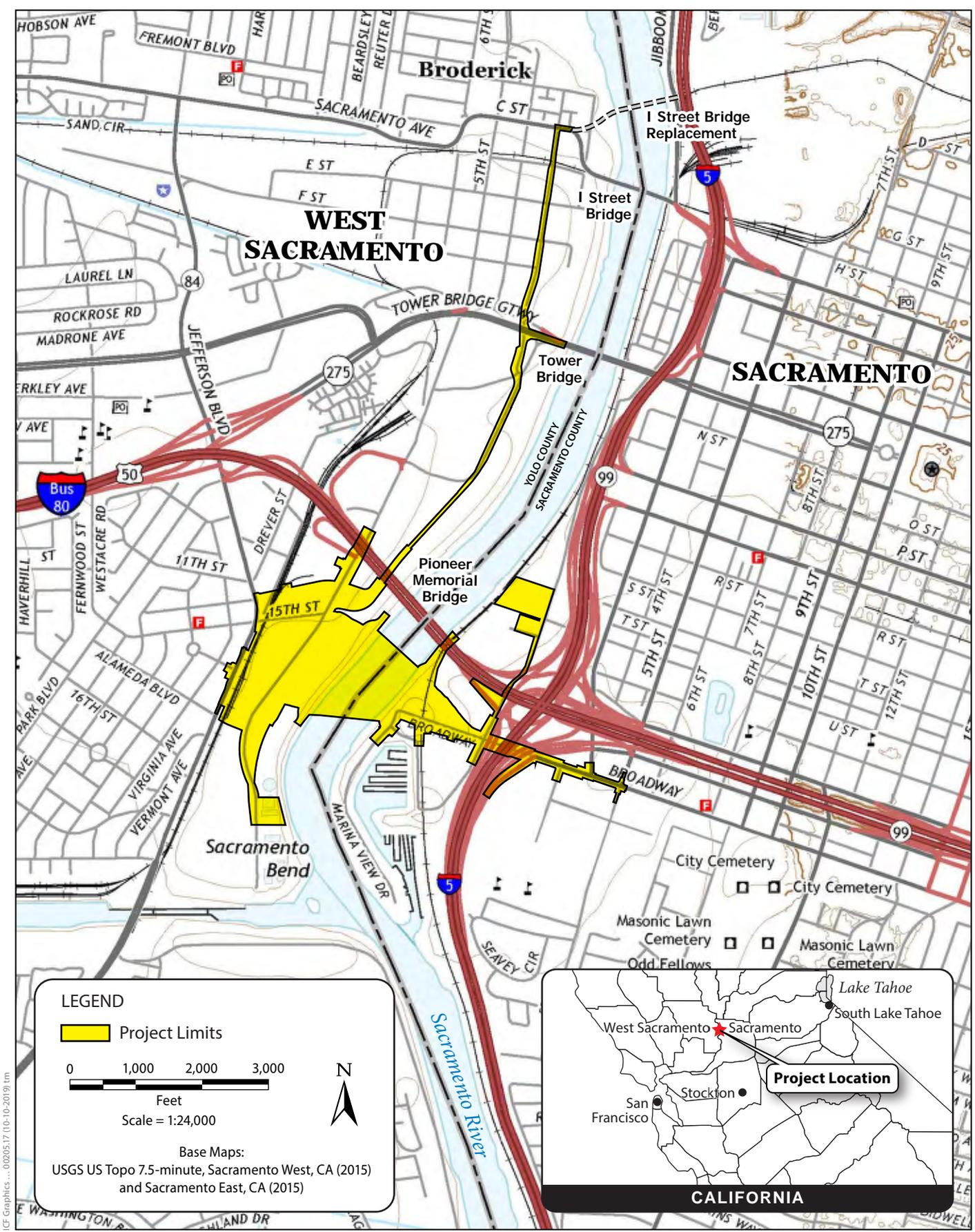
The purpose and objectives of the project are listed below

- Increase the number of river crossings that meet current design standards and encourage travel by walking, bicycling, low energy vehicles, and public transit.
- Increase the number of persons that can safely, efficiently, and reliably cross the river.
- Increase options for emergency response teams to cross the river.
- Increase options for evacuations.
- Improve the connectivity to, and accessibility of, business, recreational areas, and new or redevelopment opportunity sites located in the urban core of Sacramento and West Sacramento without affecting the use of Miller Regional Park or the Sacramento Marina.
- Reduce trip length distances across the river between major origins and destination.
- Reduce the growth in transportation-related energy use, air pollution emissions, and greenhouse gas (GHG) emissions.
- Reduce the growth in vehicle traffic on local neighborhood streets, especially cut-through traffic.

1.2.2.2 Need

The project is needed for the following reasons.

- Limited connectivity across the river creates longer trip lengths, which discourage walking and bicycling.
- Longer trip lengths create dependence on automobile use that generates negative public health effects and adverse environmental effects such as emissions of air pollutants and GHGs.



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Figure 1
Vicinity Map

- Limited connectivity across the river creates concentrated vehicle traffic flows on existing bridges and their connecting approach roadways, resulting in undesirable travel delays for vehicular traffic, including public bus transit during weekday peak periods and special events.
- Limited connectivity across the river reduces options for emergency response teams, thereby increasing response times and limiting alternatives for evacuations.
- Limited connectivity across the river is a barrier to economic activity, social exchanges, recreational opportunity, and access to jobs within the urban core of Sacramento and West Sacramento.
- Limited connectivity to the riverfront reduces the potential to achieve planned urban development and redevelopment of opportunity sites identified in the adopted plans of Sacramento and West Sacramento.
- Limited connectivity reduces the opportunity to use the riverfront for enjoyment and recreation.
- Peak AM/PM congestion is caused by local intercity commuters using the State Highway System as a result of having few local river crossing options.

Construction of the proposed project has independent utility because it can provide a local roadway connection between West Sacramento and Sacramento and their existing roadway networks that does not rely on construction of other facilities to operate. The project would meet the purpose and need without being dependent on construction of other projects or improvements.

1.3 Project Details

1.3.1 Project Description

This section describes the proposed action and the design alternatives that were developed to meet the identified need through accomplishing the defined purpose(s) while minimizing environmental impacts where feasible. The total length of the project is approximately 1.0 mile from Jefferson Boulevard in West Sacramento to the 5th Street and Broadway intersection in Sacramento. The purpose of the project is to increase the number of river crossings over the Sacramento River between West Sacramento and Sacramento. The project is needed because of the existing limited connectivity and longer trip lengths currently required.

The build alternatives under consideration are two alignments for the new bridge and approach roadways. The lettering of each build alternative reflects its similarity to alignments considered in the feasibility study. Figure 2 depicts the location of the build alternatives. Figures 3 and 4 show the preliminary plan view drawings, by phase. A No Build (No-Project) Alternative also is considered.

- Alternative B would realign 15th Street to connect to Jefferson Boulevard in West Sacramento and connect to Broadway at 5th Street in Sacramento. This alignment would require modification to the planned mobility network for South River Road and 15th Street in Pioneer Bluff.

- Alternative C (a modified Alignment C from the *Broadway Bridge Feasibility Study* [CH2M 2015]) would connect as a “T” intersection to South River Road in West Sacramento and connect to Broadway at 5th Street in Sacramento. This alignment would require modification to the planned mobility network for South River Road in Pioneer Bluff.
- No Build (No-Project) Alternative would *not* build a bridge across the Sacramento River from the Pioneer Bluff area of West Sacramento to Broadway in Sacramento. The future no-project conditions planned by both cities would be developed as proposed.

1.3.1.1 Build Alternatives

The build alternatives proposed to satisfy the purpose and need for the project are discussed in this section. Each alternative includes design features common to both build alternatives such as construction of a new bridge across the Sacramento River and roadway modifications in West Sacramento and Sacramento. The common design features are discussed first, followed by the unique features of each alternative.

1.3.1.1.1 Common Design Features of the Build Alternatives

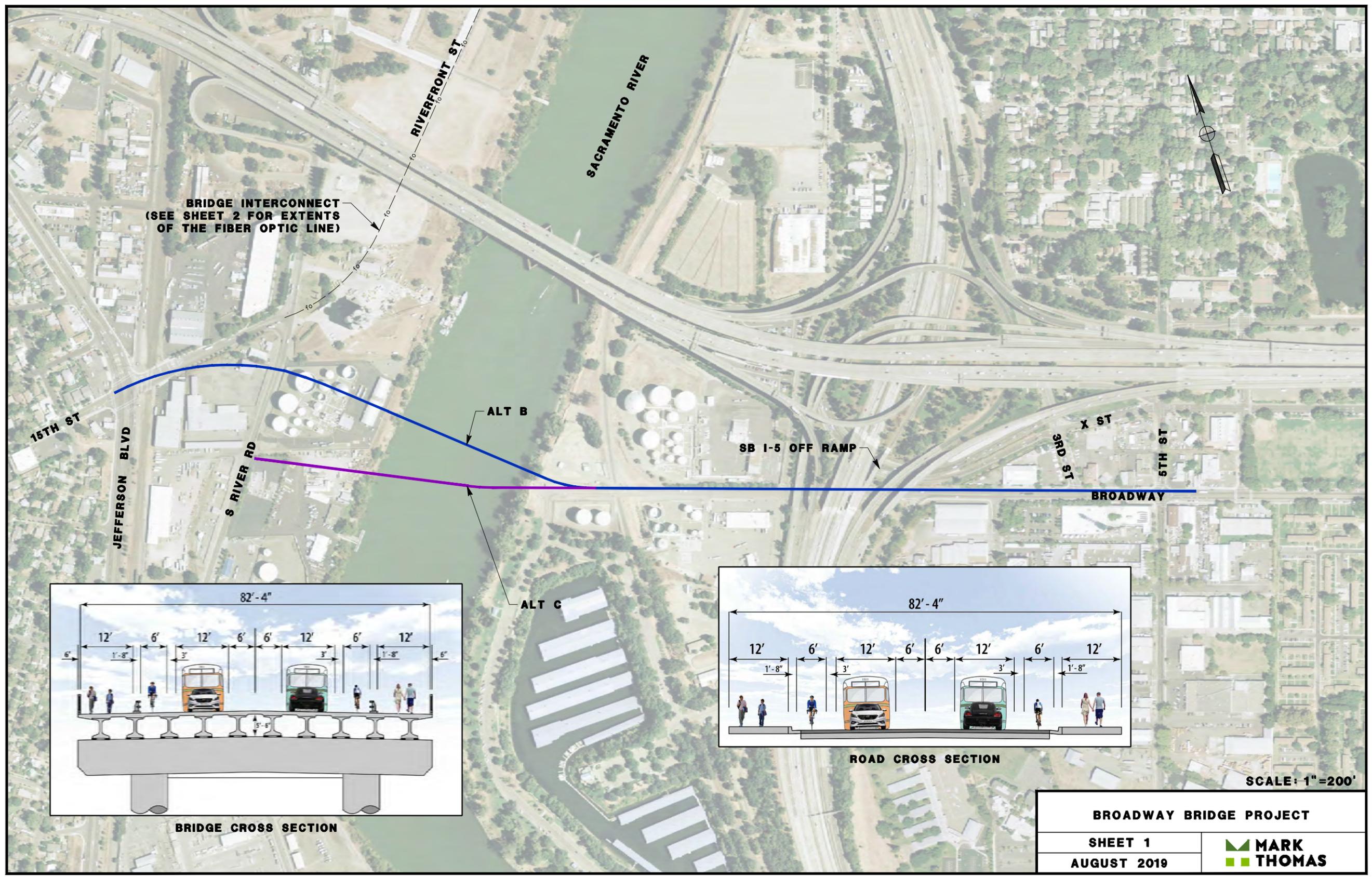
The proposed project would construct a new bridge over the Sacramento River between West Sacramento and Sacramento to facilitate vehicular and multi-modal traffic over the river and reduce traffic congestion, improve multi-modal transportation, and increase emergency options.

The Sacramento River is a navigable waterway of the United States. Under the provisions of the General Bridge Act of 1946, as amended, the United States Coast Guard (USCG) must approve the proposed location and plans for bridges over navigable waters of the United States prior to commencing construction.

New Bridge Construction and Roadway Modifications

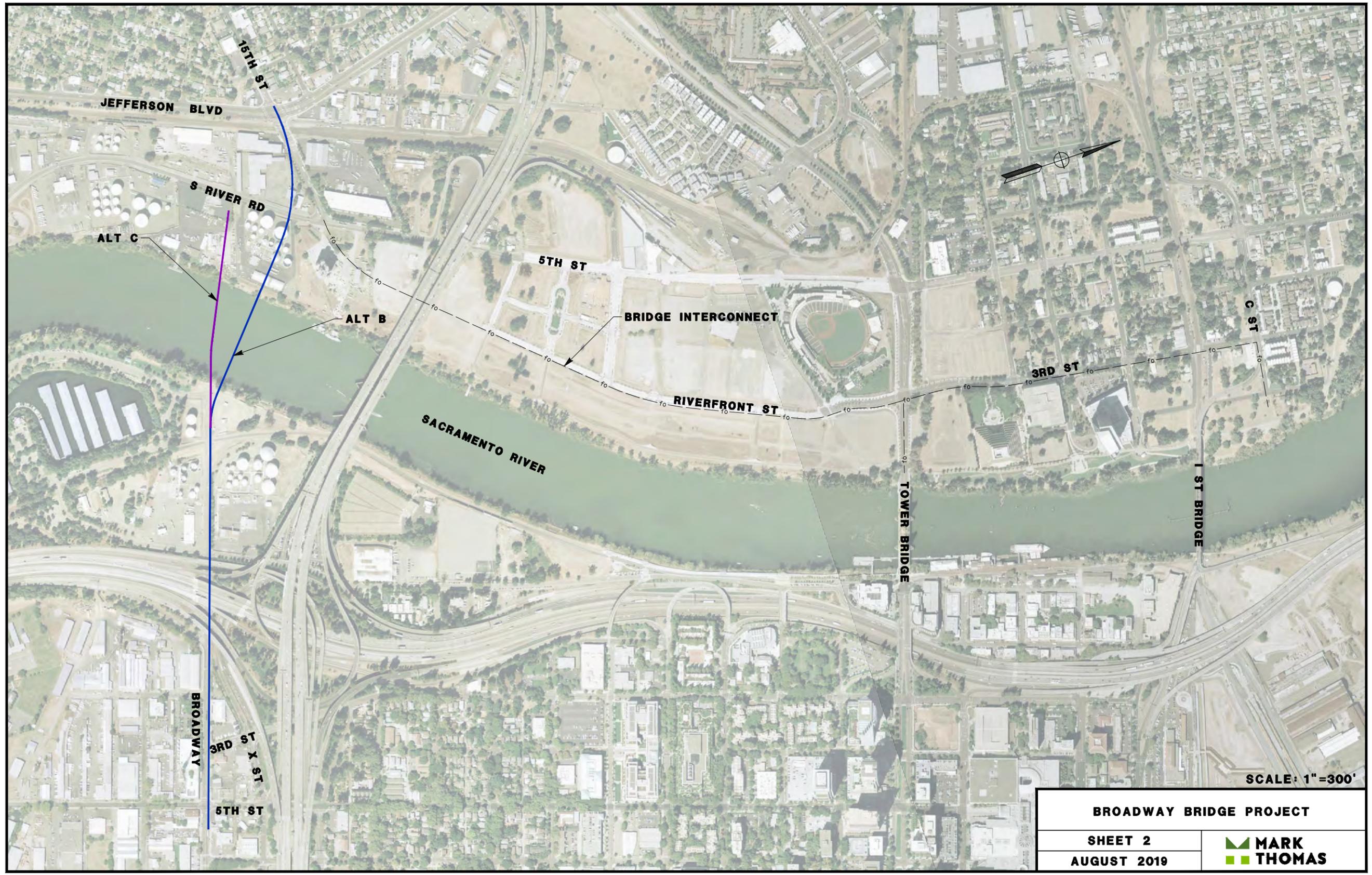
Bridge Construction

The proposed project would construct a new bridge over the Sacramento River, south of the Pioneer Bridge. The total length of the new bridge would vary from approximately 800 to 1,020 feet, with an up to 83-foot-wide deck consisting of two vehicle lanes, a median, on-street Class II buffered bike lanes, and sidewalks along both sides of the bridge. The bridge would include two fixed-span approach structures that tie into the banks of the river; the structures would vary from approximately 200 to 300 feet in length on the West Sacramento bank and from 450 to 600 feet in length on the Sacramento bank. The center span of the bridge would be movable (see below under *Bridge Type* for more information on the movable span). The bridge soffit elevation would be set a minimum of 3 feet above the 200-year water surface elevation to comply with the Central Valley Flood Protection Board (CVFPB) freeboard requirements. Rock slope protection (RSP) (assumed 1/4 ton stone weight, machine positioned [i.e., Method B]) would be installed on the river side of the bridge abutments both above and below the ordinary high water mark (OHWM) to stabilize approximately 400 linear feet of shoreline on each side of the river.



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Figure 2a
Proposed Project Alignment Alternatives



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Figure 2b
Proposed Project Alignment Alternatives

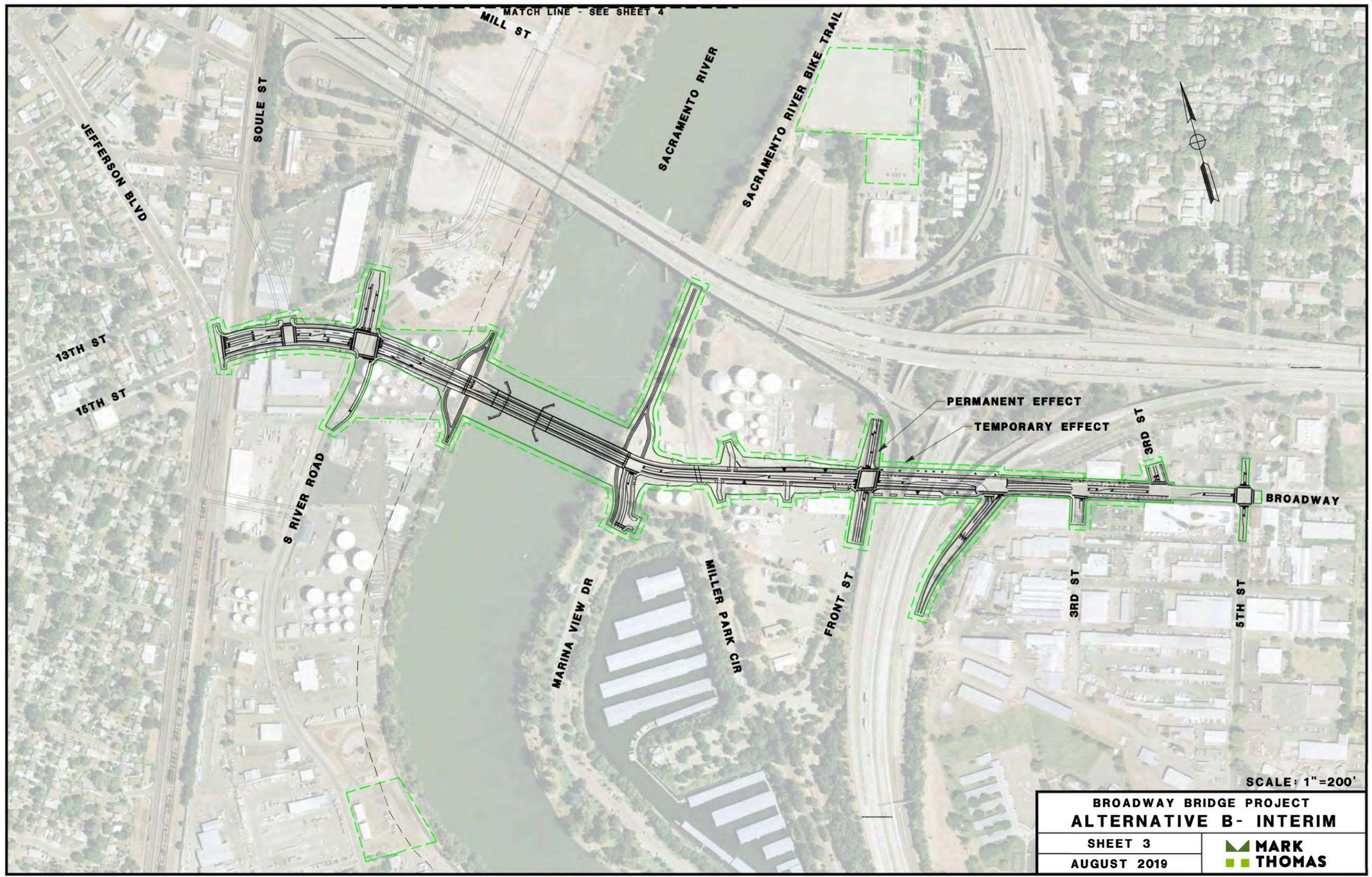
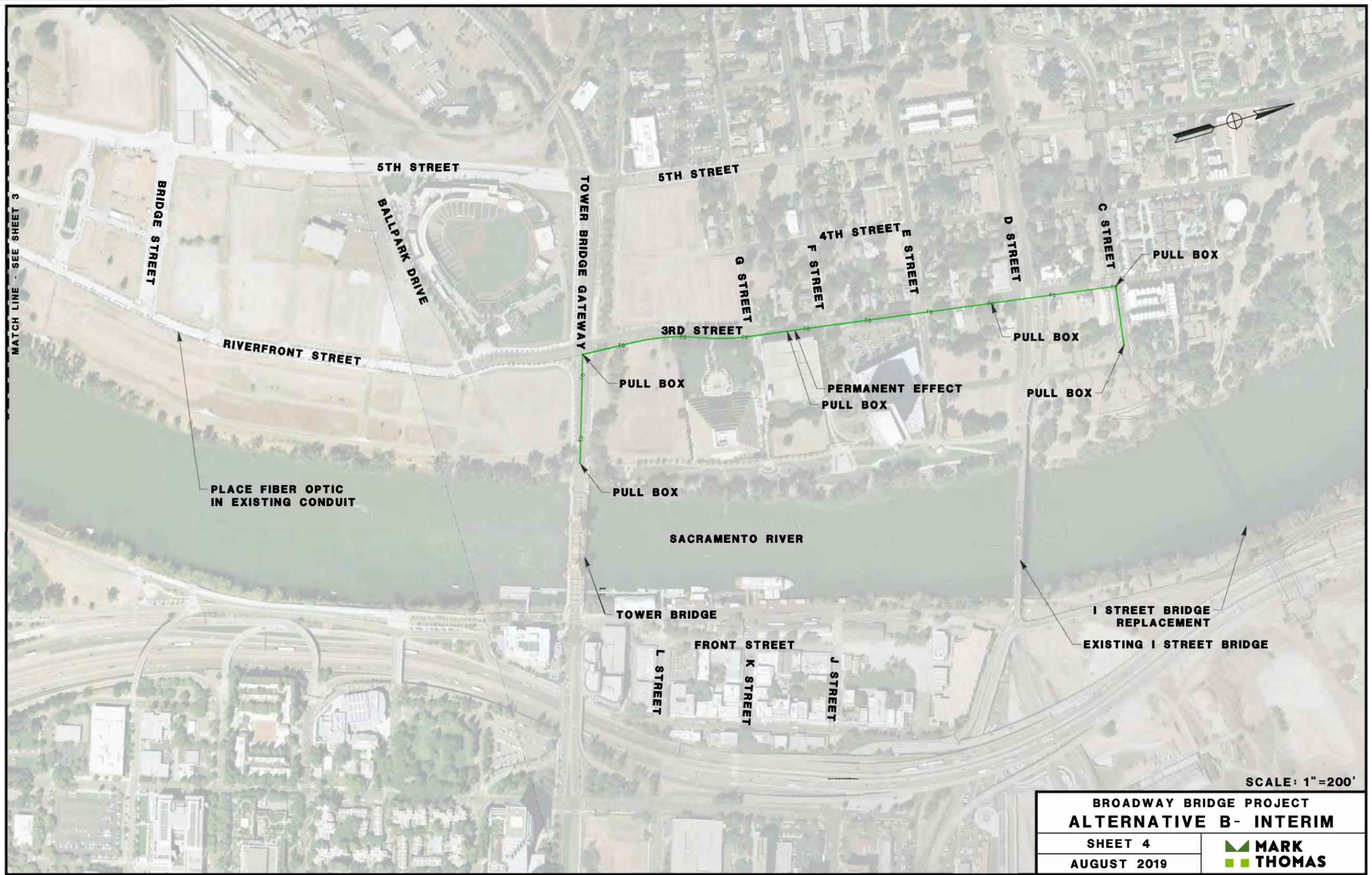


Figure 3a
Alternative B



BROADWAY BRIDGE PROJECT	
ALTERNATIVE B- INTERIM	
SHEET 4	
AUGUST 2019	MARK THOMAS

Figure 3b
Alternative B

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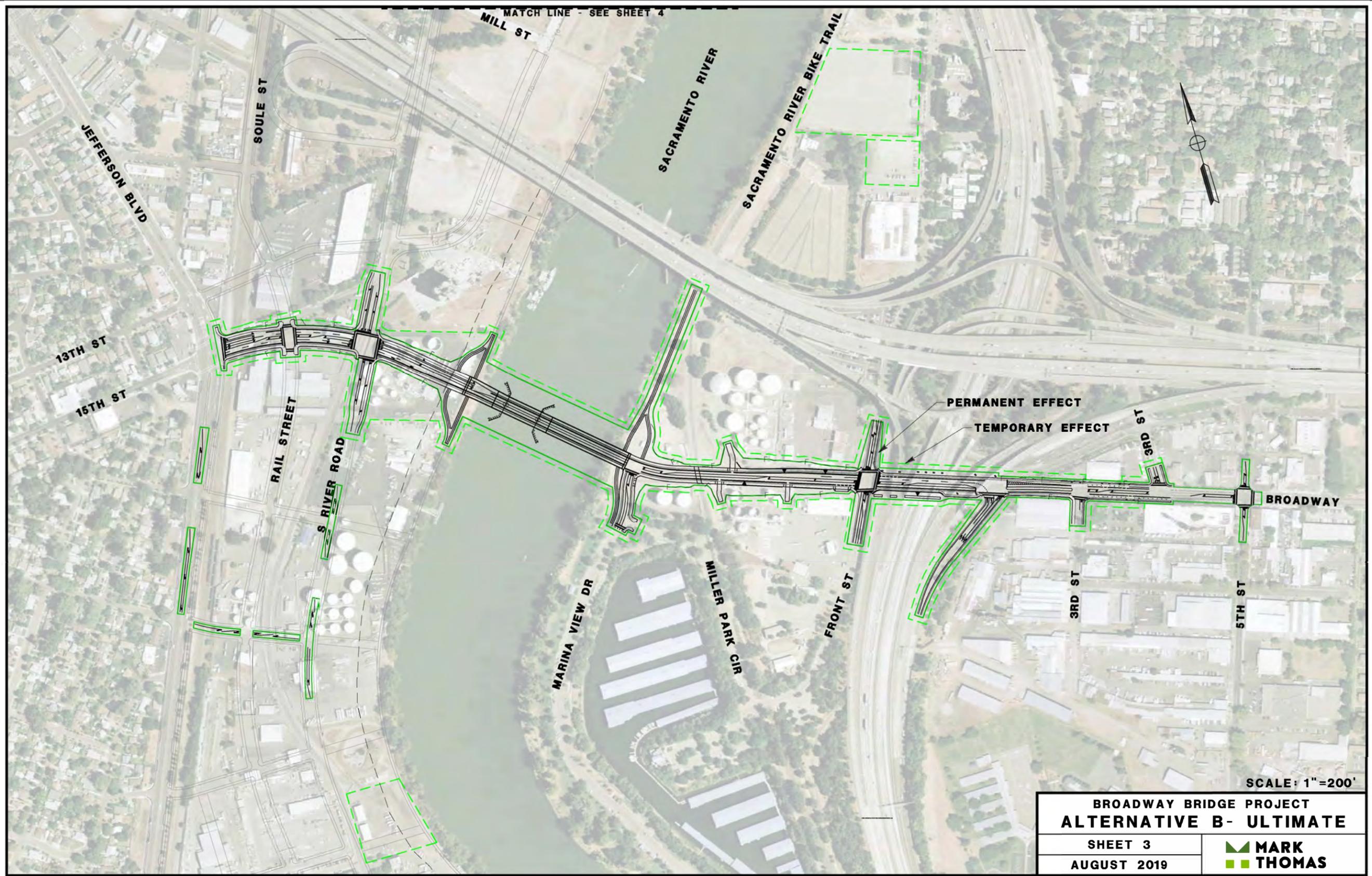


Figure 3c
Alternative B

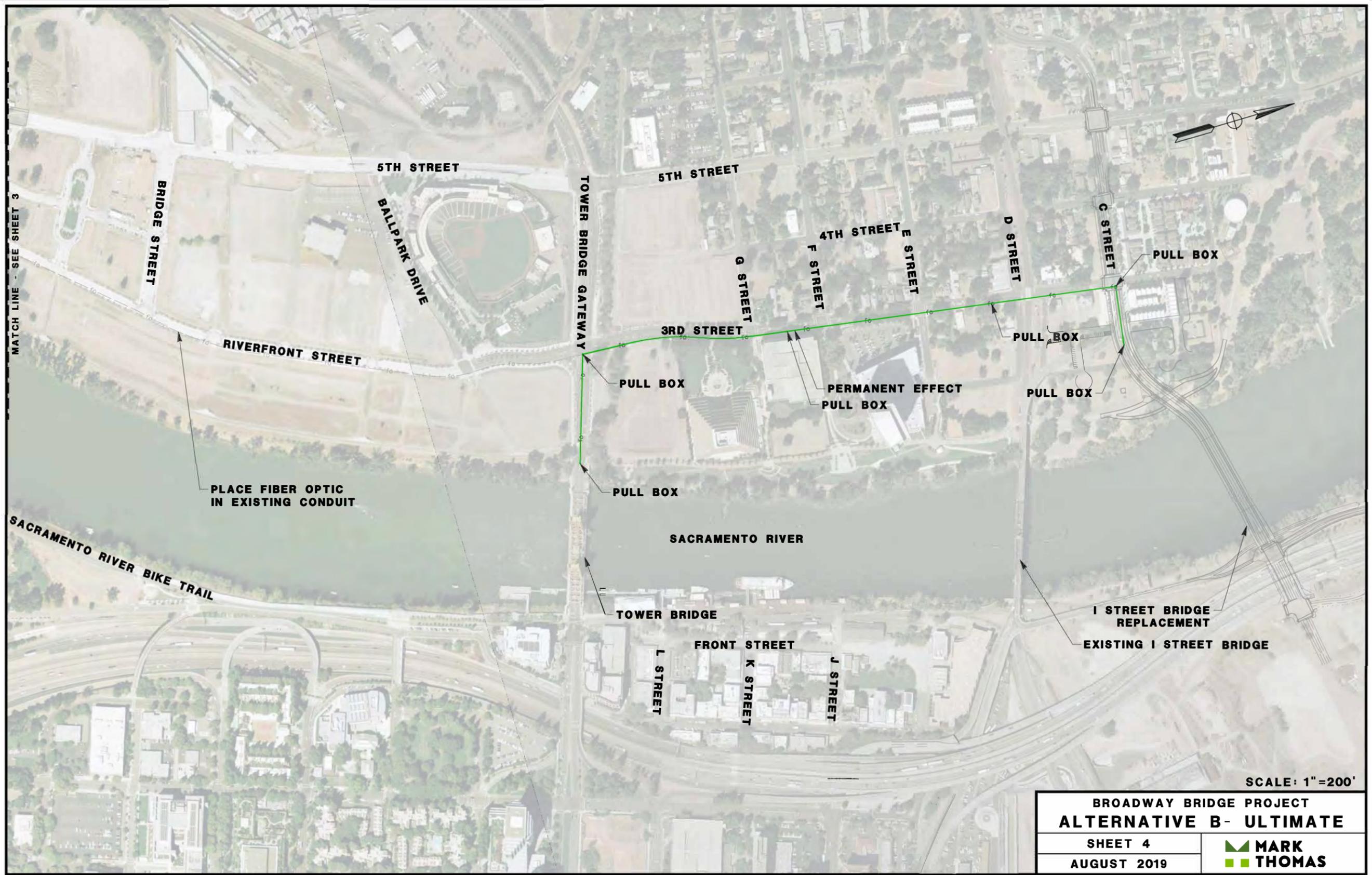
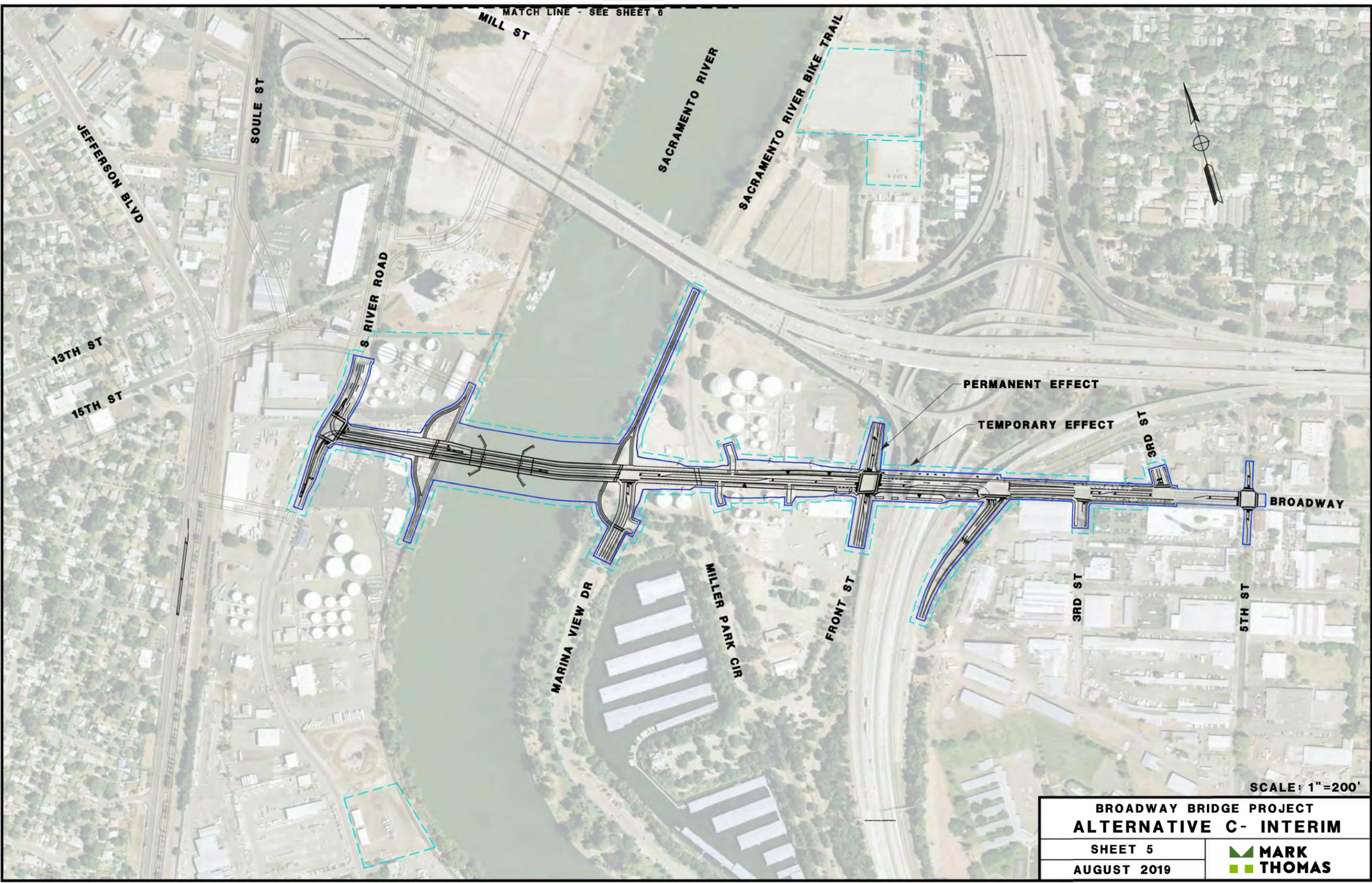


Figure 3d
Alternative B

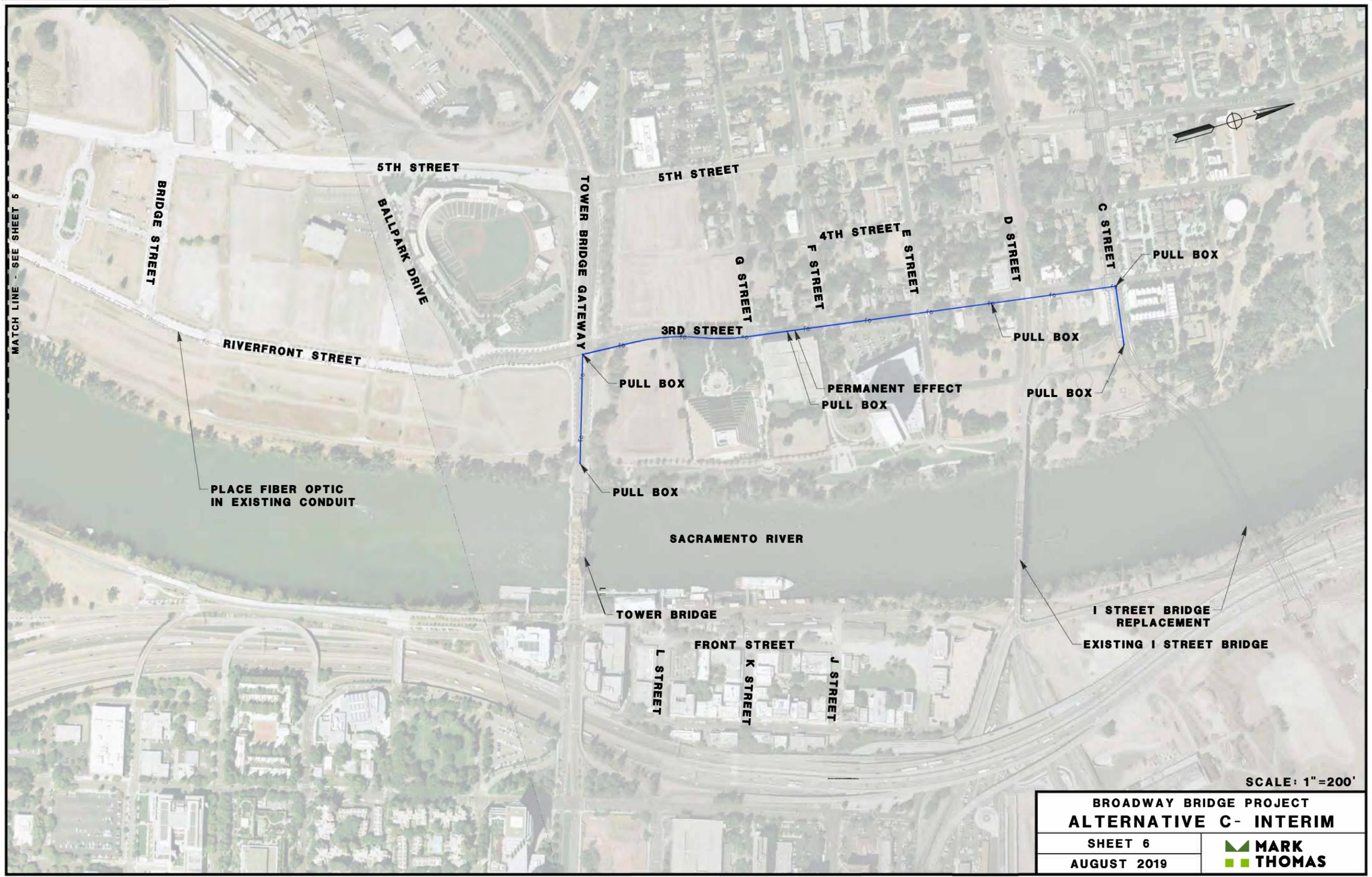
MATCH LINE - SEE SHEET 6



BROADWAY BRIDGE PROJECT	
ALTERNATIVE C- INTERIM	
SHEET 5	 MARK  THOMAS
AUGUST 2019	

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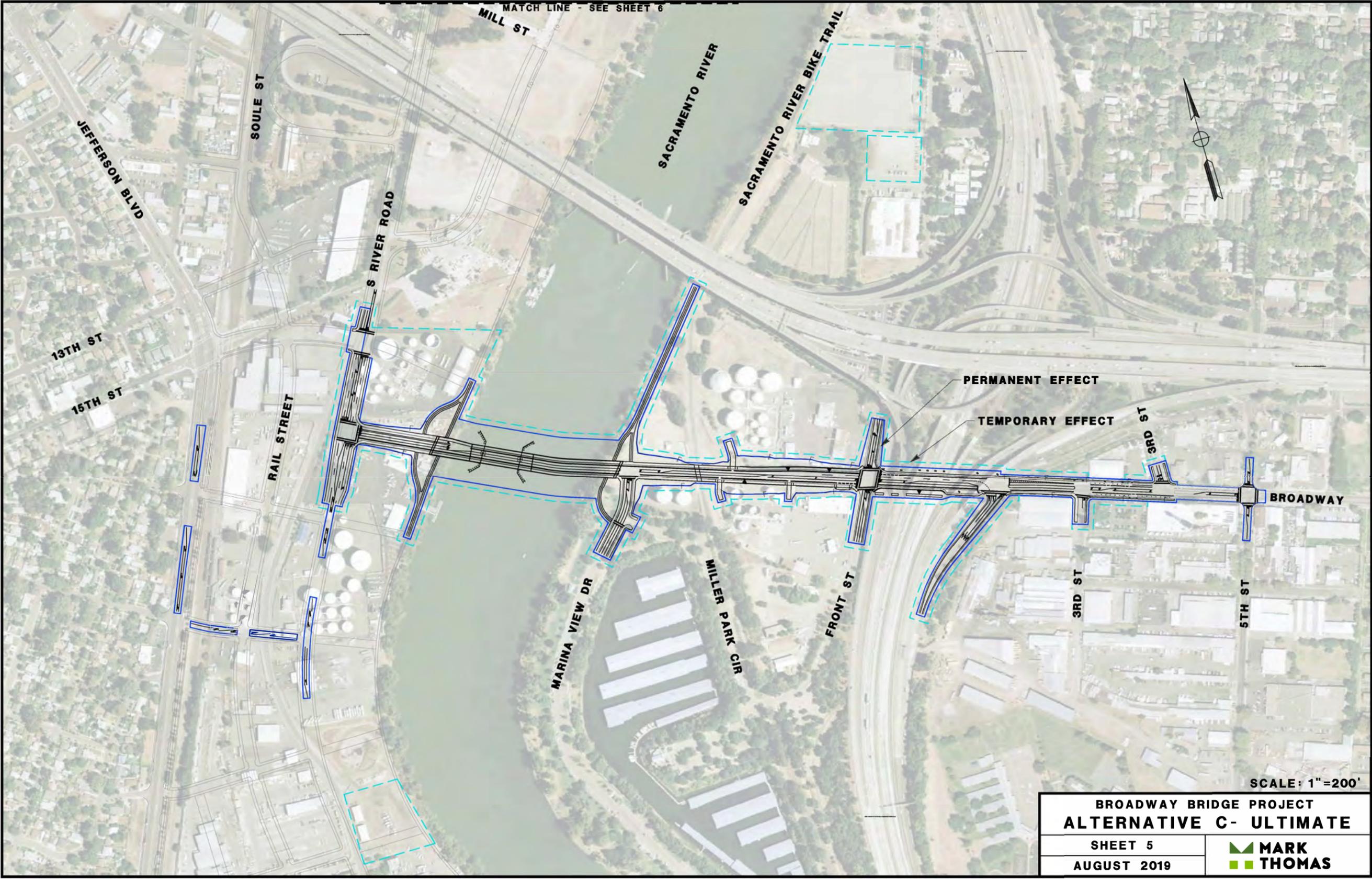
Figure 4a
Alternative C



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Figure 4b
Alternative C

MATCH LINE - SEE SHEET 6



SCALE: 1"=200'

BROADWAY BRIDGE PROJECT	
ALTERNATIVE C- ULTIMATE	
SHEET 5	MARK THOMAS
AUGUST 2019	

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Figure 4c
Alternative C

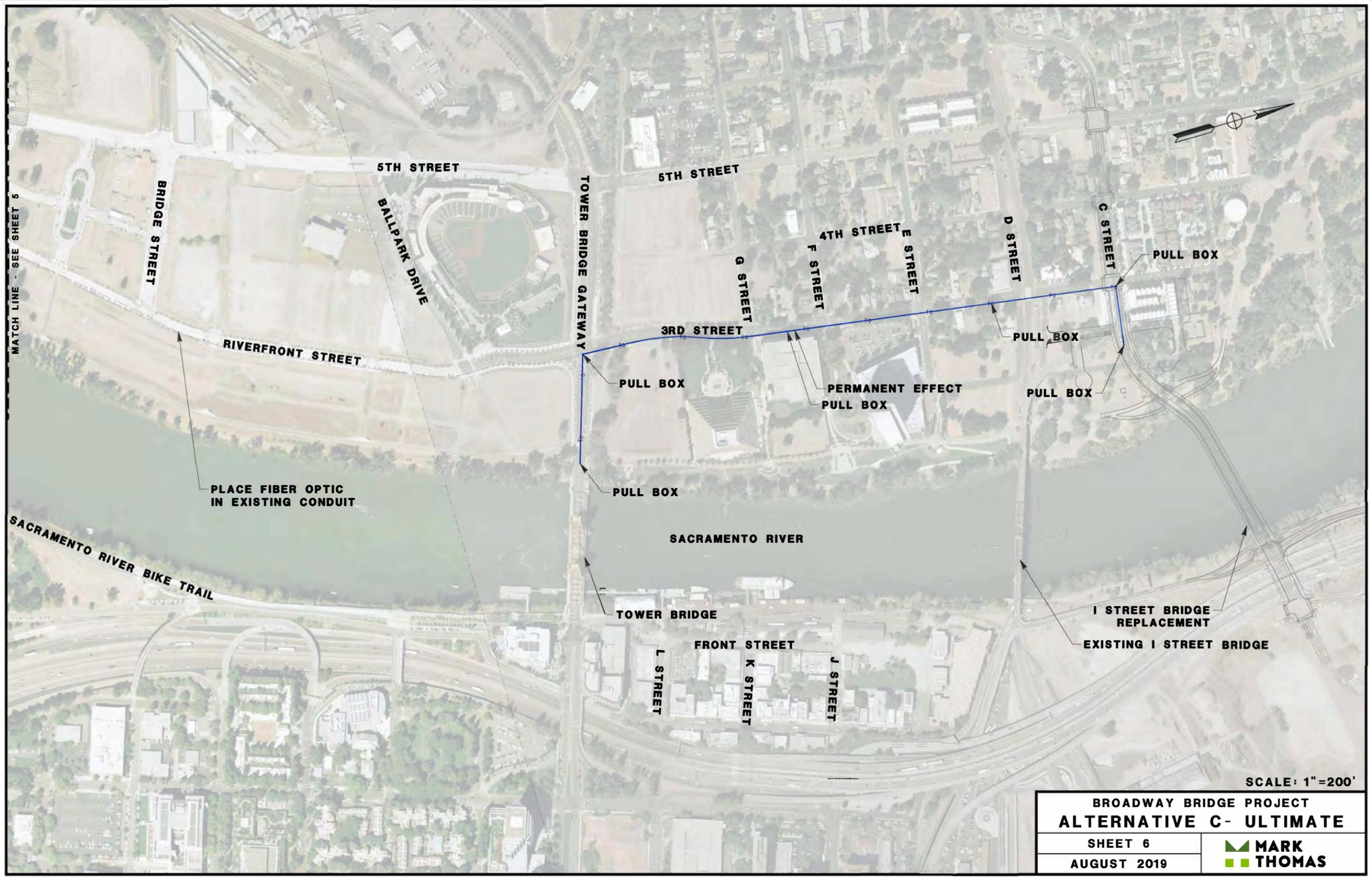


Figure 4d
Alternative C

The two fixed-span approach structures would have a superstructure depth (or total bridge thickness) of approximately 4 to 10 feet depending on the selected alternative. Each approach structure would be a one- to six-span bridge.

The required length of the movable span portion of the bridge was determined through coordination with the USCG. The movable span would provide a 170- to 230-foot clear channel opening (depending on the alignment alternative) that would line up with the western pier of the existing Pioneer Bridge (US 50 bridge) located upstream. The new bridge would have the same minimum vertical clearance of 59 feet above the maximum river elevation of 31 feet in the open position that the existing Pioneer Bridge provides (measured to the 29 National Geodetic Vertical Datum [NGVD]).

Bridge Type

One of three movable span types would be constructed: a vertical lift span, a swing span, or a bascule span. Each bridge alignment alternative could be built as any one of the three types. To address the possible impacts of the bridge type that ultimately is built, the largest in- and over-water footprint and the greatest number of construction-related impacts of the three types were assumed for the analysis.

After an alignment alternative is selected and the project is approved, final aesthetic design criteria would be developed in cooperation with the selected bridge architect. Some of the guiding principles of the bridge aesthetics will be how the bridge fits within the surrounding setting and within the overall Sacramento region history, values, and vision. Selection of the type of movable span would be part of the aesthetic design of the bridge.

Regardless of the bridge type that is constructed over the Sacramento River as part of the proposed project, a bridge fender system would be installed around the movable span piers to protect the piers from errant watercrafts that are navigating along the river.

A brief description of each of the three movable span types follows.

Vertical lift span bridges have a movable span that is lifted vertically to permit passage of boats beneath it. The Tower Bridge over the Sacramento River upstream of the proposed Broadway Bridge is an example of a vertical lift span bridge.

Swing span bridges rotate the movable span on a center pivot pier, allowing navigational traffic to pass the bridge on either side of the center pier. Because of the span lengths required by the USCG for the proposed project and the requirement of creating a neighborhood-friendly river crossing with low vertical grades, the superstructure of a swing span most likely would be a through-truss design (the truss would be cross-braced above and below vehicular traffic). The existing I Street Bridge is an example of a swing span bridge.

Bascule span bridges operate by raising into the air one side of a counterweighted movable span while the other side rotates on a horizontal axis. The rotating axis could be fixed (like a hinge) or rolling (like a rocking chair). A bascule bridge can be designed with a single movable span or two movable spans (double bascule bridge). The Freeport Bridge over the Sacramento River in the town of Freeport is a double bascule span bridge.

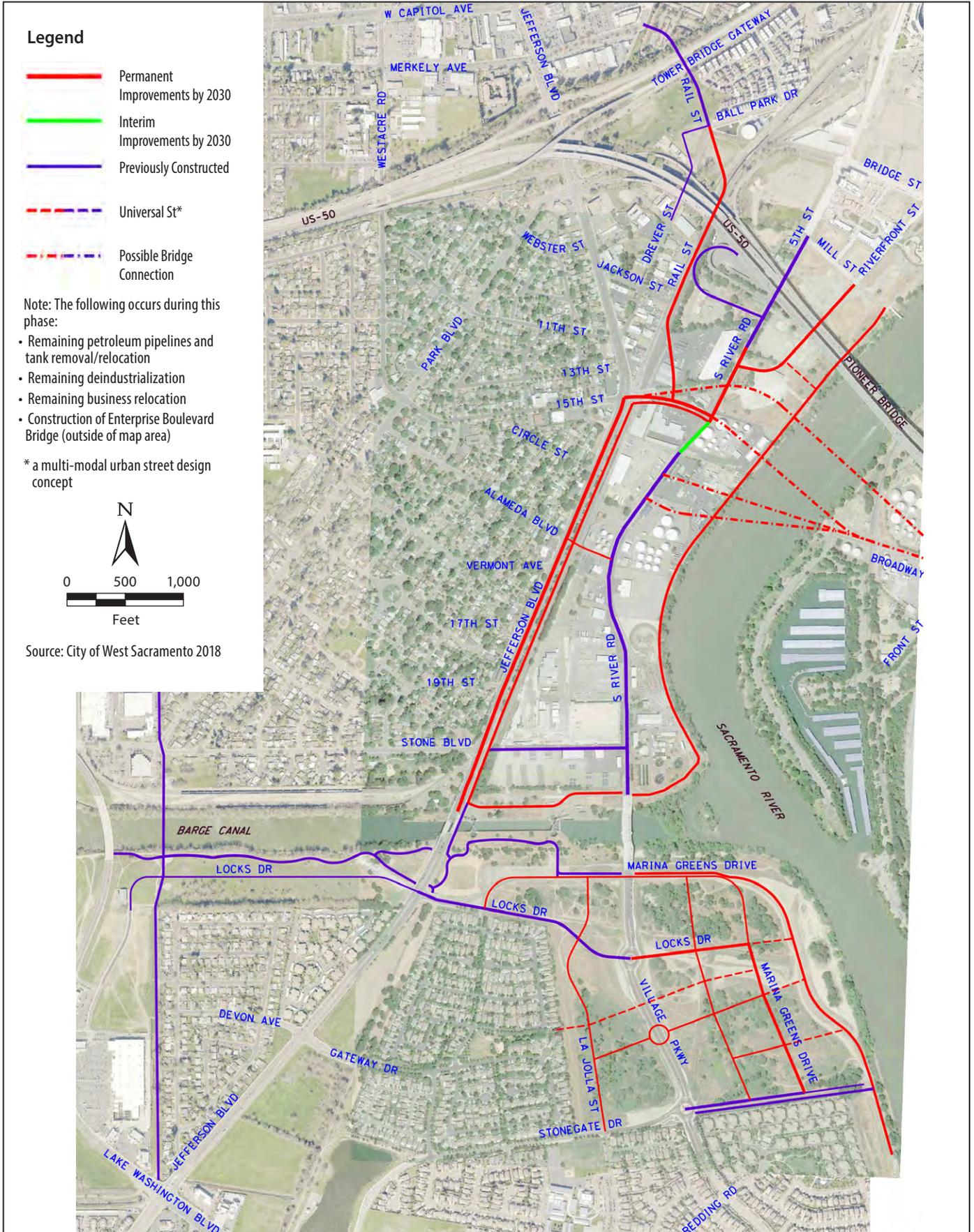


Figure 5a
Pioneer Bluff and Stone Lock Approved Mobility
Network Phasing Diagram (Interim Year)

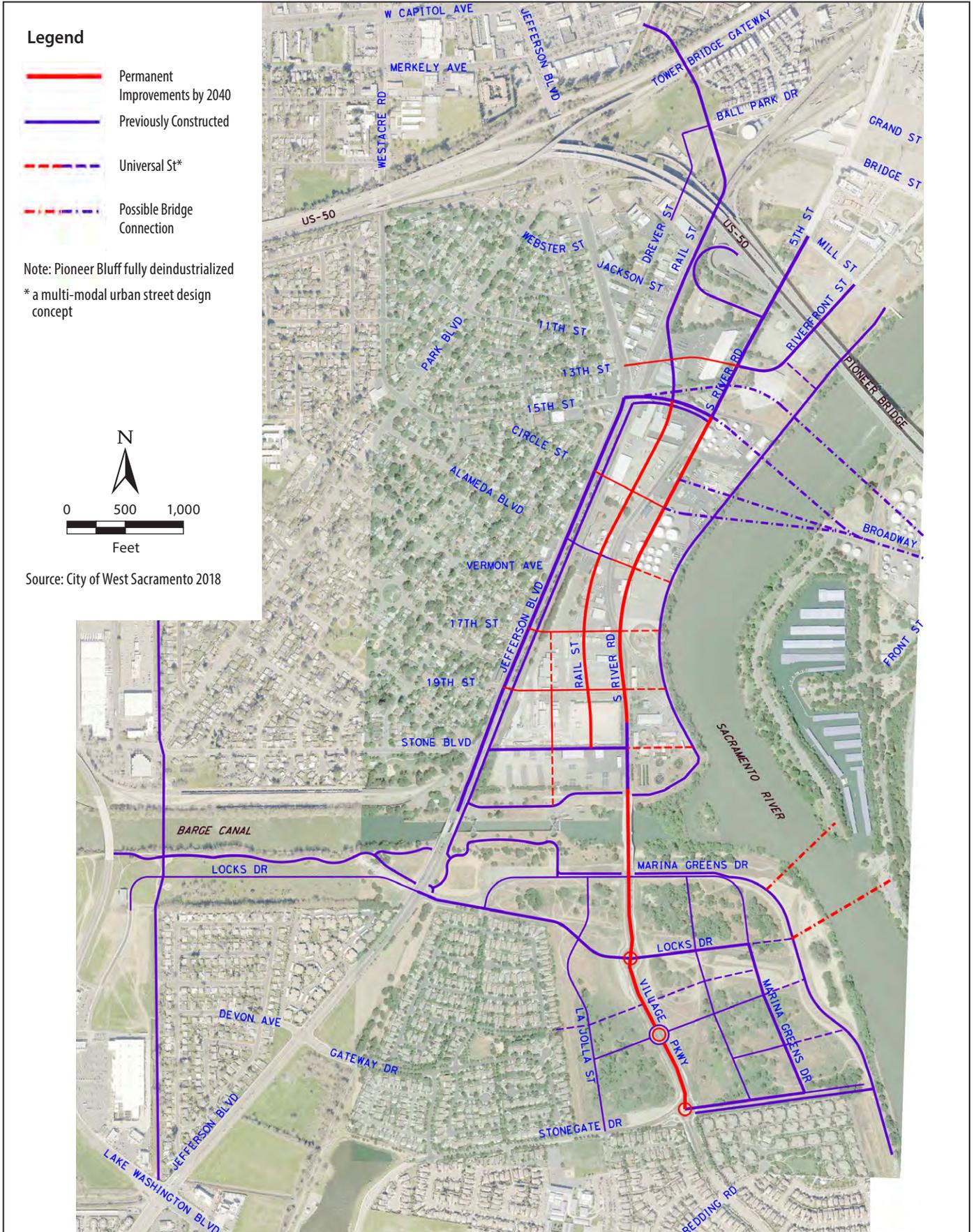


Figure 5b
Pioneer Bluff and Stone Lock Approved Mobility
Network Phasing Diagram (Design Year)

Over-Water Construction Site Access

Temporary trestles and barges would be used to provide the contractor with access to the river portion of the project area. Together, the trestles and barges would be used to stage construction materials, to provide a working platform for cranes, and for general construction support. The temporary trestles would consist of steel piles that would be driven into place with an impact hammer. Although the temporary work platforms would be removed at the end of the first construction season before the onset of winter, the temporary trestle piles could remain in place for the duration of construction. The barges would be anchored to the river bottom with piles that would be driven into place with an impact hammer. Up to two barges would be anchored in the river at one time. The barges would be repositioned in the channel throughout construction only as needed to complete the work. The barges and temporary piles would be removed after bridge construction is completed.

In-Water Construction Activities

In-water construction activities consist of those that would occur below the OHWM. The activities would be limited to the period of May 1 to November 30 during the two construction seasons. The in-water construction window allows sufficient time for most in-water work to be completed within the first “in-water work season,” thus limiting potential impacts on fish and other species from the activities to primarily one construction season. The in-water work window was selected after consideration of agency in-water work restrictions, timing of the presence of multiple special-status fish species, timing of breeding seasons for other special-status species in the project area, and other constraints. Other construction activities occurring above the OHWM (e.g., work on the abutments and approach superstructure) would not be limited to the in-water window of May 1 to November 30. Additional information on sequencing of construction activities is provided in Attachment B.

Temporary falsework platforms would be required to construct the proposed bridge foundations and approach structures. The platforms would be constructed using temporary piles within the river. In addition, temporary cofferdams would be required to construct the bridge piers within the water. The cofferdams would consist of temporary sheetpiles installed around the individual piers. Dewatering inside the cofferdams would be required. In-water construction activities would include the following.

- Installation and removal of steel piles with a vibratory hammer and an impact hammer for the temporary falsework platforms (trestles).
- Installation and removal of steel piles with an impact hammer for anchoring barges.
- Installation of steel sheet piles with a vibratory driver for temporary cofferdams.
- Installation of steel piles for the piers with an impact hammer for the new bridge (although work would occur within dewatered cofferdams, underwater sound would propagate beyond the dewatered cofferdams).
- Installation of steel casings for the piers with a vibratory hammer or hydraulic oscillator/rotator system for the new bridge.
- Installation of concrete piles with an impact hammer for the new bridge fender system.

Above-Water Construction Activities

After the temporary cofferdams are installed around the piers, forms would be constructed and concrete poured in the dewatered cofferdams to construct the pile caps. Work then would focus on the pier column construction. After the casings are installed, a rebar cage would be placed into the pile, and concrete would be poured into the steel shell. A cast-in-place concrete pier cap would be placed atop the columns to serve as the substructure.

Work then would focus on constructing the approach superstructure. The movable span superstructure likely would be constructed offsite, floated in, and erected when construction of the foundations are completed.

Bridge Construction Sequence

Attachment B shows the sequencing of construction activities. All in-water work would be conducted between May 1 and November 30.

Roadway Modifications

Proposed roadway modifications that would be part of all build alternatives are described below. Roadway modifications dependent on a specific alternative are described in Section 1.3.1.1.2, *Unique Features of Build Alternatives*.

City of West Sacramento

In West Sacramento, all build alternatives would include a new intersection for the bridge roadway at South River Road.

City of Sacramento

In Sacramento, common roadway modifications include repaving and reconstructing the sidewalk along Broadway from the new bridge east to 5th Street. Roadway modifications also would include a modified intersection at Marina View Drive and Broadway; widening of the northbound I-5 off-ramp at Broadway to two left-turn lanes and one right-turn lane; and improvements at intersections of Broadway and Front Street, 3rd Street (south), 3rd Street (north), and 5th Street to transition bridge traffic into roadway network.

Class I Bikeway Improvements

City of West Sacramento

A future Class I River Walk trail extension is planned in West Sacramento. The trail is proposed within the levee setback. As part of the proposed project, the grade of the trail would be separated to allow it to pass under the proposed bridge structure. Cyclists and pedestrians approaching Broadway Bridge in either direction from the trail would have the option to continue along the trail under the new structure, avoiding the need to cross the roadway, or to connect to the structure and cross the river into Sacramento or travel westward in West Sacramento.

City of Sacramento

The existing Class I Sacramento River Bike Trail would be reconstructed approximately 1,000 feet north and 300 feet south of Broadway as part of the proposed project. In order to reconstruct the trail, permanent right-of-way acquisition from four adjacent private parcels would be necessary (acquisitions and easements are discussed in detail in Section 1.3.1.1.2, *Unique Features of Build Alternatives*, below). The trail would be grade-separated under the proposed bridge structure. Cyclists and pedestrians approaching Broadway in either direction would have the option to continue along the trail under the new structure, avoiding the need to cross the roadway, or to connect to the structure and cross the river into West Sacramento or travel westward on Broadway in Sacramento.

Bridge Communication Fiber Optic Line

A fiber optic cable is proposed to interconnect operational communications of the proposed project (the new Broadway Bridge), the Tower Bridge, and the I Street Replacement bridge. The fiber optic line would be placed in West Sacramento under Riverfront Street. From the proposed project, the fiber optic line would run north until Riverfront Street turns into 3rd Street and would end at the intersection of 3rd Street and C Street (see Figure 2). The fiber optic line would be installed within an existing City of West Sacramento-owned conduit along Riverfront Street to Tower Bridge Gateway. North of Tower Bridge Gateway, a new conduit would be placed within the 3rd Street right-of-way north to the intersection of 3rd Street and C Street. To minimize ground disturbance, the construction method for the new fiber optic line would be jack and bore.

Stormwater Drainage Management

Stormwater and road runoff drainage for the proposed roadway would be conveyed in a new storm drain system installed approximately 5 feet below the finished road grade of South River Road, 15th Street, and Circle Street in West Sacramento and of Broadway in Sacramento. New storm drain outfalls into the Sacramento River would be constructed near each of the bridge abutments in West Sacramento and Sacramento.

Staging, Storage, and Proposed Access during Construction

Staging areas would be used to store materials and equipment during construction, such as pipe materials, precast manholes and drop inlets, steel girders, piles, and rebar, along with construction equipment when not in use. In West Sacramento, staging area options are the West Sacramento Corporation Yard (1951 South River Road) or the Shell property recently purchased by the Port of West Sacramento (1509 South River Road). Both staging areas in West Sacramento would be accessed via South River Road and are options on the condition that they are still available (have not been redeveloped) at the time the proposed project is constructed.

In Sacramento, one option for a staging area would be closing Broadway to traffic west of Front Street and using the road as a staging area with access via Broadway to the east. This option would require a traffic detour for continued access to Marina View Drive using Front Street and Miller Park Circle. Another staging area option in Sacramento is use of a vacant lot north of the California Automobile Museum with access via Front Street.

Staging areas would be in use throughout the construction duration; the areas would be returned to their pre-project conditions at completion of the project.

Utility Relocations

A number of public and private utilities would need to be relocated or adjusted to the new ground elevation as part of the project, including existing water, sewer, gas, overhead and underground electric, and communication facilities within Broadway, South River Road, 15th Street, and Jefferson Boulevard.

Two existing gas transmission lines, Kinder Morgan and Pacific Gas and Electric (PG&E), and a communication line run under the Sacramento River. The alternatives could conflict with the location of the utility lines and require the utilities to be relocated. Known conflict locations are discussed in Section 1.3.1.1.2, *Unique Features of Build Alternatives*. Utility relocations and adjustments would be conducted prior to or during construction. As part of the final project design process, prior rights would be used to determine who is responsible for the utility relocations.

Traffic Management and Detours during Construction

While most of the project would be constructed outside of existing roadways, some project construction areas would require temporary detours or staged construction.

In West Sacramento, in order to construct the proposed project—including the new intersection at South River Road, a portion of South River Road would be closed to traffic. Closure of 15th Street also may be necessary. Travelers on South River Road to the south of the project area needing to get to South River Road north of the project area would be detoured around the project to the south and directed to travel over the Mike McGowan Bridge, turn right onto Locks Drive, right onto Jefferson Boulevard, right onto Tower Bridge Gateway, and then right onto 5th Street that becomes South River Road. The detour would be repeated in reverse for travelers on South River Road north of the project area with the desire to travel south on South River Road.

In Sacramento, construction of street widening and sidewalk improvements under the I-5 viaduct structures would be phased to allow traffic access to Front Street for the duration of construction. Miller Park and Sacramento Marina traffic would travel on westbound Broadway, turn left onto southbound Front Street, right onto Miller Park Circle, and then left onto Marina View Drive. About 3,400 feet of the Sacramento River Bike Trail would be closed north and south of Broadway and detoured to the bike lane on Front Street between the Sacramento Marina and where the Sacramento River Bike Trail meets the R Street bicycle/pedestrian bridge.

Project Construction Sequence

The project may be constructed in two phases or in a single phase. The decision to construct in one or two phases will be driven by the extent of redevelopment and implementation of the approved mobility network in the Pioneer Bluff area of West Sacramento at the time project construction starts. If constructed in two phases, an interim (opening day) design phase for the proposed project would include constructing the new bridge and approach roadways with temporary pavement transitions along the existing alignment of South River Road. Construction

of this first phase is expected to take approximately 36 months, with two seasons of in-water work. A subsequent phase, the design year phase, would take approximately 6 months and would complete the remaining project roadway construction consistent with full buildout of the approved mobility network. The roadway connection to the bridge and all other project improvements in Sacramento would be constructed during the first phase. If the project is built in a single phase, construction is expected to take 36 months. Information on the sequencing of construction activities is provided in Attachment B.

Environmental Commitments

Each project build alternative includes environmental commitments that are part of the project description. The environmental commitments, such as best management practices (BMPs), are to be considered in conducting the environmental analysis and determining effects and findings. The purpose of environmental commitments is to reflect and incorporate best practices into the project that avoid, minimize, or offset potential environmental effects. Note: The term “mitigation” is specifically applied in this document only to designate measures required to reduce environmental effects triggering a finding of significance. These best practices tend to be relatively standardized and compulsory; they represent sound and proven methods to reduce the potential effects of an action. The rationale behind including environmental commitments is that the project proponent commits to undertake and implement these measures in good faith as part of the project in advance of effect findings and determinations in order to improve the quality and integrity of the project, streamline the environmental analysis, and demonstrate responsiveness and sensitivity to environmental quality.

Runoff and Erosion Control Practices

As is standard with all construction projects that disturb soil, the construction contractor would be required to install temporary BMPs to control any runoff or erosion from the project site into the surrounding storm drain systems and waterways in order to be compliant with local, state and federal water quality regulations. Temporary BMPs would be installed prior to any construction operations and would be in place for the duration of the contract. Removal of the temporary BMPs would be the final operation, along with project site cleanup.

In-Water Sound and Shock Level Minimization

The following BMPs would be implemented during construction of pier columns for the bridge and placement and driving of piles and temporary sheet piles for cofferdams (if needed). The cofferdams would be removed when pier column construction is completed.

- Install bubble curtains around piles during impact driving and proofing operations to dampen underwater sound shockwaves.
- Conduct several dry or dead blows with the hammer initially to frighten fish away from the pile before the pile is driven or proofed with an impact pile driver. Implementation of several dry or dead blows with the hammer to initially frighten fish away is being proposed because the use of a cushioning block or similar feature would result in more strikes being needed to drive the piles, thereby resulting in a greater chance of exceeding the cumulative sound exposure levels (SELs) without significantly reducing peak SELs.

Transportation Management Plan

A Transportation Management Plan (TMP) would be developed for use during project construction. The TMP would implement strategies described in the *California Manual on Uniform Traffic Control Devices* (California Department of Transportation 2014) and Caltrans' *Transportation Management Plan Guidelines* (TMP Guidelines) (California Department of Transportation 2015), selected in accordance with the scale and scope of the project and the variety of transportation facility types and jurisdictions in the project area. The TMP would direct the process and procedures for dissemination of information to the public and motorists, provide guidance for implementation of incident management, describe construction strategies for traffic handling and guiding traffic through work zones, address traffic demand management during construction, and describe and direct the implementation of alternate routes or detours.

Environmental Stewardship

Construction and implementation of the proposed project would conform with applicable policies in the elements of the West Sacramento and Sacramento General Plans; requirements of the West Sacramento and Sacramento city codes; and Caltrans Standard Specification Section 14, Environmental Stewardship, (California Department of Transportation 2018:225–240). In addition to environmental protections established by state and federal law, City and Caltrans policies and standards address responsibilities for many environmental areas, such as air pollution; noise limits; protection of lakes, streams, and other water bodies; use of pesticides; safety; sanitation; convenience for the public; and damage or injury to any person or property as a result of construction.

1.3.1.1.2 Unique Features of Build Alternatives

Two combined bridge and roadway alignments are being considered (Figure 2). While each could be constructed in a single phase, the discussion of each alternative's unique features is separated into the components that would be constructed as part of an interim (opening day) phase and the remaining components that would be constructed as part of the design year phase. At the interim year, the new bridge across the Sacramento River would be constructed and open to traffic. By the design year, the remaining improvements and roadway connections proposed as part of the project would be constructed to allow the full, final design of the proposed project to be operational. See Section 1.3.2.1 *Existing Conditions without Project* for interim and design year condition assumptions without the project. If the project is constructed in a single phase, the efforts needed to construct the new bridge and the ultimate (design year) roadway alignment configuration would be completed at the same time.

Figures 3 and 4 show preliminary plan view drawings for each alternative, by phase.

Deviations from the approved mobility network in West Sacramento that are part of the proposed project are noted by alternative in the subsections below.

Alternative B

The proposed project would realign 15th Street between Jefferson Boulevard and South River Road, consistent with the approved mobility network shown in Figure 3, to connect the new

bridge to the roadway network in West Sacramento. The bridge would connect to Broadway on the Sacramento side.

Interim Year Features of Alternative B

Project features that would be constructed and in operation by 2030 include the following.

- New bridge and roadway modifications, including a redesigned intersection connection for the bridge at 15th Street and new turn pockets on South River Road to facilitate traffic turning movements at the bridge connection in West Sacramento.
- Stormwater drainage management features.
- Utility relocations.
- Fiber optic cable installation for operational communications.

In West Sacramento, modifications to the approved mobility network would be necessary for construction of Alternative B. These modifications include the following.

- Constructing a northbound right-turn pocket on South River Road at 15th Street.
- Constructing a southbound right-turn pocket on South River Road at 15th Street.

In Sacramento, Alternative B requires the following modifications to the existing (or planned opening day) conditions.

- Reconstructing 350 feet of Marina View Drive to provide for a new connection to Broadway.
- Modifying property access along Broadway west of I-5.

The existing at-grade State Parks railroad crossing at Broadway would remain in the same location.

Construction of the interim year design of Alternative B would create 2.0 acres of new impervious surface.

RSP would be installed on the river side of the bridge abutments both above and below the OHWM to stabilize the shoreline on each side of the river. The estimated linear feet and area and volume above and below the OHWM are shown in Table 1.

Table 1. Estimated Rock Slope Protection Needed for Alternative B

Location	Linear Feet of Shoreline	Area (square feet)	Area below OHWM (square feet)	Volume below OHWM (cubic yards)	Volume above OHWM (cubic yards)
West Sacramento shoreline	426	31,033	12,833	1,569	2,224
Sacramento shoreline	398	27,589	11,293	1,380	1,992
Total	824	58,622	24,126	2,949	4,216

OHWM = ordinary high water mark

Design Year Features of Alternative B

Project features that would be constructed by 2040 include the following.

- Roadway alignment modifications in West Sacramento necessary to shift the alignment of South River Road and connection of the new bridge to the east to conform with the approved mobility network alignment of South River Road.
- Roadway striping and turn pocket additions on Jefferson Boulevard, South River Road, and Alameda Boulevard.

In both West Sacramento and Sacramento, no additional modifications to the assumed design year conditions without the project would be needed.

Construction of the design year features of Alternative B would not increase impervious surface area from that created during the interim year phase.

Utility Relocations, Alternative B

The proposed location of the eastern bridge abutment conflicts with the location of the Kinder Morgan gas transmission line. The under-river portion of the line can remain in place; however, the proposed project would require relocation of a portion of gas line located under Broadway. The project's bridge alignment does not conflict with the location of the PG&E gas transmission line.

The proposed project also conflicts with the location of a communication line at the eastern bridge abutment. Similar to the Kinder Morgan gas line, the under-river portion of the communication line can remain in place, but the project would require relocation of a portion of the communication line under Broadway.

Property Acquisitions, Alternative B

Permanent property acquisitions or permanent easements would be necessary to construct the proposed project. Temporary construction easements (TCEs) also would be needed. The acquisitions presented in Table 2 assume that the project is constructed in two phases needed for the interim and ultimate design years.

Table 2. Property Acquisitions Needed for Alternative B

Parcel Number	Total Parcel Size (acres)	Interim Year Permanent Acquisition (acres)	Design Year Permanent Acquisition (acres)	Interim Year TCE (acres)	Design Year TCE (acres)	Business Relocation Necessary (yes, no)
West Sacramento						
058-027-006	2.579		0.023		0.013	No
058-027-014	7.568	0.120		0.015		No
058-028-003	3.530	1.005	0.056	0.089	0.012	No
058-028-005	6.010	2.920	0.200	0.325	0.065	No
058-028-006	0.473	0.056		0.055		Yes
058-028-007	0.911	0.177		0.027		Yes
843-57-5-7	6.477	0.064		0.019		No
Sacramento						
009-0012-008	1.598	0.220		0.074		Yes*
009-0012-038	0.033	0.033				No
009-0012-064	2.673	2.673				No
009-0012-065	0.793	0.793				No
009-0012-071	2.494	0.378		0.159		Yes*
009-0012-072	6.903	0.049		0.068		Yes*
009-0020-001	1.525	0.605		0.083		No
009-0030-054	5.616	0.657		0.274		Yes*

TCE = temporary construction easement

* Assumes the fill slopes shown along realigned Broadway. No business relocation would be necessary if retaining walls are constructed instead of fill slopes to support the increase in elevation and widening of Broadway between the bridge and Front Street.

Alternative C

Alternative C (modified from the feasibility study) would connect to South River Road at a new intersection between 15th Street and Circle Street on the West Sacramento side and would connect to Broadway on the Sacramento side.

Interim Year Features of Alternative C

Project features that would be constructed and in operation by 2030 include the following.

- New bridge and roadway modifications, including construction of a new “T” intersection on the existing alignment of South River Road.
- Stormwater drainage management features.
- Utility relocations.
- Fiber optic cable installation for operational communications.

In West Sacramento, modifications to the approved mobility network shown in Figure 5 would be necessary for Alternative C. These modifications include the following.

- Creating a “T” intersection on South River Road between 15th Street and the future Circle Street location.
- Constructing an interim northbound right-turn pocket on the existing alignment of South River Road at Broadway.
- Constructing an interim southbound left-turn pocket on the existing alignment of South River Road at Broadway.

In Sacramento, Alternative C requires the following modifications to existing conditions.

- Reconstructing 350 feet of Marina View Drive to provide for a new connection to Broadway.
- Modifying property access along Broadway west of I-5.

The existing at-grade State Parks railroad crossing at Broadway would remain in the same location.

Construction of the interim year design of Alternative C would create 2.2 acres of new impervious surface.

RSP would be installed on the river side of the bridge abutments both above and below the OHWM to stabilize the shoreline on each side of the river. The estimated linear feet and area and volume above and below the OHWM are shown in Table 3.

Table 3. Estimated Rock Slope Protection Needed for Alternative C

Location	Linear Feet of Shoreline	Area (square feet)	Area below OHWM (square feet)	Volume below OHWM (cubic yards)	Volume above OHWM (cubic yards)
West Sacramento shoreline	466	29,455	10,779	1,317	2,283
Sacramento shoreline	395	19,363	8,652	1,058	1,309
Total	861	48,818	19,431	2,375	3,592

OHWM = ordinary high water mark

Design Year Features of Alternative C

Project features that would be constructed by 2040 include the following.

- Roadway alignment modifications in West Sacramento necessary to shift the alignment of South River Road and the “T” intersection connection of the new bridge approximately 100 feet to the east to conform with the approved mobility network alignment of South River Road.
- Roadway striping and turn pocket additions on Jefferson Boulevard, South River Road, and Alameda Boulevard.

In West Sacramento, additional modifications to the approved mobility network would be necessary to construct the design year components of Alternative C. Leading up to the design year, development in Pioneer Bluff will occur following a new alignment of South River Road (road shifting to the east as shown in Figure 5). After construction of the proposed project in the interim year, the new alignment of South River Road would require the proposed project to

reconstruct the bridge's roadway connection to match. Modifications to the approved mobility network in West Sacramento include the following.

- Creating a new "T" intersection matching the new more eastern alignment of South River Road between 15th Street and Circle Street.
- Constructing the final northbound right-turn pocket on South River Road at Broadway.
- Constructing the final southbound left-turn pocket on South River Road at Broadway.

In Sacramento, no additional changes from the interim design are needed.

Construction of the design year features of Alternative C would not increase impervious surface area from that created during the interim year phase.

Utility Relocations, Alternative C

The proposed location of the eastern bridge abutment conflicts with the location of the Kinder Morgan gas transmission line. The under-river portion of the line can remain in place; however, Alternative C would require relocation of a portion of gas line located under Broadway. This alternative does not conflict with the location of the PG&E gas transmission line or the under-river communication line.

Property Acquisitions, Alternative C

As with Alternative B, permanent property acquisitions or permanent easements will be necessary for Alternative C. TCEs also would be needed. The acquisitions presented in Table 4 assume that the project is constructed in two phases needed for the interim and ultimate design years.

Table 4. Property Acquisitions Needed for Alternative C

Parcel Number	Total Parcel Size (acres)	Interim Year Permanent Acquisition (acres)	Design Year Permanent Acquisition (acres)	Interim Year TCE (acres)	Design Year TCE (acres)	Business Relocation Necessary (yes, no)
West Sacramento						
058-027-006	2.579	0.777	0.810	0.080	0.058	Yes
058-027-007	0.450	–	0.104	–	0.025	No
058-027-014	7.568	2.762	–	0.102	–	Yes
058-028-005	6.010	0.680	0.136	0.137	0.071	No
Sacramento						
009-0012-008	1.598	0.223	0.223	0.074	0.074	Yes*
009-0012-038	0.033	0.033	0.033	0.000	0.000	No
009-0012-064	2.673	2.673	2.673	0.000	0.000	No
009-0012-065	0.793	0.793	0.793	0.000	0.000	No
009-0012-071	2.494	0.394	0.394	0.158	0.155	Yes*
009-0012-072	6.903	0.063	0.063	0.074	0.069	Yes*
009-0020-001	1.525	0.682	0.682	0.082	0.081	No
009-0030-054	5.616	0.672	0.672	0.428	0.270	Yes*

TCE = temporary construction easement

* Assumes the fill slopes shown along realigned Broadway. No business relocation would be necessary if retaining walls are constructed instead of fill slopes to support the increase in elevation and widening of Broadway between the bridge and Front Street.

1.3.2 Existing and Future No-Project Conditions

Because the proposed project would be constructed in the future, the conditions that are in the project area now will be different based on implementation of the planned future development and infrastructure improvements identified in the related plans and projects. The following sections describe existing conditions and the assumed future conditions in two different future years: an interim year of 2030 and a design year for the proposed project of 2040.

1.3.2.1 Existing Conditions without Project

In West Sacramento, Pioneer Bluff's existing land uses are industrial, including tank farms and corporation yards. The road network consists of Jefferson Boulevard and South River Road as the north-south connection and 15th Street as the east-west connection. The area also includes the UPRR east-side rail line that runs in the north-south direction parallel to and just east of Jefferson Boulevard.

In Sacramento, the existing land uses in the project area are both industrial and recreational, including tank farms and Miller Regional Park/Sacramento Marina. The road network consists of Broadway as the east-west connection and Marina View Drive and Front Street as the north-south connection. A two-lane off-ramp from northbound I-5 connects to Broadway between

Front Street and 3rd Street (south). The area also includes railroad tracks owned by California State Parks that run through the project area in the north-south direction.

1.3.2.2 Interim Year (2030) Conditions without Project

West Sacramento

The approved mobility network was used to develop the network for the interim year (opening day 2030) conditions without the proposed project in West Sacramento. The land use plans for the area include pipeline and tank farm removal or relocation and de-industrialization of Pioneer Bluff.

The following assumptions are for the interim (opening day 2030) roadway network conditions without the proposed project which includes a “Universal Street,” a multi-modal urban street design concept.

- 15th Street between Jefferson Boulevard and South River Road realigned to approximately 300 feet south from its existing location.
- Rail Street constructed from Merkley Avenue to 15th Street.
- Eastbound US 50 on-ramp modifications constructed at South River Road.
- Riverfront Street extended to connect to South River Road.
- South River Road widened to a four-lane facility (two northbound and two southbound lanes) with a median or left-turn pocket, sidewalk, and a bike lane on both sides of the road. At the US 50 on-ramp, the cross section will include two northbound left-turn lanes onto US 50. The widening will be from Mill Street to approximately 200 feet south of the new 15th Street and South River Road intersection.
- River Walk Trail extended south from Mill Street to run along the Sacramento River and extend west along the Barge Canal to connect to Jefferson Boulevard.
- Planned transportation maintenance facility designed under US 50 near Riverfront Street. The facility will include storage tracks and a maintenance building.
- Relocation of the UPRR east-side rail line that parallels Jefferson Boulevard. Yolo County, as well as the City of West Sacramento, plans to relocate the UPRR tracks. The relocation is part of the de-industrialization effort being made in the Pioneer Bluff area (City of West Sacramento 2014).

Deviations from the above roadway network that are part of the proposed project are noted in Section 1.3.1.1, *Build Alternatives*.

Sacramento

The design of the Broadway Complete Street Project was used to develop the interim and design year conditions in Sacramento. The following assumptions are for the interim (opening day 2030) conditions in Sacramento without the proposed project.

- Broadway from 3rd Street to Franklin Boulevard converted from a four-lane to a two-lane facility with a two-way left-turn lane.
- Buffered bike lanes on Broadway.

- On-street parking on Broadway in locations where it can be accommodated.

1.3.2.3 Design Year (2040) Conditions without Project

West Sacramento

The approved mobility network was used to develop the network for design year (2040) conditions without the project in West Sacramento. The roadway network will include the network items listed above for the interim year, in addition to those listed below.

- South River Road realigned to the east.
- Rail Street extended from 15th Street to Stone Boulevard.
- Riverfront Street extended from Jefferson Boulevard to South River Road.
- East-west local roadway connections from Jefferson Boulevard to South River Road constructed at Circle Street, Alameda Boulevard, 17th Street, and 19th Street.

Deviations from the above roadway network that are part of the proposed project are noted in Section 1.3.1.1, *Build Alternatives*.

Sacramento

In Sacramento, design year conditions without the proposed project were assumed to be the same as those listed for the interim year.

2. REGULATORY SETTING

2.1 Federal Laws and Requirements

2.1.1 Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (U.S.) from any point source unlawful unless the discharge is in compliance with a NPDES permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/construction point sources to comply with the NPDES permit program. Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the U.S., to obtain certification from the State that the discharge will comply with other provisions of the act. (Most frequently required in tandem with a Section 404 permit request. See below).
- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. The Federal Environmental Protection Agency delegated to the California State Water Resources Control Board (State Water Board) the implementation and administration of the NPDES program in California. State Water Board established nine Regional Water Quality Control Boards (Regional Water Boards). The State Water Board enacts and enforces the Federal NPDES program and all water quality programs and regulations that cross Regional boundaries. The nine Regional Water Boards enact, administer and enforce all programs, including NPDES permitting, within their jurisdictional boundaries. Section 402(p) requires permits for discharges of stormwater from industrial, construction, and Municipal Separate Storm Sewer Systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S, including wetlands. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The objective of the CWA is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are also two types of Individual permits: Standard Individual permit and Letter of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Individual permits. For Standard Individual permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency's (EPA) Section 404 (b)(1) Guidelines (U.S. EPA CFR 40 Part 230), and whether permit approval is in the public interest. The 404(b)(1) Guidelines were developed by the U.S. EPA in conjunction with USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that USACE may not issue a permit if there is a least environmentally damaging practicable alternative (LEDPA), to the proposed discharge that would have less effects on waters of the U.S., and not have any other significant adverse environmental consequences. Per Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures have been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4.

2.1.1.1 Sections 303, 304, and 305 – Impaired Waters, TMDLs, and Water Quality Criteria

The State of California adopts water quality standards to protect beneficial uses of state waters as required by Section 303(d) of the CWA and the Porter Cologne Water Quality Control Act (Porter-Cologne Act). Section 303(d) of the CWA established the total maximum daily load (TMDL) process to guide the application of state water quality standards (see the discussion of state water quality standards below). To identify candidate water bodies for TMDL analysis, the State Water Board generated a list of water quality-limited segments. These stream or river segments are impaired by the presence of pollutants such as sediment and are more sensitive to disturbance because of this impairment.

Section 304(a)(1) of the CWA requires development of criteria for water quality that accurately reflect the latest scientific knowledge. These criteria are based solely on data and scientific judgments on pollutant concentrations and environmental or human health effects. Section 304(a) also provides guidance to states and tribes in adopting water quality standards. Criteria are developed for the protection of aquatic life as well as for human health.

In addition to the impaired water body list required by Section 303(d), Section 305(b) requires states to develop a report assessing statewide surface water quality. Both CWA requirements are addressed through development of a 303(d)/305(b) Integrated Report, which addresses both an update to the 303(d) list and a 305(b) assessment of statewide water quality. The State Water Board developed a statewide 2012 California Integrated Report (State Water Resources Control Board 2015) based on the Integrated Reports from each of the nine geographically separated Regional Water Boards.

All of the 303(d)-listed impaired waters with potential to be affected by the project are shown in Table 9 (see Section 3.3.1 *List of Impaired Waters*). These waters will be evaluated as part of the project, and minimization measures will be implemented to protect waters from further impairment.

2.1.1.2 Section 401 – Water Quality Certification

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permit triggering 401 Certification is a CWA Section 404 permit, issued by the USACE. The 401 Certifications are obtained from the appropriate Regional Water Board, dependent on the project location, and are required before USACE issues a Section 404 Permit.

In some cases, the Regional Water Board may have specific concerns with discharges associated with a project. As a result, the Regional Water Board may issue a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act). WDRs define activities, such as inclusion of specific features, effluent limitations, monitoring, and plan submittals, that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

The proposed project involves placement of fill materials in waters of the U.S.; therefore, a 401 Certification must be obtained from the Central Valley Regional Water Board.

2.1.1.3 Section 402 – National Pollutant Discharge Elimination System

The 1972 amendments to the federal Water Pollution Control Act established the NPDES program to control discharges of pollutants from point-source discharges (discharges from a known source of pollutants). The NPDES program is the primary federal program that regulates point-source and non-point-source discharges (discharges from diffuse sources of pollutants) to waters of the U.S.

The 1987 amendments to the CWA created a new section of the CWA devoted to storm water permitting (Section 402). EPA has granted the State of California primacy in administering and enforcing provisions of the CWA and NPDES within state boundaries. NPDES permits are issued by the State Water Board and the nine Regional Water Boards in California. General NPDES Permits cover industrial, construction, and municipal storm water discharges, and some point-source discharges for specific activities. Individual NPDES Permits cover point-source discharges from wastewater facilities.

CWA Section 402 General NPDES Permits that apply to the project are the Construction General Permit and Municipal Separate Storm Sewer System (MS4) Permit requirements. Because the project involves disturbance of more than 1 acre of land, a General Construction Permit will be required. As discussed under the state requirements for the NPDES program (see Section 2.2.1.2), the project would comply with applicable MS4 requirements.

2.1.1.4 Section 404 – Dredge/Fill Permitting

The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of the CWA and specifically under Section 404 (Discharges of Dredge or Fill Material). Section 404 permits are administered by the USACE.

The Sacramento River is a navigable water under jurisdiction of the USACE, and the proposed project involves in-water activities. Therefore, a Section 404 Permit will be required for the project.

2.1.1.5 National Flood Insurance Program

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer-funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally backed flood insurance available for communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The Federal Emergency Management Agency (FEMA) manages the NFIP. FEMA creates Flood Insurance Rate Maps (FIRMs) that designate 100-year floodplain zones and delineate flood hazard areas. A 100-year floodplain zone is an area with a one in one hundred (1%) chance of being flooded in any one year based on historical data.

The project is located within a FEMA-designated floodway and 100-year floodplain (Federal Emergency Management Agency 2020).

2.2 State Laws and Requirements

2.2.1 Porter-Cologne Water Quality Control Act

California’s Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a “Report of Waste Discharge” for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the State. It predates the CWA and regulates discharges to waters of the State. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of “waste” as defined and this definition is broader than the CWA definition of “pollutant”. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards as required by the CWA, and regulating discharges to protect beneficial uses of water bodies. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set standards necessary to protect these uses. Consequently, the water quality standards developed for particular water body segments are based on the designated use and vary depending on such use. Water body segments that fail to meet standards for specific pollutants are included in a

Statewide List in accordance with CWA Section 303(d). If a Regional Board determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-source point controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed. The SWRCB implemented the requirements of CWA Section 303(d) through Attachment IV of the Caltrans Statewide MS4, as it includes specific TMDLs for which Caltrans is the named stakeholder.

The project lies within the jurisdiction of the Central Valley Regional Water Board which is responsible for implementing its Basin Plan. The *Fifth Edition of the Water Quality Control Plan* (Basin Plan) for the Sacramento River and San Joaquin River Basins was updated in 2018 (Central Valley Regional Water Quality Control Board 2018).

2.2.1.1 State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Board adjudicates water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. Regional Water Boards are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

2.2.1.2 National Pollutant Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of stormwater dischargers, including MS4s. The U.S. EPA defines an MS4 as “any conveyance or system of conveyances (roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over storm water, that are designed or used for collecting or conveying stormwater.” The State Water Board has identified the Department as an owner/operator of an MS4 pursuant to federal regulations. The Department’s MS4 permit covers all Department rights-of-way, properties, facilities, and activities in the state. The State Water Board or the Regional Water Board issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

MS4 permits require that cities and counties develop and implement programs and measures to reduce the discharge of pollutants in storm water discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, these municipalities have created storm water management plans for their respective locations. The plans outline requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in storm water discharge. During implementation of specific projects under the

program, project applicants are required to follow the guidance contained in the storm water management plans as defined by the permit holder in that location.

Because the project area is located within Caltrans, City of West Sacramento, and City of Sacramento rights-of-way (ROW), three different MS4 permits apply to the project: (1) Caltrans General NPDES MS4 Permit that covers statewide Caltrans municipal storm water discharges, (2) State Water Board's Small MS4 Permit for the City of West Sacramento, and (3) Sacramento County MS4 Permit for the City of Sacramento. These permits are discussed in more detail below.

Caltrans MS4 Permit

The State Water Board has identified Caltrans as an owner/operator of an MS4 pursuant to federal regulations. Caltrans holds a CWA Section 402 General NPDES MS4 Permit that covers primarily municipal storm water discharges within Caltrans ROW. The Department's MS4 Permit, NPDES No. CAS000003, SWRCB Order No. 2012-0011-DWQ (adopted on September 19, 2012 and effective on July 1, 2013), as amended by Order No. 2014-0006-EXEC (effective January 17, 2014), Order No. 2014-0077-DWQ (effective May 20, 2014) and Order No. 2015-0036-EXEC (conformed and effective April 7, 2015) contains three basic requirements:

1. The Department must comply with the requirements of the CGP (see below);
2. The Department must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and
3. The Department stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs) to the Maximum Extent Practicable, and other measures deemed necessary by the SWRCB and/or other agency having authority reviewing the stormwater component of the project.

To comply with the permit, the Department developed the Statewide Storm Water Management Program (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within the Department for implementing stormwater management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices the Department uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address stormwater runoff.

State Water Board's Small MS4 Permit

The City of West Sacramento is designated as a Traditional Small MS4 Permittee currently covered under the State Water Resources Control Board's Phase II MS4 (Statewide Phase II MS4 Permit) (NPDES Order No. 2013-001-DWQ; General Permit No. CAS000004). This permit

requires controls be implemented to reduce the discharge of pollutants in stormwater discharges to the maximum extent possible, including management practices, control techniques, system design and engineering methods, and other measures as appropriate. As part of permit compliance, the City of West Sacramento developed a SWMP Planning Document in 2003. This plan outlines stormwater requirements for municipal operations, industrial and commercial businesses, construction sites, and planning and land development. These requirements may include multiple measures to control pollutants in stormwater discharge. During implementation of specific projects, project applicants will be required to follow the guidance contained in the SWMP.

Traditional permittees are required to comply with Section E of the Statewide Phase II MS4 Permit, which specifies requirements for site design measures¹, LID design standards, alternative post-construction stormwater management program, and operations and management requirements for post construction stormwater management. Under the Statewide Phase II MS4 permit, site design measures are required for all projects that create and/or replace between 2,500 square feet and 5,000 square feet of impervious surface. LID design standards are required to be implemented for all development projects that create and/or replace 5,000 square feet or more of impervious surface. If and where MS4 requirements are triggered for this project, the project will comply with all applicable permit requirements. Permittees also must develop and implement a program to assess operation and maintenance activities and develop applicable BMPs, such as for bridge maintenance, including re-chipping, grinding, saw cutting, and painting.

Sacramento County MS4 Permit

The City of Sacramento is currently covered under Waste Discharge Requirements for the Cities of Citrus Heights, Elk Grove, Folsom, Galt, Sacramento, and County of Sacramento Stormwater Discharges from Municipal Separate Storm Sewer Systems in Sacramento County (Sacramento County MS4 Permit) (NPDES No. CAS082597; Order No. R5-2015-0023). As part of permit compliance, the Sacramento County MS4 Permittees developed a Sacramento Stormwater Quality Partnership and a Sacramento Stormwater Quality Improvement Program, which is a comprehensive program comprised of various program elements and activities designed to reduce stormwater pollution to Maximum Extent Practicable (MEP) and eliminate prohibited non-stormwater discharges through a NPDES municipal stormwater discharge permit.

The City of Sacramento's Stormwater Quality Improvement Program was established in 1990. The Program includes pollution reduction activities for construction sites, industrial sites, illegal discharges and illicit connections, new development, and municipal operations. The Program also includes an extensive public education effort, target pollutant reduction strategy and monitoring program. The Stormwater Quality Improvement Plan (SQIP) (July 2007) outlines the

¹ Site design measures are implemented to reduce site runoff. Examples of these measures include stream setbacks and buffers, soil quality improvement and maintenance, tree planting and preservation, rooftop and impervious area disconnection, porous pavement, green roofs, vegetated swales, and rain barrels and cisterns.

priorities, key elements, strategies, and evaluation methods of the City's Stormwater Management program for 2007-2011 (Sacramento Stormwater Quality Partnership 2009).

Under the Sacramento County MS4 Permit, storm water mitigation measures are required to be incorporated into project design plans for Planning Priority Projects. These include development projects (residential, industrial and commercial), parking lots, redevelopment project (or land disturbing activity) that results in the creation, addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site, or projects located in or directly adjacent to or discharging directly to an Environmentally Sensitive Area (ESA)², which meet thresholds. In addition, the Sacramento Stormwater Quality Partnership developed a Hydromodification Management Plan that provides technical guidance on LID measures³/hydromodification⁴ strategies for the development community in the Sacramento urbanized area.

The proposed Broadway Bridge would be located adjacent to an ESA because the Sacramento River has 303(d)- listed impairments, and therefore implementation of storm water mitigation measures into the project design plan are required (Sacramento Stormwater Quality Partnership 2009). The project is not subject to hydromodification requirements within the City of Sacramento, because projects discharging directly to the Sacramento River (through either drainage channels or pump stations) are considered exempt from the regulations of the HMP (Sacramento Stormwater Quality Partnership 2013).

Construction General Permit

Construction General Permit (NPDES No. CAS000002, SWRCB Order No. 2009-0009-DWQ, adopted on November 16, 2010) became effective on February 14, 2011 and was amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ. The permit regulates stormwater discharges from construction sites which result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development.

For all projects subject to the CGP, the applicant is required to hire a Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer (QSD) to develop and implement an effective SWPPP. All Project Registration Documents, including the SWPPP, are required to be uploaded into the SWRCB's on-line Stormwater Multiple Application and Report Tracking System (SMARTS), at least 30 days prior to construction.

² A project within an ESA if it meets one or more of the following criteria: The Project is located near receiving waters designated as (1) Tributary to a CWA 303(d) Water Body, (2) RARE beneficial use, (3) Areas of Special Biological Significance, (4) Multiple Species Conservation Program (MSCP), (5) any other ESA which has been identified by a County.

³ LID are implemented to mimic a site's predevelopment hydrology by using de-centralized design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall. Examples include bioretention facilities (rain gardens), cisterns and rain barrels, permeable pavement, bioswales, and biostrips.

⁴ Hydromodification means the change in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, interflow and groundwater flow) caused by urbanization or other land use changes that result in increased stream flows and sediment transport. In addition, alteration of stream and river channels, installation of dams and water impoundments, and excessive stream bank and shoreline erosion are also considered hydromodification, due to their disruption of natural watershed hydrologic processes.

By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1 acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than one acre is subject to the CGP if there is potential for significant water quality impairment resulting from the activity as determined by the Regional Water Board. Operators of regulated construction sites are required to develop SWPPPs; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the CGP.

The CGP contains a risk-based permitting approach by establishing three levels of risk possible for a construction site. Risk levels are determined during the planning, design, and construction phases, and are based on project risk of generating sediments and receiving water risk of becoming impaired. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows. A risk level assessment was done for the project and provided in Section 3.3.2 *Construction General Permit Risk Level Assessment*.

General Waste Discharge Requirements for Limited Threat Discharges to Surface Waters

Limited threat discharges to surface waters are currently regulated by the Central Valley Regional Water Board under a regional general permit, General Waste Discharge Requirements for Limited Threat Discharges to Surface Water (Limited Threat Discharge Permit) (Order R5-2016-0076-01). This permit is required if discharges occur continuously over a period of time. Otherwise, one-time surface water discharges for surface in-water work or groundwater excavation are typically covered under a 401 Certification, if one is obtained. A Notice of Intent (NOI) and Report of Waste Discharge must be submitted to the Central Valley Regional Water Board to comply with this discharge permit. The permit organizes limited threat discharges into three tiers. Based on Table 3 of the Order (Eligible Discharges with Applicable Tiers), discharge activities to surface water for this project, classified as Construction Dewatering, would fall under Tier 1B (clean or relatively pollutant-free wastewaters that pose little or no threat to water quality) unless the wastewater exceeds the screening levels thereby elevating the project to Tier 2. For all discharges, the permit specifies effluent limitations for pH, total suspended solids, turbidity, biological oxygen demand, oil and grease, settleable solids, sulfides, phenols, and residual chlorine—in addition to several other effluent limitations for specific compounds.

General Waste Discharge Requirements for Low-Threat Discharges to Land

Low-threat discharges to land are currently regulated by the State Water Board under a regional general permit, Statewide General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality (General Dewatering Permit for Land Discharges) (Order No. 2003–0003-DWQ). Similar to the Limited Threat Discharge Permit, a NOI and a Report of Waste Discharge must be submitted to the Central Valley Regional Water Board to comply with this dewatering permit. Among other activities, this permit covers small temporary dewatering projects that discharge groundwater to land from small construction projects, excavation projects, or dewatering of underground utility vaults.

California Department of Fish and Wildlife Streambed Alteration Agreement

Under Chapter 6 of the California Fish and Game Code, the California Department of Fish and Wildlife (CDFW) is responsible for the protection and conservation of the State’s fish and wildlife resources. Section 1602 et seq. of the code defines the responsibilities of CDFW and requires that public and private applicants obtain an agreement to “divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by the department (CDFW) in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department.” A Streambed Alteration Agreement is required under Section 1602 of the California Fish and Game Code for all activities that involve temporary or permanent activities within State jurisdictional waters. A Section 1602 Streambed Alteration Agreement will be required for the proposed project due to potential effects on the Sacramento River.

2.2.2 Central Valley Flood Protection Board Encroachment Permit

An encroachment permit must be obtained from the CVFPB for all proposed activities related to placement of encroachments within, under, or over the State highway rights-of-way. An encroachment is defined in Section 660 of the California Streets and Highways Code as “any tower, pole, pole line, pipe, pipeline, fence, billboard, stand or building, or any structure, object of any kind or character not particularly mentioned in the section, or special event, which is in, under, or over any portion of the State highway rights of way. ‘Special event’ means any street festival, sidewalk sale, community-sponsored activity, or community-approved activity.”

Central Valley Flood Protection Act of 2008

The Central Valley Flood Protection Act of 2008 (California Water Code Section 9600) establishes the 200-year flood event as the minimum level of flood protection for urban and urbanizing areas. Currently, the Central Valley Flood Protection Plan (CVFPP) outlines that more work is required in order to achieve urban level of flood protection by 2025 for urban areas protected by the State Plan of Flood Control (SPFC). The California Department of Water Resources (DWR) and the CVFPB collaborated with local governments and planning agencies to prepare the CVFPP. The CVFPP was developed under a process implemented by the Central Valley Flood Management Program (CVFMP), which was established in 2008 to guide, manage, and implement integrated flood management actions in the Central Valley. The CVFPP, as set forth in California Water Code Section 9614, was adopted on June 29, 2012. The CVFPP proposes a “systemwide investment approach” for integrated, sustainable flood management in areas currently protected by facilities of the SPFC. The 2012 CVFPP fulfilled the intent and requirements of the Central Valley Flood Protection Act of 2008. The CVFPP is required to be updated every 5 years beginning in 2017. The 2017 update of the CVFPP refined the State Systemwide Investment Approach (SSIA) that was formulated in 2012 and provided a road map for Central Valley flood risk management; refined capital and ongoing costs, funding, and implementation phasing of the SSIA; Identified long-standing policy issues that challenge the CVFPP implementation; and established an outcome-based planning framework with measurable objectives.

The proposed project is located within the Lower Sacramento Regional Work Group of the CVFMP Lower Sacramento and Delta North Regional Flood Management planning area. This planning area includes the cities of Sacramento, Woodland, Davis, and Rio Vista; adjoining unincorporated areas of Yolo, Solano, Sacramento and Sutter counties; and reclamation districts on both sides of the Sacramento River and Yolo Bypass, from the Fremont Weir to Rio Vista. Following adoption of the 2012 CVFPP, DWR launched a regional effort to help local agencies develop comprehensive regional flood management plans (RFMPs) that describe local flood management priorities, challenges, and potential funding mechanisms, as well as define site specific improvement needs. The RFMPs present local agencies' perspectives of flood management with a prioritized list of projects that need to be implemented to reduce flood risks in each region. Each plan presents an assessment of the costs and benefits for proposed projects while considering their potential contribution to an integrated multi-benefit and basin-wide solution.

Central Valley Flood Protection Board Regulations

The CVFPB exercises regulatory authority within its jurisdiction to maintain the integrity of the existing flood control system and designated floodways by issuing permits for encroachments (CCRs, Title 23, Division 1, Tier 1b Updates, and Division 1.5 – California Water Code Section 8710 et seq.). The CVFPB has mapped designated floodways along more than 60 streams and rivers in the Central Valley. In addition, Table 8.1 of the CCRs, Title 23 contains several hundred stream reaches and waterways that are regulated streams. Projects that encroach on a designated floodway or regulated stream, or that are within 10 feet of the toe of a state-federal flood control structure (levee), require an encroachment permit and submission of an associated application, including an environmental assessment questionnaire. A project must demonstrate that it will not reduce the channel flow capacity and that it will comply with channel and levee safety requirements.

In cooperation with USACE, the CVFPB enforces standards for construction, maintenance, and protection of adopted flood control plans that will protect public lands from floods. The jurisdiction of the CVFPB encompasses the Central Valley, including all tributaries and distributaries of the Sacramento River, the San Joaquin River, and designated floodways (CCRs, Title 23, Section 2). The CVFPB has all the responsibilities and authorities necessary to oversee future modifications as approved by USACE, pursuant to assurance agreements with USACE and the USACE Operation and Maintenance Manuals (33 Code of Federal Regulations, Section 208.10; 33 U.S. Code, Section 408).

The Sacramento River (Keswick Dam to the west end of Sherman Island) is a CVFPB-designated floodway.

2.3 Regional and Local Requirements

2.3.1 City of West Sacramento

2.3.1.1 West Sacramento Area Flood Control Agency

The City of West Sacramento and Reclamation Districts 900 and 537 make up the joint powers authority that forms the West Sacramento Area Flood Control Agency (WSAFCA) whose mission is to plan and build flood risk reduction facilities that protect the City of West Sacramento's residents and property. WSAFCA is also the regional floodplain administrator carrying out duties associated with floodplain management and flood preparedness activities.

2.3.1.2 West Sacramento Master Plan

The City of West Sacramento General Plan (City of West Sacramento 2016) was adopted in 1990 and underwent an update in 2016. This update (i.e. General Plan 2035) is the first comprehensive revision to the General Plan. This current 2016 version outlines the following key goals and policies that relate to hydrology and water quality.

Public Facilities and Services Element

Goal PFS-4: To maintain an adequate level of service in the City's storm drainage system to accommodate runoff from existing and future development, prevent property damage due to flooding, and improve environmental quality.

PFS-4.1 Public Improvement Design: The City shall design public improvements such as streets, parks, and plazas for retention and infiltration of stormwater by diverting urban runoff to bio-filtration systems such as greenscapes. (RDR/MPSP)

PFS-4.2 Accommodate New and Existing Development: The City shall continue to expand and develop stormwater drainage facilities to accommodate the needs of existing and planned development. (MPSP/SO)

PFS-4.3 Storm Drainage Districts: The City shall form stormwater drainage districts as needed to ensure that stormwater drainage facilities are properly constructed, operated, and maintained. (MPSP/SO)

PFS-4.4 Development Fair Share: The City shall, through a combination of drainage improvement fees and other funding mechanisms, ensure that new development pays its fair share of the costs of drainage system improvements. (RDR/FB)

PFS-4.7 Fix Local Flooding: The City shall continue to identify and correct problems of localized flooding within the city. Where practical and economical, the City shall upgrade existing drainage facilities as necessary to correct localized flooding problems. (MPSP/SO)

PFS-4.9 Grading Projects: The City shall impose appropriate conditions on grading projects performed during the rainy season to ensure that silt is not conveyed to storm drainage systems. (RDR)

PFS-4.10 Diversion: The City shall require new development to be designed to prevent the diversion of floodwaters onto neighboring parcels. (RDR)

PFS-4.11 Storm Drain Improvements: The City shall require construction of storm drainage improvements, as appropriate, to prevent flooding during periods of heavy rainfall. (RDR)

Natural and Cultural Resources Element

Goal NCR-4: To preserve and protect water quality in the City's natural water bodies and drainage systems and the area's groundwater basin.

NCR-4.2 Open Space Buffers: The City shall conserve and, where feasible, create or restore open space areas that serve to protect water quality such as riparian corridors, buffer zones, wetlands, undeveloped open space areas, levees, and drainage canals. (RDR)

NCR-4.5 No Adverse Impact: The City shall not approve new development that has a significant potential for adversely affecting water quality in the city's natural water bodies and drainage systems including the Sacramento River, Deep Water Ship Channel, Lake Washington, or groundwater basin. (RDR)

NCR-4.6 New Development: The City shall require new development to protect the quality of water resources and natural drainage systems through site design, source controls, runoff reduction measures, best management practices (BMPs), and Low Impact Development (LID). (RDR)

NCR-4.7 Construction Site Impacts: The City shall control pollutant sources to natural water bodies and drainage systems from construction activities through the use of stormwater protection measures in accordance with Federal, State, and local regulations such as the City's grading ordinance and National Pollutant Discharge Elimination System (NPDES) permit. (RDR)

Safety Element

Goal S-2: To prevent loss of life, injury, and property damage due to flooding.

S-2.1 Flood Insurance Program: The City shall continue to participate in the National Flood Insurance Program, and ensure that local regulations are in full compliance with standards adopted by the Federal Emergency Management Agency (FEMA). (RDR/MPSP)

S-2.2 Minimize Risk of Flood Damage: The City shall evaluate and regulate development in areas subject to flooding in accordance with local, State, and Federal requirements to avoid or minimize the risk of flood damage. (MPSP)

S-2.7 200-year Flood Protection: The City shall work with local, regional, State, and Federal agencies to achieve by 2025 at least 200-year flood protection for all areas of the

city. Priority shall be given to the levees protecting the people and property within the existing City limits. (IGC)

S-2.9 200-Year Flood Protection in New Development: The City shall require new development to achieve a minimum of 200-year level of flood protection either through: i) the construction of flood management improvements or other mitigation measures beyond those required by the City’s Floodplain Management Ordinance (Title 18 of the Municipal Code); or ii) payment of in-lieu flood management fees. (RDR)

S-2.12 New Development Design: The City shall require new development located within a special (100-year) flood hazard are to be designed to minimize the risk of damage in the event of a flood. (RDR)

2.3.1.3 City of West Sacramento Municipal Code

The following regulations of the City’s Municipal Code regarding hydrology and water quality are applicable to the project.

Title 13, Public Services, Chapter 13.10—Urban Stormwater Quality Management and Discharge Control

This chapter contains the following regulations and requirements to prevent, control, and reduce stormwater pollutants:

- 13.10.130 - NPDES stormwater discharge general permits.
- 13.10.140 - Requirement to prevent, control and reduce stormwater pollutants.
- 13.10.150 - Best management practices for ground disturbing activities, new development, and redevelopment.
- 13.10.160 - Compliance with best management practices.
- 13.10.170 – Requirement to eliminate illicit discharges.
- 13.10.190 – Watercourse protection.
- 13.10.200 – Damage to the storm drain system
- 13.10.210 – Requirement to remediate.
- 13.10.220 – Requirement to monitor and analyze.
- 13.10.230 – Containment and notification of spills.
- 13.10.240 – Authority to inspect.
- 13.10.250 - Authority to sample, establish sampling devices and test.
- 13.10.260 – City inspection of stormwater conveyance system.

Title 15—Buildings and Construction

Chapter 15.08, Grading, establishes standards for the preparation of sites and construction activities to protect the health, safety and general welfare of the public by protecting against

unwarranted or unsafe grading, drainage works or other aspects of site development. The following provisions in Chapter 15.08 are applicable:

15.08.180 Erosion control: Contains basic design principles and standards that shall be incorporated in grading operations to control erosion and reduce sedimentation.

15.08.280 Runoff control: Contains performance standards for a surface runoff control plan if required by the City manager or designee.

15.08.300 Environmental standards: Contains compliance requirements for CEQA and other environmental laws.

Chapter 15.50, 200 Year Flood Protection, includes the following requirements for 200-year flood protection: 15.50.060 No building permit until compliance demonstrated:

15.50.060 No building permit until compliance demonstrated:

No building permit shall be issued in connection with the construction of any new structure until the applicant for the building permit demonstrates to the satisfaction of the floodplain administrator that: (1) prior to occupancy, the structure will have 200 year flood protection; and (2) any improvements constructed or measures implemented by the applicant to ensure 200-year flood protection will not significantly increase the risk of flooding or the effect of flooding on any adjacent or nearby properties. An applicant shall demonstrate compliance either by the construction of flood management improvements or other mitigation measures beyond those set forth in Title 18, or the payment to the City of an in-lieu flood management fee established by resolution of the City Council. The fees shall be paid at the time of issuance of building permits

15.50.080 Integration with Title 18: Contains requirements for coordination with Title 18 below. In the event of any conflict, the more stringent requirements will apply.

2.3.1.4 City of West Sacramento Urban Stormwater Quality Management and Discharge Control Ordinance

The City's Grading, Erosion, and Sediment Control Ordinance (Title 13, Chapter 13.10 of the City Code) sets forth rules and regulations to protect and promote the health, safety, and general welfare of the citizens of the city by controlling non-storm water discharges to the storm water conveyance system, by eliminating discharges to the storm water conveyance system from spills, dumping, or disposal of materials other than storm water, and by reducing pollutants in urban storm water discharges to the maximum extent practicable.

2.3.1.5 City of West Sacramento Stormwater Management Program Planning Document

The City of West Sacramento developed the Stormwater Management Program Planning Document (2003) to address storm water quality within the City's jurisdiction. The SWMP addresses a wide variety of activities conducted in urbanized areas of the City that are sources of

pollutants in storm water. This planning document was developed to comply with the State Water Board's Small MS4 General Permit.

2.3.1.6 Pioneer Bluff Transition Plan

In West Sacramento, the Pioneer Bluff District is an approximately 125-acre area along a 1-mile stretch of South River Road. Current land uses include storage and distribution facilities for petroleum products, the West Sacramento Public Works Department corporation yard, and other industrial and commercial uses. In 2014, the City of West Sacramento approved the *Pioneer Bluff Transition Plan* (City of West Sacramento 2014). The plan discusses the de-industrialization and planning efforts needed to facilitate transition of the Pioneer Bluff District to urban land uses. The transition plan provides initial guidelines and actions needed for de-industrialization and coordination with city and regional planning activities. The de-industrialization process started prior to preparation of the transition plan and has continued as demonstrated by the following.

- **Decommissioning of Wastewater Treatment Plant.** In 2008, one of the first steps toward de-industrialization occurred. West Sacramento decommissioned the wastewater treatment plant located at the southern end of the Pioneer Bluff district.
- **Relocation of Cemex Cement Terminal.** In 2009, Cemex relocated its cement terminal operations from its riverfront location on South River Road at 15th Street. Demolition of the silos and other facilities at the site began in 2014. At the same site, decommissioning of the pier in the Sacramento River is currently underway.
- **Construction of the Mike McGowan Bridge.** The bridge, which opened to traffic in 2014, connects the Pioneer Bluff and Stone Lock Districts via the northern and southern segments of South River Road.
- **Acquisition and Decommissioning of Shell Oil Facility.** In 2017, the Port of West Sacramento acquired the Shell Oil petroleum tank farm located on South River Road south of 15th Street. Through an agreement with the tank farm operator, operations of the tank farm will gradually phase out by March 2021.

The plans for de-industrialization of Pioneer Bluff also include relocation of the Union Pacific Railroad (UPRR) line known as the east-side rail line that parallels the east side of Jefferson Boulevard. Relocation of the tracks is discussed further below under *Yolo Rail Relocation*.

The Broadway Bridge roadway connection in West Sacramento would be in the Pioneer Bluff District.

2.3.1.7 Pioneer Bluff and Stone Lock Reuse Master Plan

The City of West Sacramento is preparing a master plan for the reuse of both the Pioneer Bluff and Stone Lock Districts. In preparation of the plan, a phased multi-modal transportation circulation network for the plan area was developed and approved by City of West Sacramento City Council in January 2018 (approved mobility network). For use by the proposed project, the City of West Sacramento summarized in a memorandum the approved mobility network and maximum employment and dwelling unit projections for the plan area (City of West Sacramento

2018). The memorandum also included the approximate timeline for implementation of the phases of the mobility network, and the timeline for reuse and development of the other land in the plan area.

The 10- to 15-year phase and the 15+ year phase of the approved mobility network were used to define the assumed interim (2030) and design year (2040) conditions in West Sacramento.

2.3.1.8 Bridge District Specific Plan

The *Bridge District Specific Plan*, formerly the *Triangle Plan*, initially was adopted by the City of West Sacramento in 1993. A significantly updated version was adopted in 2009 (City of West Sacramento 2009). The *Bridge District Specific Plan* provides a framework for development of a waterfront-orientated urban district in an area of West Sacramento bounded by Tower Bridge Gateway, US 50, and the Sacramento River; the plan also includes a small area along the river south of US 50.

The northernmost roadway connection alternative for the Broadway Bridge in West Sacramento would be in the Bridge District Specific Plan area.

2.3.1.9 Riverfront Street Extension Project

The City of West Sacramento is proposing to extend Riverfront Street approximately 0.15 mile to the south to accommodate circulation and access for a Streetcar Vehicle Maintenance Facility. The extension project also would widen the east side of 5th Street/South River Road between Mill Street and 15th Street to add bicycle and pedestrian amenities, frontage, and place underground the overhead utilities. The bicycle and pedestrian amenities would include sidewalk along the east side of 5th Street, a cycle track (two-way bike lane) to close a gap in the bike lane network, and enhancements at the Bridge Street and 5th intersection to route bicycles between the River Walk and 5th Street.

2.3.1.10 Yolo Rail Relocation

In 2014, the City of West Sacramento, along with the Cities of Davis and Woodland and Yolo County, created the Yolo Rail Realignment Partnership to jointly assess the feasibility of relocating and decommissioning rail lines within their jurisdictions. The assessments prepared for the Partnership identified four conceptual project phases (1, 2A, 2B, and 2C). Phase 2A includes removal of the east-side rail line and six at-grade crossings in West Sacramento, and the addition of a new rail connection between the UPRR mainline and the Port of West Sacramento spur rail terminus.

To advance the relocation of tracks in West Sacramento independently from the overall rail realignment project, in 2017 West Sacramento arranged for a more detailed engineering, environmental, and financial analysis of Phase 2A. The results of the analysis were documented in *Yolo Rail Realignment Project, Phase 2A Technical Analysis of Alternatives* (HDR 2017). West Sacramento currently is exploring mechanisms to proceed with implementation of the report's recommendations.

Advancing Phase 2A of the rail relocation is consistent with the timeline for the phased multi-modal transportation circulation network in the *Pioneer Bluff and Stone Lock Reuse Master*

Plan–Broadway Bridge Integration (as adopted by West Sacramento City Council in 2018). The approved mobility network for Pioneer Bluff assumes that relocation of the UPRR east-side rail line would occur by 2030. Relocation of the east-side rail line is a necessary component of the redevelopment of Pioneer Bluff and facilitates transportation circulation patterns for the proposed Broadway Bridge.

2.3.2 City of Sacramento

2.3.2.1 Sacramento Area Flood Control Agency

The Sacramento Area Flood Control Agency (SAFCA) was formed in 1989 to address the Sacramento area’s vulnerability to catastrophic flooding. This vulnerability was exposed during the record flood of 1986, when Folsom Dam exceeded its normal flood control storage capacity and several area levees nearly collapsed under the strain of the storm. In response, the City of Sacramento, the County of Sacramento, the County of Sutter, the American River Flood Control District, and Reclamation District No. 1000 created SAFCA through a Joint Exercise of Powers Agreement to provide the Sacramento region with increased flood protection along the American and Sacramento Rivers.

2.3.2.2 City of Sacramento 2035 General Plan

The following policies from the City of Sacramento 2035 General Plan (City of Sacramento 2015) are applicable to this project with respect to hydrology and water quality.

Goal Environmental Resources (ER) 1.1. Water Quality Protection. Protect local watersheds, water bodies and groundwater resources, including creeks, reservoirs, the Sacramento and American rivers, and their shorelines.

- ER 1.1.3 Stormwater Quality. The City shall control sources of pollutants and improve and maintain urban runoff water quality through storm water protection measures consistent with the City’s National Pollution Discharge Elimination System (NPDES) Permit.
- ER 1.1.4 New Development. The City shall require new development to protect the quality of water bodies and natural drainage systems through site design, (e.g., cluster development), source controls, storm water treatment, runoff reduction measures, best management practices (BMPs) and Low Impact Development (LID), and hydromodification strategies consistent with the city’s NPDES Permit.
- ER 1.1.5 Limit Stormwater Peak Flows. The City shall require all new development to contribute no net increase in stormwater runoff peak flows over existing conditions associated with a 100-year storm event.
- ER 1.1.6 Post-Development Runoff. The City shall impose requirements to control the volume, frequency, duration, and peak flow rates and velocities of runoff from development projects to prevent or reduce downstream erosion and protect stream habitat.

- ER 1.1.7 Construction Site Impacts. The City shall minimize disturbances of natural water bodies and natural drainage systems caused by development, implement measures to protect areas from erosion and sediment loss, and continue to require construction contractors to comply with the City’s erosion and sediment control ordinance and stormwater management and discharge control ordinance.

Goal Utilities 4.1 Adequate Stormwater Drainage. Provide adequate stormwater drainage facilities and services that are environmentally-sensitive, accommodate growth, and protect residents and property.

- U4.1.1 Adequate Drainage Facilities. The City shall ensure that all new drainage facilities are adequately sized and constructed to accommodate stormwater runoff in urbanized areas.
- U4.1.2 Master Planning. The City shall implement master planning programs to: Identify facilities needed to prevent 10-year event street flooding and 100-year event structure flooding; Ensure that public facilities and infrastructure are designed pursuant to approved basin master plans; Ensure that adequate land area and any other elements are provided for facilities subject to incremental sizing (e.g., detention basins and pump stations); Consider the use of “green infrastructure” and Low Impact Development.
- U4.1.3 Regional Stormwater Facilities. The City shall coordinate efforts with Sacramento County and other agencies in the development of regional stormwater facilities.
- U4.1.4 Watershed Drainage Plans. The City shall require developers to prepare watershed drainage plans for proposed developments that define needed drainage improvements per City standards, estimate construction costs for these improvements and comply with the City’s National Pollutant Discharge Elimination System (NPDES) permit.
- U4.1.6 New Development. The City shall require proponents of new development to submit drainage studies that adhere to City stormwater design requirements and incorporate measures, including “green infrastructure” and Low Impact Development (LID) techniques, to prevent on- or off-site flooding

Goal Environmental Constraints 2.1 Flood Protection. Protect life and property from flooding.

- EC 2.1.11 New Development. The City shall require evaluation of potential flood hazards prior to approval of development projects and shall regulate development in urban and urbanizing areas per state law addressing 200-year level of flood protection.
- EC 2.1.12 New Development Design. The City shall require new development located within a special (100-year) flood hazard area to be designed to minimize the risk of damage in the event of a flood.

2.3.2.3 *Broadway Complete Streets Plan and Project*

In 2016, the City of Sacramento approved the *Broadway Complete Streets Plan* that proposes improvements along Broadway from 3rd Street east to Franklin Boulevard. The first phase of the plan, from 3rd Street to 16th Street, is expected to be constructed in 2021. As part of the first

phase, Broadway would be modified to have two travel lanes, a center two-way left-turn lane, buffered bike lanes, and on-street parking.

The new roadway connection and river crossing that would be created by the proposed project would connect with the improvements that are part of the Broadway Complete Streets Project.

2.3.2.4 West Broadway Specific Plan

The City of Sacramento is developing a specific plan for an area called West Broadway. The 240-acre plan area generally is bounded by the Sacramento River to the west, US 50 and Broadway to the north, Muir Way and 5th Street to the east, and 4th Avenue and Merkley Way to the south. The Broadway Bridge connection in Sacramento is located within the West Broadway Specific Plan area, and the bridge is recognized in the plan as a future roadway connection.

The plan area includes the Northwest Land Park Planned Unit Development area, an infill project (under construction) known as The Mill at Broadway; Alder Grove Public Housing Community and Marina Vista Public Housing community; William Land Woods Affordable Housing Community; Leataata Floyd Elementary School; Health Professionals High School; approximately 32 acres of existing industrial land uses; Miller Regional Park; and the Sacramento Marina. (City of Sacramento 2019.)

The *West Broadway Specific Plan* will define the land use regulations and policies for development of the plan area and will identify necessary public improvements to support new urban development. The anticipated development will be consistent with the framework of the General Plan, which anticipates a mix of traditional and urban-scale housing with neighborhood commercial uses. The City of Sacramento Community Development Department is the lead agency in developing the Specific Plan (City of Sacramento 2019).

The plan is expected to be approved in 2020.

2.3.2.5 Central City Mobility Project

Following the installation of bikeways in downtown Sacramento in 2018, the Central City Mobility Project is the next step for implementing transportation improvements identified for the central city in the City's *Grid 3.0* and the *Central City Specific Plan. Grid 3.0* (City of Sacramento 2016) integrates a number of transportation projects and programs to further enhance the downtown grid. The *City of Sacramento Central City Specific Plan* (City of Sacramento 2018) establishes a policy framework to guide development and infrastructure decisions in the central city area. The Central City Mobility Project will extend the bikeway network by adding 62 blocks of protected bikeways and converting two segments of one-way streets to two-way, including 5th Street from Broadway north to I Street.

2.3.2.6 City of Sacramento Stormwater Management and Control Code

The City Stormwater Management and Control Code (Chapter 13.16 of the City Code) is intended to control non-storm water discharges to the storm water conveyance system; eliminate discharges to the storm water conveyance system from spills, dumping, or disposal of materials other than storm water; and reduce pollutants in urban storm water discharges to the maximum

extent practicable. Non-storm water discharges are prohibited except where the discharge is regulated under an NPDES permit. Discharges from specified activities that do not cause or contribute to the violation of any plan standard, such as landscape irrigation and lawn watering and flows from fire suppression activities, also are exempt from this prohibition. Discharges of pumped groundwater not subject to an NPDES permit may be permitted to discharge to the storm water conveyance system upon written approval from the City and in compliance with the City's conditions of approval.

2.3.2.7 City of Sacramento Grading, Erosion, and Sediment Control Ordinance

The City of Sacramento Grading, Erosion, and Sediment Control Ordinance (Title 15, Chapter 15.88 of the City Code) sets forth rules and regulations to control land disturbances, landfill, soil storage, pollution, and erosion and sedimentation resulting from construction activities. With limited exceptions, grading approval must be received from the City Department of Utilities before construction. All project applicants, regardless of project location, are required to prepare and submit separate erosion and sediment control plans applicable to the construction and post-construction periods. The ordinance also specifies other requirements, such as written approval from the City for grading work within the right-of-way of a public road or street, or within a public easement.

2.3.2.8 Sacramento Stormwater Quality Improvement Plan

The Sacramento Stormwater Management Program is a comprehensive program comprised of various program elements and activities designed to reduce storm water pollution to the maximum extent practicable and eliminate prohibited non-storm water discharges in accordance with federal and state laws and regulations. These laws and regulations are implemented through NPDES municipal storm water discharge permits. In 1990, the County of Sacramento and the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova, collectively known as the Sacramento Stormwater Quality Partnership (Partnership), applied for and received one of the first areawide NPDES MS4 storm water permits in the country and began development of core storm water management program elements and activities to address local urban runoff water quality problems. As part of the program, a SQIP (Sacramento Stormwater Quality Partnership 2009) was prepared in compliance with the MS4 Permit as a comprehensive plan that describes the Partnership's Stormwater Management Program.

3. AFFECTED ENVIRONMENT

Hydrology, water quality, aquatic habitat, and in channel sediments are affected by climatological conditions, topography, and the type and volume of pollutants discharged. This chapter describes regional existing hydrology and water quality conditions in the project vicinity and the immediate project area.

3.1 General Environmental Setting

3.1.1 Population and Land Use

The proposed bridge crossing is over the Sacramento River between the City of West Sacramento to the west and the City of Sacramento to the east. Both cities are located in the northern portion of the Central Valley near the confluence of the Sacramento and American Rivers. West Sacramento is located in Yolo County, while Sacramento is located in Sacramento County. Based on Census data, the population of the City of West Sacramento was 52,826 (Census 2018b), and the population of the City of Sacramento was 495,011 (Census 2018a).

The land use of the immediate project area is primarily industrial in West Sacramento and Sacramento. The project area also consists of roads, railroad tracks, and commercial. The banks of the river are reinforced with erosion control protection. Suburban and commercial land use is located to the east and west of the project area. The Project site is not located near a state scenic highway or other designated scenic corridor (California Department of Transportation 2019a).

3.1.2 Topography

Regionally, the topography trends downhill toward the center of the Sacramento Valley from the Sierra foothills to the east and Coast Ranges to the west. The Sacramento Valley generally trends downhill to the southwest toward the San Joaquin-Sacramento River Delta, approximately 35 miles to the southwest of the site.

The site topography is relatively flat, except where it slopes down to the Sacramento River. Locally, the elevations are slightly higher along the banks of the Sacramento River and lower away from the river. The project elevations generally range between approximately 15 and 30 feet above mean sea level (msl). Based on the Natural Resources Conservation Service (NRCS) soil unit map, slopes within the project area are 0-2% (Natural Resources Conservation Service 2019). Therefore, a slope of 1% was assumed for this WQAR.

3.1.3 Hydrology

3.1.3.1 Regional Hydrology

The project is located in the Sacramento River Basin, which has a total drainage area of approximately 27,000 square miles. Within the basin, the project site is located within the Lower Sacramento Valley Watershed. The basin drains the eastern slopes of the Coast Ranges, Mount Shasta, the western slopes of the southernmost region of the Cascades, and the northern portion

of the Sierra Nevada. The Sacramento Valley Watershed is approximately 5,500 square miles (Sacramento River Watershed Program 2010). Figure 6 shows watersheds and hydrological features within the project vicinity.

According to the U.S. Geological Survey National Watershed Boundary Dataset, the project area lies within two hydrologic units. The eastern bridge landing and Sacramento River are within Lake Greenhaven-Sacramento River (Hydrologic Unit Code [HUC] 180201630701). On the western landing, the project is within Toe Drain-Cache Slough (HUC 180201630606) (U.S. Geological Survey 2019).

3.1.3.2 Local Hydrology

3.1.3.2.1 Precipitation and Climate

The climate of Sacramento is Mediterranean, which is characterized as damp to wet mild winters and hot, dry summers. The rainy season generally occurs between October and April, and the total average annual rainfall is 17.24 inches (Table 5).

Table 5. Month Average Precipitation at the Sacramento Executive Airport

Monthly Average Total Precipitation (inches)											Total Annual	
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		Dec
3.56	3.07	2.44	1.17	0.50	0.18	0.03	0.06	0.25	0.93	2.04	3.02	17.24

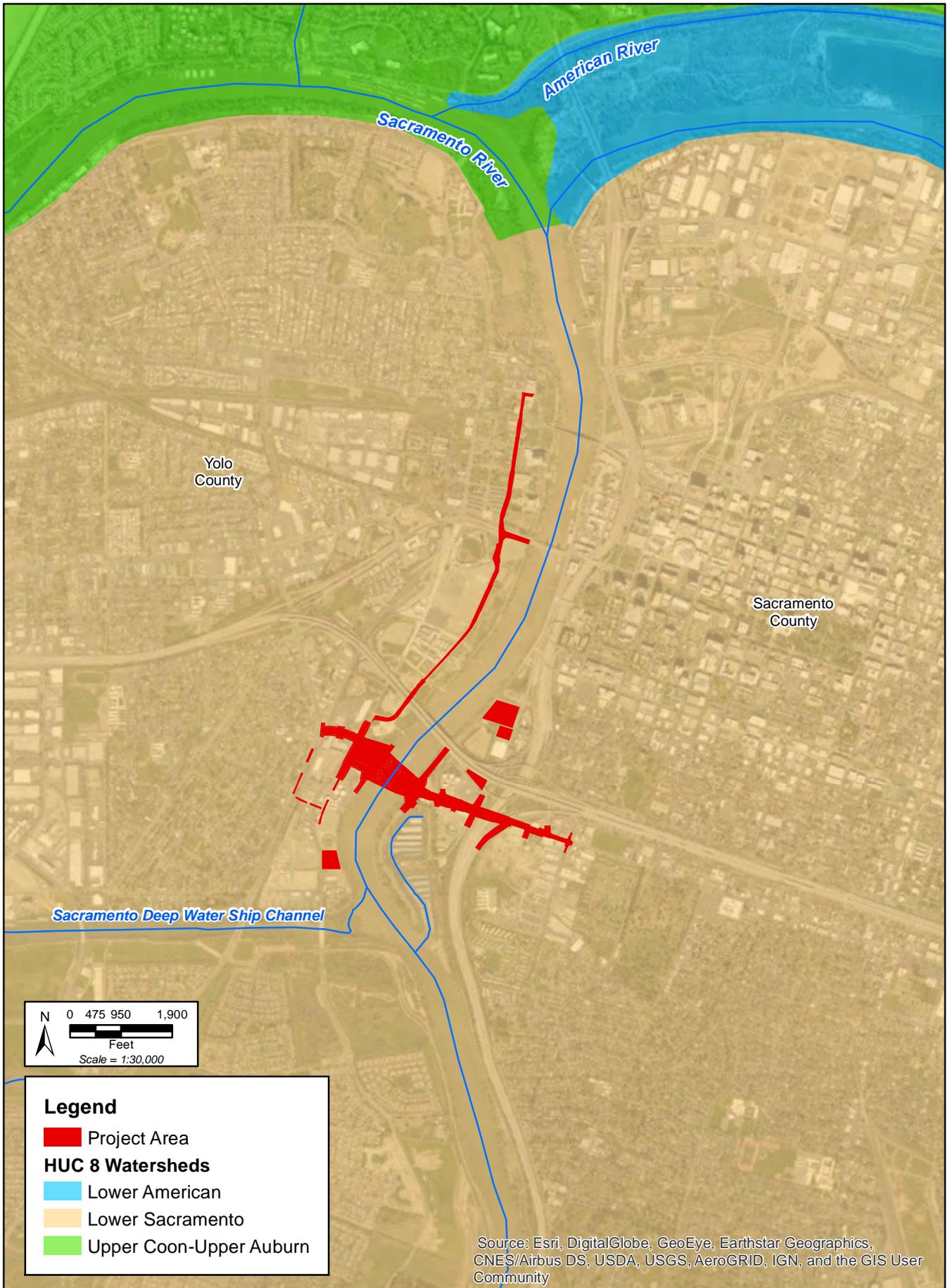
Source: Western Regional Climate Center 2016

The annual mean temperature is 61.0 °F, with the monthly daily average temperature ranging from 45.7 °F in January to 75.5 °F in July. Summer heat is generally moderated by the “Delta breeze” coming from the Delta and ultimately the San Francisco Bay, and temperatures cool down sharply at night. (Western Regional Climate Center 2012)

3.1.3.2.2 Surface Waters

Sacramento River

The proposed Broadway Bridge crosses the Sacramento River at approximately 2.25 miles downstream of its confluence with the American River. The Sacramento River is the largest river in California. The Sacramento River carries 31% of the State’s total surface water runoff. Primary tributaries to the Sacramento River are the Pit, Feather, and American Rivers. The headwaters of the Sacramento River are in the Klamath Mountains in northern California; the river flows 445 miles before joining the San Joaquin River 40 miles south of the City of Sacramento, which ultimately flows to San Francisco Bay. The Sacramento River, beginning at the I Street Bridge, falls within the legal description of the Delta (California Department of Water Resources 1995). Before development of the Sacramento area, the river had a wide natural floodplain. Today, the river is heavily altered, with hydroelectric and water supply impoundments throughout the course of the river and a network of flood control levees through populated areas. (Sacramento River Watershed Program 2020)



Source: USGS NHD HU 4 - 1802 (2020).

Figure 6
Watersheds and Hydrological Features within the Project Vicinity

The preliminary results of the wetland delineation for the project indicate that the location of the ordinary high-water mark (OHWM) in the Sacramento River was based on the elevation of 19 feet National Geodetic Vertical Datum (NGVD), or mean sea level. Observations in the field further confirmed this location based on the presence of shelving, silt deposition, and wracking. The average width of the Sacramento River at the OHWM is approximately 720 feet, and the survey area encompasses 27.759 acres of the river. The channel bottom is a natural substrate, presumably sand and sediment, but water turbidity prevented visual confirmation of the composition. The riverbanks are mostly steeply sloped and support riparian forest vegetation above and below the OHWM, with riprap near the bottom of the slope (ICF 2020).

Storm Drainage System

The City of Sacramento owns and operates a combined sewer system (CSS) that conveys domestic and commercial wastewater and stormwater runoff from downtown Sacramento, East Sacramento, and Land Park areas. The City of Sacramento also owns and operates a separate sanitary sewer system that conveys domestic and commercial wastewater from parts of the city surrounding the CSS to the north, east, and south; the stormwater is carried and discharged directly into local waterways within the Lower Sacramento River watershed. In the City of West Sacramento, stormwater from south of Interstate 80 (I-80) is carried through a system of both surface ditches and pipes. This stormwater ultimately is discharged to the Deepwater Shipping Channel (City of West Sacramento 2003). However, permitted storm drain infrastructure and infrastructure with unknown permit status, is present along the City of West Sacramento's Sacramento River levee south of the proposed bridge (City of West Sacramento 2018a). This suggests that there is stormwater discharge to the Sacramento River. The project area is served by the City of West Sacramento's separate storm water system to the Deepwater Channel and Sacramento River and the City of Sacramento's CSS to the Sacramento River.

3.1.3.2.3 Floodplains

As shown in Figure 7, the eastern side of the proposed Broadway Bridge alternative area is located within 100-year Flood Zone AE. This zone is a FEMA-identified Special Flood Hazard Area (SFHA), an area subject to flooding during the 100-year storm event (1% annual chance of flooding) (Federal Emergency Management Agency 2020). The western side of the channel is protected from the 100-year flood by levees. Development in an SFHA is regulated by federal, state, and local agencies. Flood Zone AE applies to the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood elevations. The segments of the eastern landings and approaches of the proposed Broadway Bridge alternatives are within the 100-year FEMA flood zone; however the majority of the project areas are within a Zone X or unshaded areas within the City of West Sacramento, which are areas subject to minimal flooding that are outside the 500-year flood zone (Federal Emergency Management Agency 2020 and City of West Sacramento 2020). The City of West Sacramento states that while the current designation for the majority of the City's properties in Zone X, WSAFCA officials believe that FEMA will eventually change West Sacramento's flood zone designations from Flood Zone X to something called a Special Flood Hazard Area. Descriptions of flood zone designations are provided in Table 6.

Table 6. FEMA Flood Zone Designations in the Project Vicinity

Zone	Zone Description
AE	Areas with a 1 percent annual chance of flooding. Base flood elevations are determined and shown on FEMA flood maps
Zone C and Zone X (unshaded)	Areas of minimal flood hazard, usually depicted on Flood Insurance Rate Maps as above the 500-year flood level. Zone X is the area determined to be outside the 500-year flood and protected by levee from the 100-year flood.

As required by the CVFPB, levees within urban areas of the Central Valley need to be able to provide for a 200-year flood event level of protection. The proposed project is located within the Lower Sacramento Regional Work Group of the CVFMP Lower Sacramento and Delta North Regional Flood Management planning area. The Lower Sacramento and Delta North Regional Working Group has branded itself as FloodProtect and released their RFMP in July 2014.

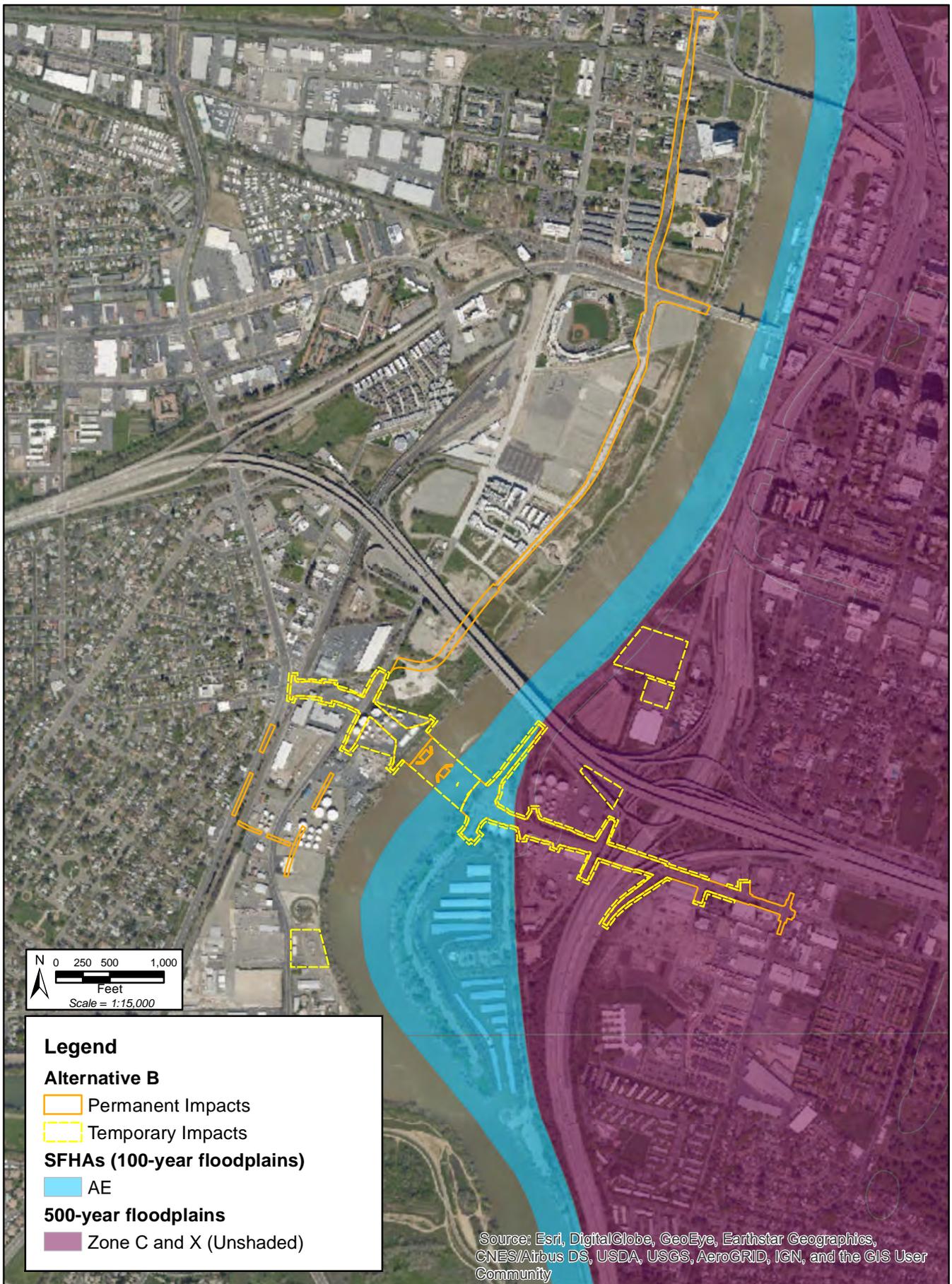
Both Sacramento and West Sacramento have a history of serious flooding, beginning in the 1800's when the City of Sacramento was founded and continuing until the 1986 Folsom Dam flood. Prior to development, the area would have been flooded by seasonal runoff every year. Following the population growth in the area, flood control levees, weirs, and dams were constructed to protect the area from flooding. SAFCA is the responsible agency for maintaining flood protection along the Sacramento River (California Department of Water Resources 2010).

The Lower Sacramento River/Delta North Flood Management Planning Region contains multiple flood control facilities—both locally-owned and operated and State-owned and operated through the State Plan of Flood Control (SPFC). The closest SPFC facility to the project site is the Sacramento Weir, located on the Sacramento River just upstream of the confluence of the Sacramento and American Rivers. This structure allows excess water to be discharged into the Yolo Bypass via the Sacramento Bypass and to reduce pressure on downstream levees during high flows. Both the Sacramento and American Rivers are surrounded by SPFC levees. The Sacramento River Bank Protection Project (SRBPP) was initiated to evaluate the levees bordering the river and reduce stream bank erosion along the levees to minimize the threat of a flood along the Sacramento River. The USACE, Sacramento District is responsible for implementation of the project in conjunction with its non-federal partner, the CVFPB.

3.1.3.2.4 Municipal Supply

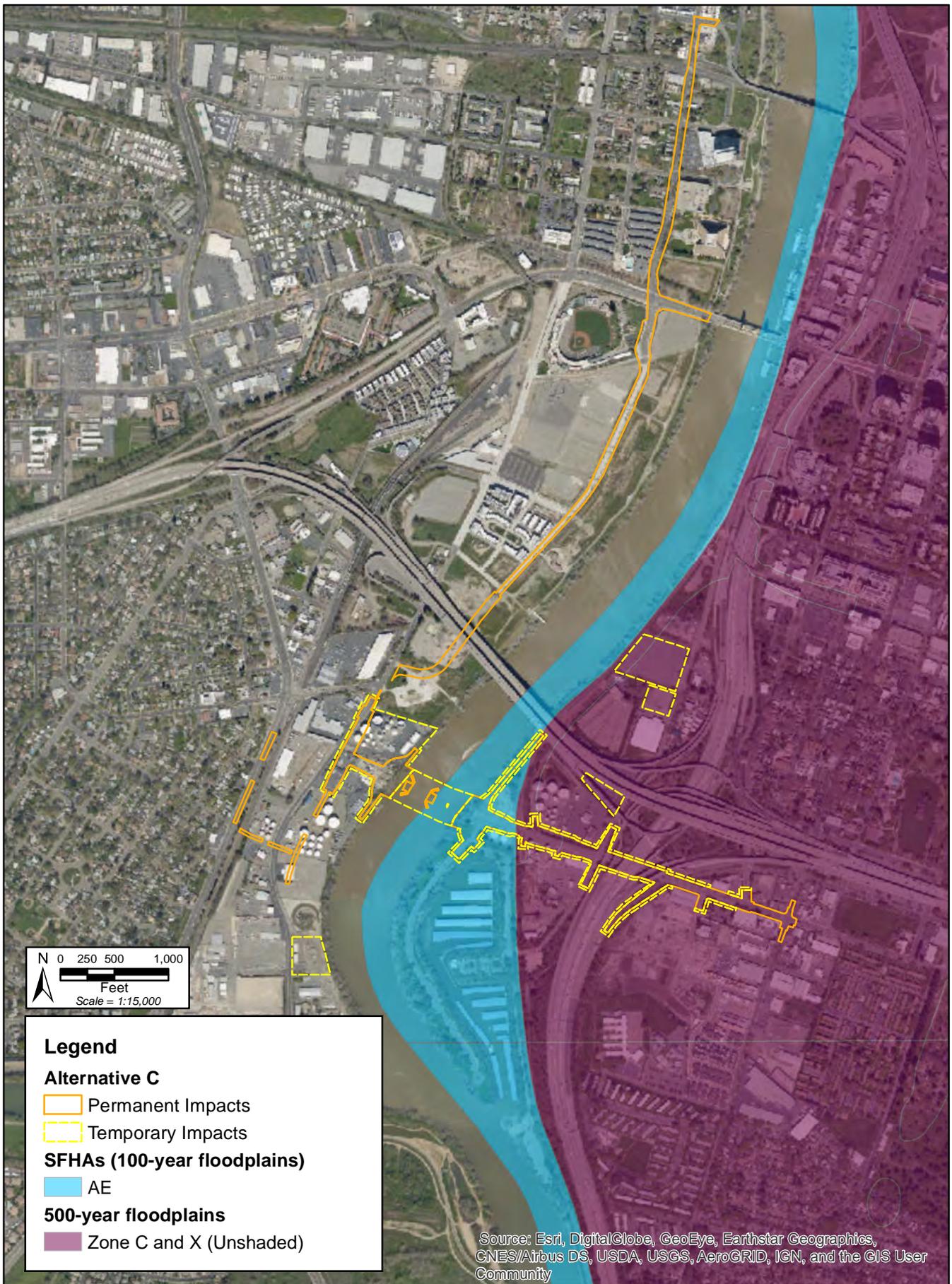
The main source of drinking water for the City of West Sacramento is the Sacramento River. The surface water intake structure is located at Bryte Bend upstream of the confluence of the Sacramento and American Rivers. In addition to surface water, the City of West Sacramento operates two groundwater wells that primarily provide water during emergencies, such as drought periods. Water is treated to drinking water quality at the George Kristoff Water Treatment Plant (previously known as the Bryte Bend Water Treatment Plant) (City of West Sacramento 2018b).

City of Sacramento drinking water comes from two main sources: surface water from the American and Sacramento Rivers (84% of total supply) and groundwater (16% of total supply).



Source: FEMA Portal 2019

Figure 7a
FEMA Flood Zones in Alternative B Project Area



Source: FEMA Portal 2019

Figure 7b
FEMA Flood Zones in Alternative C Project Area

Sacramento has two intake structures, one located on the American River and one located on the Sacramento River. Each feeds water to the E.A. Fairbairn Water Treatment Plant on the American River and the Sacramento River Water Treatment Plant on the Sacramento River (City of Sacramento 2015).

Many groundwater wells exist within the Sacramento Valley basin, and most are used to supply individual domestic demands or small agricultural operations. The basin has an extensive system of both shallow and deep aquifers, which the county depends on for domestic and agricultural water supply. Recent droughts indicate that water supplies in Sacramento Valley are vulnerable to overdraft.

3.1.3.3 Groundwater Hydrology

Regional Groundwater Hydrology

The project site is within the larger Sacramento Valley Groundwater Basin. Each approach (or landing) of the proposed Broadway Bridge is located within a different subbasin. The eastern landing of the Broadway Bridge is within the South American Subbasin, whereas the western landing is within the Yolo Subbasin.

The South American Subbasin is bounded on the east by the Sierra Nevada, on the west by the Sacramento River, on the north by the American River, and on the south by the Cosumnes and Mokelumne Rivers. The subbasin is recharged by subsurface inflow from American River percolation and by precipitation on the valley floor. Groundwater levels declined consistently from the 1960's to 1980's but recovered by 2004, except for some wells within the vicinity of the City of Sacramento (California Department of Water Resources 2004a). Currently, there are four areas in the subbasin that are considered groundwater decline areas and two areas of groundwater recharge (Sacramento Central Groundwater Authority and GEI Consultants 2016).

Several sites of significant groundwater quality impairment are within the South American Subbasin, including three EPA Superfund sites: Aerojet, Mather Field, and the Sacramento Army Depot. Other sites with groundwater quality impairment are the Kiefer Boulevard Landfill, an abandoned Pacific Gas & Electric Company site on Jibboom Street near Old Sacramento, and the Southern Pacific and Union Pacific Rail Yards in downtown Sacramento, located adjacent to the project site (California Department of Water Resources 2004a).

The Yolo Subbasin is bounded on the east by the Sacramento River, on the west by the Coast Ranges, on the north by Cache Creek, and on the south by Putah Creek. Similar to the South American Subbasin, the subbasin is recharged by subsurface inflow from American River percolation and by precipitation on the valley floor. During periods of drought, groundwater levels decline, but long-term trends do not indicate any significant decline in water levels—except for localized pumping depressions in the vicinity of the Davis, Woodland, and Dunnigan/Zamora areas (California Department of Water Resources 2004b). Groundwater quality in the Yolo Subbasin is generally considered to be good for both agricultural and municipal uses, even though the water is hard to very hard overall (California Department of Water Resources 2004b).

The primary source of groundwater recharge for both subbasins is applied irrigation water and direct rainfall. Recharge of aquifers typically occurs along the streambeds of creeks and canals. Recharge occurs naturally and also through reservoir releases, which can be used as effective conjunctive water use facilities to minimize groundwater overdraft and land subsidence.

Local Groundwater Hydrology

Groundwater is expected to vary seasonally. The information contained in this section concerning local groundwater hydrology is based on a previous study for the I Street Bridge Replacement Project approximately 1.5 miles upstream of the proposed Broadway Bridge Project (GEI Consultants 2014). It is assumed that due to similar proximity to the Sacramento River and each other that the I Street Bridge Replacement study would serve as an adequate proxy for the current proposed project.

During the I Street Bridge Replacement Project study, groundwater was encountered during previous drilling explorations at a depth of approximately 15 to 25 feet below ground surface (an elevation ranging from approximately 0 to 5.5 feet NSVD88) (GEI Consultants 2014).

Groundwater levels can vary over time in response to environmental, seasonal, and land use changes. For this reason, groundwater levels at the time of construction or in the future could differ from those indicated in previous boring logs (GEI Consultants 2014).

3.1.4 Geology/Soils

3.1.4.1 Regional Geology/Soils

Sacramento and the project site are situated within the Great Valley geomorphic province of California. The Great Valley is a gently-sloping to flat alluvial plain east of the Coast Ranges and west of the Sierra Nevada. It is a northwest-trending structural trough that was formed by the westward tilting of the Sierra Nevada block.

3.1.4.2 Local Soils

According to the NRCS Web Soil Survey (2019), the upper 5 feet of the project site is underlain by soils assigned to the following types.

- Urban land (Sacramento County)
- Lang sandy loam (Yolo County)

Based on the preliminary Geotechnical and Foundation Report for the I Street Bridge Replacement Project, the structure and composition of subsurface soils along the west side of the river were sampled during levee evaluations on the crest and in the vicinity of the West Sacramento levee (GEI Consultants 2014). The analysis found approximately 15 feet of loose sand and silt in the embankment, which was underlain by an approximately 9-foot layer of clay, followed by an approximately 16-foot layer of sandy silt, and then a 35-foot layer of sand and silt. On the east end of the river embankment, core samples found approximately 6 feet of loose sand with silt underlain by approximately 10 feet of loose sand, followed by approximately 50 feet of sand and silt, which is underlain by an approximately 23-foot layer of medium-dense to very-dense gravel, followed by a clay layer.

3.1.4.3 Soil Erosion Potential

Extensive erosion has occurred from the Sacramento River and tributaries that run across the Central Valley toward the Delta. The banks of the Sacramento River channel are particularly vulnerable to erosion during high winter flows. In 1960, SRBPP was authorized to help prevent erosion of the Sacramento River banks. The SRBPP evaluates the levees bordering the river to reduce stream bank erosion along the levees and minimize the threat of a flood along the Sacramento River. The USACE, Sacramento District is responsible for implementation of the SRBPP in conjunction with its non-federal partner, the CVFPB (U.S. Army Corps of Engineers 2020).

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised USLE (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion, in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). The value of K at the project site is 0.24 (NRCS data acquired through the State Water Board). Therefore, the potential for erosion at the site is moderate. See Attachment A.

3.1.5 Biological Communities

Historically, the Sacramento River was home to a multitude of avian and aquatic species. Development has drastically reduced the size of these populations. Today, the Sacramento River Basin continues to provide habitat for a variety of fish and wildlife but not at the same population sizes as historical conditions. This section provides an overview of existing biological resources in the project vicinity.

The health of the Sacramento River and its tributaries is critical for the survival of anadromous fish species such as Chinook salmon, steelhead, and sturgeon. Rivers and streams in the upper watersheds are vital for coldwater fish such as native trout. Located along the Pacific Flyway, the marshlands in the Sacramento Valley continue to be an important stop for migrating waterfowl. Both migratory and resident species rely on the state and federal wildlife refuges that exist throughout the Sacramento Basin and on the vast area of irrigated agricultural land.

The Yolo Bypass Wildlife Area is the closest wildlife refuge approximately 6 miles west of the proposed project, on I-80 at the Yolo Causeway between Davis and West Sacramento.

3.1.5.1 Aquatic Habitat

Special-Status Species

Table 7 presents the special-status species that could be found in the project area. Field assessments were conducted at the project site to determine presence of suitable habitat (ICF 2020).

Table 7. Special-Status Wildlife and Fish Known or with Potential to Occur in the Project Area, or That May Be Affected by the Proposed Project

Common Name	Scientific Name
Fish	
Green sturgeon	<i>Acipenser medirostris</i>
White sturgeon	<i>Acipenser transmontanus</i>
Pacific lamprey	<i>Entosphenus tridentata</i>
Delta smelt	<i>Hypomesus transpacificus</i>
Western river lamprey	<i>Lampetra ayresi</i>
Sacramento hitch	<i>Lavinia exilicauda exilicauda</i>
Hardhead	<i>Mylopharodon conococephalus</i>
Central Valley Steelhead	<i>Oncorhynchus mykiss</i>
Chinook, Central Valley spring run	<i>Oncorhynchus tshawtscha</i>
Chinook, Sacramento River winter run	<i>Oncorhynchus tshawtscha</i>
Chinook, Central Valley fall/late fall run	<i>Oncorhynchus tshawtscha</i>
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>
Longfin smelt	<i>Spirinchus thaleichthys</i>
Invertebrates	
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>
Reptiles	
Western pond turtle	<i>Emys marmorata</i>
Birds	
Swainson's hawk	<i>Buteo swainsoni</i>
White-tailed kite	<i>Elanus leucurus</i>
Mammals	
Pallid bat	<i>Antrozous pallidus</i>
Western red bat	<i>Lasiurus blossevillii</i>

Source: US Fish and Wildlife Service 2019.

Stream/Riparian Habitats

Riparian habitat exists on both the eastern and western banks of the Sacramento River. This riparian habitat is predominantly Cottonwood riparian forest consisting of Fremont's cottonwood, salix species, valley oak, black locust, box elder, white alder, California black walnut, and western sycamore. The understory on the waterside of the levee is primarily riprap with non-native grasses and forbs and some patches of narrow leaf willow and Himalayan blackberry (ICF 2020).

Perennial stream habitat exists on site as the Sacramento River and consists of unvegetated open water.

Wetlands

According to the U.S. Code of Federal Regulations, Title 40, Part 230, entitled “Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material,” special aquatic sites are defined as the following.

- Sanctuaries and refuges
- Wetlands
- Mud flats
- Vegetated shallows
- Coral reefs
- Riffle and pool complexes

Within the project area, there is no history of wetland habitat based on a preliminary wetland delineation.

Fish Passage

The Sacramento River is wide and deep and provides unimpeded passage for adult and juvenile migratory and resident fish species in the project area. The Sacramento River in the project area falls within the Sacramento-San Joaquin Province (Central Valley Subprovince), one of six aquatic zoogeographic provinces in California, as defined by Moyle (2002). The Sacramento-San Joaquin Province is drained by the Sacramento and San Joaquin Rivers. Based on its geographic location, the the project area lies at the interface between the zone characterized by the deep-bodied fish assemblage and the Sacramento-San Joaquin Estuary (i.e., the Delta).

The Sacramento River in the project area also serves as Essential Fish Habitat for Pacific salmon (Chinook).

3.2 Water Quality Objectives/Standards and Beneficial Uses

3.2.1 Surface Water Quality Objectives/Standards and Beneficial Uses

Beneficial uses represent the services and qualities of a water body (i.e., the reasons the water body is considered valuable). Water quality in a typical surface water body is influenced by processes and activities that take place within the watershed. Because of the urbanized nature of the project vicinity, surface water quality in the project area is directly affected by storm water runoff from adjacent streets; highways; and properties using fertilizers, pesticides, metals, hydrocarbons, and other pollutants. Typically, pollutant levels in the ocean are highest following the first storm flows of the season, when constituents accumulated during the dry season are flushed into the river.

The project is within the the legal boundaries of the San Joaquin Sacramento Delta as the most upstream reach of the Sacramento River. The Central Valley Regional Water Board Basin Plan has delineated region-wide and water body-specific beneficial uses and has set numeric and narrative water quality objectives for several substances and parameters in numerous surface waters in its region. Beneficial uses designated in the Basin Plan for the Sacramento River downstream of the I Street Bridge are shown in Table 8.

Table 8. Designated Beneficial Use for the Sacramento San Joaquin Delta (Sacramento River)

Water Body	Designated Beneficial Use
Sacramento San Joaquin Delta (Sacramento River)	Municipal and domestic supply, agricultural (irrigation), agricultural (stock watering), industry process, industry service supply, contact recreation, non-contact recreation, warm freshwater habitat, cold freshwater habitat, warm freshwater fish migration, cold freshwater fish migration, warm freshwater fish spawning, wildlife habitat, navigation

3.2.2 Groundwater Quality Objectives/Standards and Beneficial Uses

Beneficial uses of groundwater are designated in the Central Valley Regional Water Board Basin Plan. Unless otherwise designated, all groundwater in the Sacramento Valley is considered suitable, or at a minimum potentially suitable, for the following beneficial uses (Central Valley Regional Water Quality Control Board 2018).

- Municipal and domestic (MUN)
- Agricultural (AGR) – irrigation (IRR) and stock watering
- Industrial process (PROC)
- Industrial service supply (IND)
- Existing water quality

3.3 Regional Water Quality

Water in the Sacramento River Basin is generally considered to be relatively clean and acceptable for a variety of beneficial uses. Because most of the water in the Sacramento River and its major tributaries, such as the Feather and American Rivers, is derived from melting snow that enters the rivers by managed discharges of water from reservoirs, much of the Sacramento River and its large tributaries have low concentrations of dissolved minerals. Although water quality of the Sacramento River is good most of the year, seasonal events – such as agricultural runoff or runoff from historical mining operations – may affect this quality. Some water quality concerns related to these events are listed below (Sacramento River Watershed Program 2020).

- Erosion of stream channels and uplands, and increased turbidity and changes in sediment deposition patterns.
- Rising water temperatures from the loss of riparian canopy cover, streamflow diversion, and waste discharges.
- Mercury and methylmercury levels from legacy mining sites that can be absorbed into and accumulate in the aquatic food chain.
- Aquatic toxicity from agricultural chemical use, including organophosphate pesticides in the Sacramento Valley.

3.3.1 List of Impaired Waters

The proposed project is located along a reach of the Sacramento River that falls within both the Sacramento River (Knights Landing to the Delta) segment and Delta waterways (northern portion) segment for classifying impaired waters. Table 9 shows Section 303(d)-listed impairments for the Sacramento River based on the 2012 California Integrated Report (State Water Resources Control Board 2015)

Table 9. Section 303(d)-Listed Impairments for the Sacramento River and Delta Waterways

Reach	Section 303(d)-Listed Impairments	Source	TMDL Completion
Sacramento River (Knights Landing to the Delta)	Chlordane	n/a	2021
	DDT (Dichlorodiphenyltrichloroethane)	n/a	2021
	Dieldrin	n/a	2022
	Mercury	Resource extraction	2012
	PCBs (Polychlorinated biphenyls)	n/a	2021
	Unknown Toxicity	n/a	2019
Delta Waterways (northern portion)	Chlordane	n/a	2011
	DDT	n/a	2011
	Dieldrin	n/a	2011
	Group A Pesticides	n/a	2011
	Invasive Species	n/a	2011
	Mercury	Resource extraction	2009
	PCBs	n/a	2019
	Unknown Toxicity	n/a	2019

3.3.2 Construction General Permit Risk Level Assessment

Beneficial uses and status of impaired water bodies are used to determine permit requirements. A construction site risk level assessment was performed for the project SWPPP, with a resultant Risk Level 2 (medium level). The risk level was determined based on the procedure described in the Construction General Permit and based on two major elements: (1) project sediment risk (the relative amount of sediment that can be discharged, given the project and location details); and (2) receiving water risk (the risk that sediment discharges pose to the receiving waters). Project sediment risk is determined by multiplying the R, K, and LS factors from RUSLE to obtain an estimate of project-related bare ground soil loss expressed in tons/acre. Receiving water risk is based on whether a project drains to a sediment-sensitive water body. A sediment sensitive water body is on the most recent Section 303d list for water bodies impaired for sediment; has a U.S. EPA approved TMDL implementation plan for sediment; or has the beneficial uses of COLD,

SPAWN, and MIGRATORY. More details on how the risk level was determined are provided in Attachment A.

Tables 10 and 11 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

Table 10. Summary of Sediment Risk

RUSLE Factor	Value	
R	117	EPA website: https://www.epa.gov/sites/production/files/2015-10/documents/fact3-1.pdf
K	0.24	SWRCB K GIS files: ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/
LS	0.52	SWRCB LS GIS files: ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/
Total predicted sediment loss (tons/acre)		14.6
Overall Sediment Risk Low sediment risk = < 15 tons/ acre Medium sediment risk = > 15 and < 75 tons/acre High sediment risk >= 75 tons/acre		<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

RUSLE = Revised Universal Soil Loss Equation

Table 11. Summary of Receiving Water Risk

Receiving Water Name	303(d) Listed for Sediment-Related Pollutant*	TMDL for Sediment-Related Pollutant*	Beneficial Uses of COLD, SPAWN, and MIGRATORY*
Sacramento River	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Overall receiving water risk			<input type="checkbox"/> Low <input checked="" type="checkbox"/> High

* If "yes" is selected for any option, the receiving water risk is high

3.3.3 Areas of Special Biological Significance

The proposed project is not within the vicinity of an Area of Special Biological significance, as designated by the State Water Board (State Water Resources Control Board 2017).

4. ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter describes potential impacts on hydrology and water quality that could result from the proposed project. Construction activities may result in short-term impacts, such as the input of sediment loads and spills into water bodies. Long-term impacts include the increased potential for polluted runoff into water bodies. The chapter identifies the impacts of the project to the extent that they are reasonably foreseeable given the general level of project detail that is available at this time. Figures 2, 3, and 4 show the proposed bridge project alternatives and associated roadway alternatives.

4.2 Potential Impacts to Water Quality

The WQAR describes project-induced effects on water quality. For the purpose of this report, an impact is considered adverse if the proposed project would result in any of the following.

- Violate water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation onsite or offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to inundation by seiche or tsunamis.

Short-term or temporary construction impacts on water quality have the potential to occur during grading and construction related to the proposed Broadway Bridge and associated roadway modifications. Potential sources of water pollution associated with the project include storm

water runoff containing sediment from soil erosion, petroleum and wear products from motor vehicle operation, and accidental spills of hazardous materials during construction activities. Contaminants in runoff from the new bridge could include sediment, oils and grease, and heavy metals. Implementation of commonly used construction activity best management practices (BMPs) is anticipated to minimize any potential impacts on water quality to the maximum extent practicable. Post-project drainage would be designed so as not to be altered from pre-project drainage, and drainage would be directed to the storm drain system.

4.2.1 Anticipated Changes to the Physical/Chemical Characteristics of the Aquatic Environment

4.2.1.1 Substrate

In-channel construction and maintenance activities for the proposed bridge may alter the structure and composition of the river bed (or substrate). In-water construction work such as installation of temporary cofferdams and pile driving would disturb the bottom substrate over the stiff clay layer in the Sacramento River channel, which could remobilize sediments as well as contaminants adsorbed to the sediments. Non-soluble contaminants with a tendency to adsorb to sediments (as opposed to soluble contaminants, which have the tendency to be readily diluted in water) can accumulate in the substrate over time. Non-soluble contaminants that are known to be present in the Sacramento River include polychlorinated biphenyls (PCBs), mercury, pesticides and insecticides (i.e., dieldrin, chlorodane, DDT), and other unknown toxicities (State Water Resources Control Board 2011). The resuspension of contaminants found in bottom substrate can remobilize these contaminants and release them into the water column, degrading water quality. In addition, resuspended particulate material could be transported to other locations in the Sacramento River as a result of flow patterns and tidal currents, thus leading to potential degradation of water quality beyond the immediate project area.

4.2.1.2 Currents, Circulation or Drainage Patterns

The proposed project would modify existing drainage patterns due to the proposed paving and the construction of a new bridge with new outfalls at the base of the piers. The project may also modify the water volume, depth, and flow rate. The project would also establish a new storm drainage system to convey road runoff. As discussed in section 3.1.3.2 *Local Hydrology*, the Sacramento River is the receiving waterbody for the project watershed.

Proposed Bridge

Based on the hydrologic study of the I Street Bridge Replacement Project conducted along this segment of the Sacramento River, it is likely that the proposed bridge would cause a negligible increase in the peak water surface elevation (WSE) immediately upstream and a negligible decrease in WSE immediately downstream for all three flood events evaluated (50-year, 100-year, and 200-year). The I Street Bridge Replacement Project estimated the increase in the WSE to be 0.02 feet and the decrease to be 0.06 to 0.07 feet (GEI Consultants 2014).

Roadway Modifications

During construction, as is standard with all construction projects, the contractor would be required to install temporary BMPs to protect existing drainage inlets and storm drain systems and to control any runoff or erosion from the project site that may discharge into the surrounding waterways.

During operation, new impervious surface and changes in topography could alter surface runoff drainage patterns and river flows. However, project drainage is considered in the design and the proposed roadway drainage would be conveyed in new storm drain systems in the City of West Sacramento and the City of Sacramento. Drainage from the bridge itself would be directed to drains located on the bridge and routed to the abutment discharge points.

4.2.1.3 Suspended Particulates (Turbidity)

During construction, potential short-term increases in turbidity would result from soil erosion and suspended solids being introduced into the Sacramento River, from both in-water and land construction activities. This could violate water quality standards or WDRs related to turbidity and have the potential to result in physiological, behavioral, and habitat effects on aquatic life (ICF 2020).

Proposed Bridge

In-water construction activities in the Sacramento River would directly disturb sediment along the river bed and result in a temporary increase in turbidity in the immediate project area and potentially downstream. The potential for disturbance of riverbed sediments and associated increases in sedimentation and turbidity in the Sacramento River are anticipated to be greatest during removal of temporary trestles, cofferdams, and steel piles used to anchor barges required for in-water work during bridge construction. These activities would result in greater disturbance to riverbed sediments than would occur during pile driving for installation of piers and the bridge fender system; these piles would be driven only and not extracted (ICF 2020).

Dewatering may be needed for (1) removal of water from within the cofferdams after they complete pile driving and prior to pouring the concrete inside the pile cage; and/or (2) removal of the water that is displaced as the concrete is poured.

The first instance involves partial or complete dewatering without any new containments. The discharge of turbid water would be prevented by filtering the discharge first using a filter bag, diverting the water to a settling tank or infiltration area, and/or treating the water in a manner to ensure compliance with water quality requirements prior to discharging water back to the Sacramento River. This type of dewatering would occur if the casings were dewatered partially before pouring concrete or if cofferdams are used and dewatering is needed to rescue fish. If casings remain on for a least 1-2 days after the work is completed, sediments would settle in the casings before the casings are pulled.

The second instance requires preventing the discharge of concrete to the Sacramento River by diverting and properly disposing of water displaced from within the cofferdams as concrete is being poured. The water likely would contain uncured concrete. A Limited Threat Discharge Permit would not be needed if the water within the encasements that comes in contact with the

cement is pumped out, placed in a container, and hauled to a hazardous waste facility where it would be properly treated and disposed. However, if it is discharged to the Sacramento River or nearby storm drains, monitoring and treatment of constituents associated with concrete (e.g., pH, hardness) would need to be conducted in compliance with the conditions of the Limited Threat Discharge Permit prior to discharge. If the water is discharged to land, such as to temporary infiltration basins, the project would need to obtain a General Dewatering Permit for Land Discharges.

Roadway Modifications

Construction activities occurring on land adjacent to the river channel could cause erosion of sediments and contribute to short-term increases in turbidity in the river. Land-disturbing activities (e.g., vegetation clearing, excavation, and grading) could result in erosion and subsequent soil deposition to the river, which would increase river turbidity. Table 12 lists the acreages of each land cover type in the biological study area (as described in the NES for the project) that would be permanently or temporarily affected by the proposed project, and Figures 8 and 9 show these areas in a map series for reference. Alternative B would result in slightly less disturbance to Cottonwood Riparian Forest, Perennial Stream, and Landscaped land covers than Alternative C, but approximately 0.8 acre more disturbance to Ruderal land cover type. As a result, there would be approximately 0.2 acre more permanent land disturbance associated with Alternative B.

Table 12. Permanent and Temporary Impacts on Land Cover Types in the Biological Study Area.

Impacts by Alternative	Land Cover Type				
	Cottonwood Riparian Forest	Perennial Stream	Ruderal	Landscaped	Total
<i>Alternative B, Interim Year</i>					
Permanent impact (acres)	1.273	0.948	3.063	4.484	9.768
Temporary impact (acres)	0.625	4.211	1.030	1.286	7.152
<i>Alternative B, Design Year</i>					
Permanent impact (acres)	1.273	0.948	3.069	4.484	9.774
Temporary impact (acres)	0.625	4.211	1.030	1.260	7.126
<i>Alternative C, Interim Year</i>					
Permanent impact (acres)	1.290	1.196	2.248	4.819	9.553

Impacts by Alternative	Land Cover Type				
	Cottonwood Riparian Forest	Perennial Stream	Ruderal	Landscaped	Total
Temporary impact (acres)	1.035	4.254	0.871	1.325	7.485
<i>Alternative C, Design Year</i>					
Permanent impact (acres)	1.290	1.196	2.253	4.819	9.558
Temporary impact (acres)	1.035	4.254	0.871	1.299	7.459

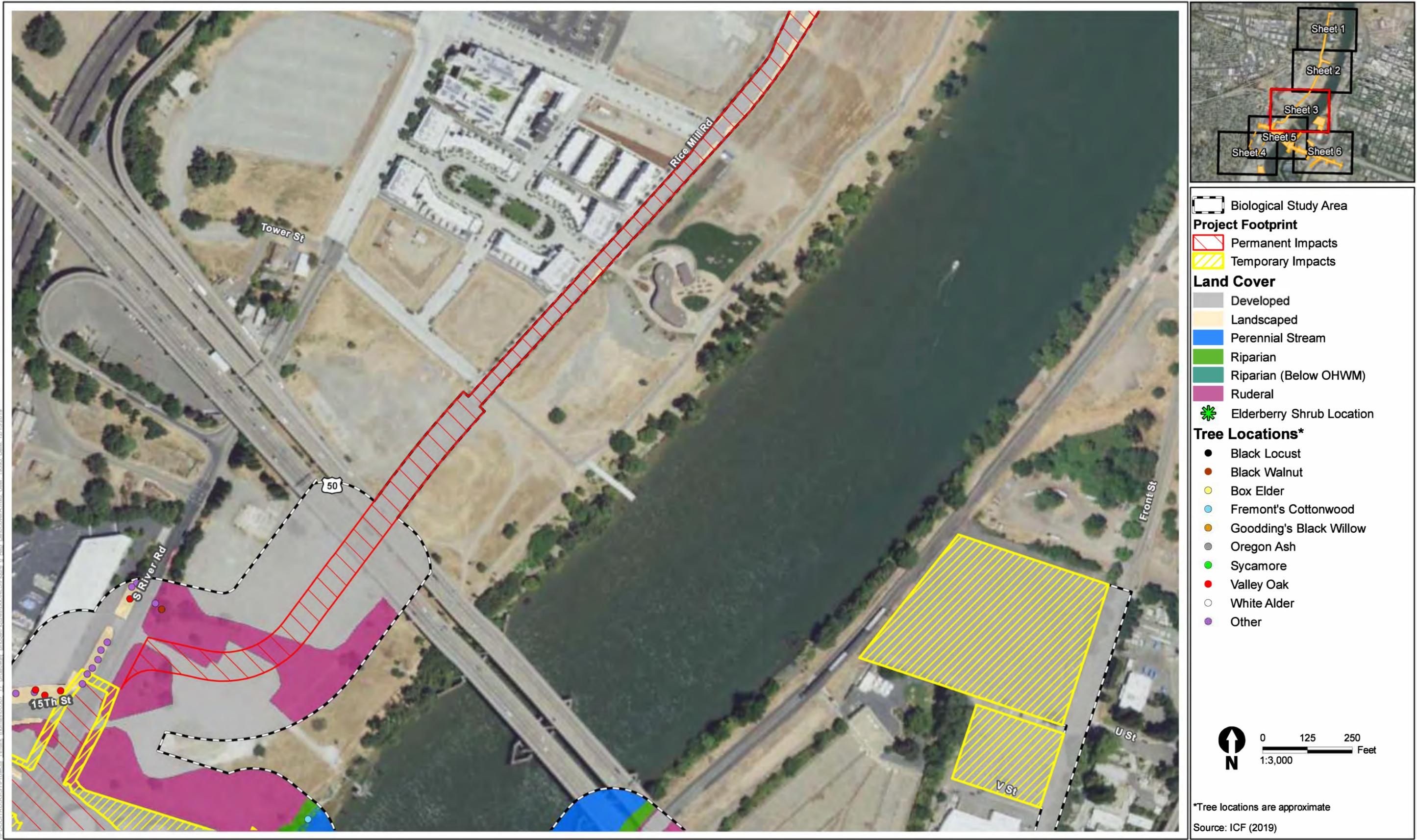
Construction of the proposed project would disturb more than one acre of land. Because the project is on and adjacent to the Sacramento River, Construction General Permit SWPPP erosion and sediment control BMPs would be implemented to prevent or minimize sediment and suspended solids from entering the river.

During operation, long-term water quality impacts could result from changes in stormwater drainage and/or loss of riparian vegetation. Alternative B would result in a permanent loss of 1.06 acre of riparian and landscaped vegetation within the levees (0.53 acre in West Sacramento and 0.53 acre in Sacramento) for RSP and permanent structures. Alternative C would result in a permanent loss of 1.67 acre of riparian and landscaped vegetation within the levees (0.54 acre in West Sacramento and 1.13 acre in Sacramento) for RSP and permanent structures. Vegetation along slopes can help reduce the potential for erosion during rain events.

The proposed project would result in added impervious surface that would have the potential to increase runoff volume to the Sacramento River. Increases in impervious surfaces change the storm hydrograph by increasing flow velocity and the peak and quantity of storm runoff due to reduced natural infiltration (groundwater recharge) and uptake from native soils and vegetation. Further, if periodic maintenance of the bridge were to require in-water work, there would be potential for sediment disturbance and turbidity. The project design will incorporate Construction General Permit SWPPP post-construction measures, site design measures, LID measures, and other permanent erosion control elements found in Caltrans' MS4 program guidance documents, Sacramento Stormwater Quality Partnership's SQIP, and the City of West Sacramento's SWMP, to ensure that storm water runoff minimizes soil erosion. Implementation of these measures would reduce or avoid permanent impacts on water quality.

4.2.1.4 Oil, Grease and Chemical Pollutants

The use of heavy construction equipment or construction-related materials or post-construction roadway operations can introduce pollutants of concern or toxic chemicals to the project site, which has the potential to violate water quality standards or WDRs. In addition, some of these pollutants can accumulate in stream sediments with lethal and sublethal consequences for fish and other aquatic species, particularly during "first-flush" rain events (ICF 2020).



Biological Study Area
Project Footprint
 Permanent Impacts
 Temporary Impacts
Land Cover
 Developed
 Landscaped
 Perennial Stream
 Riparian
 Riparian (Below OHWM)
 Ruderal
✱ Elderberry Shrub Location
Tree Locations*
● Black Locust
● Black Walnut
● Box Elder
● Fremont's Cottonwood
● Goodding's Black Willow
● Oregon Ash
● Sycamore
● Valley Oak
○ White Alder
● Other

↑
N

0 125 250
 Feet
 1:3,000

*Tree locations are approximate
 Source: ICF (2019)



Figure 8c
Alternative B Land Cover and Project Impacts

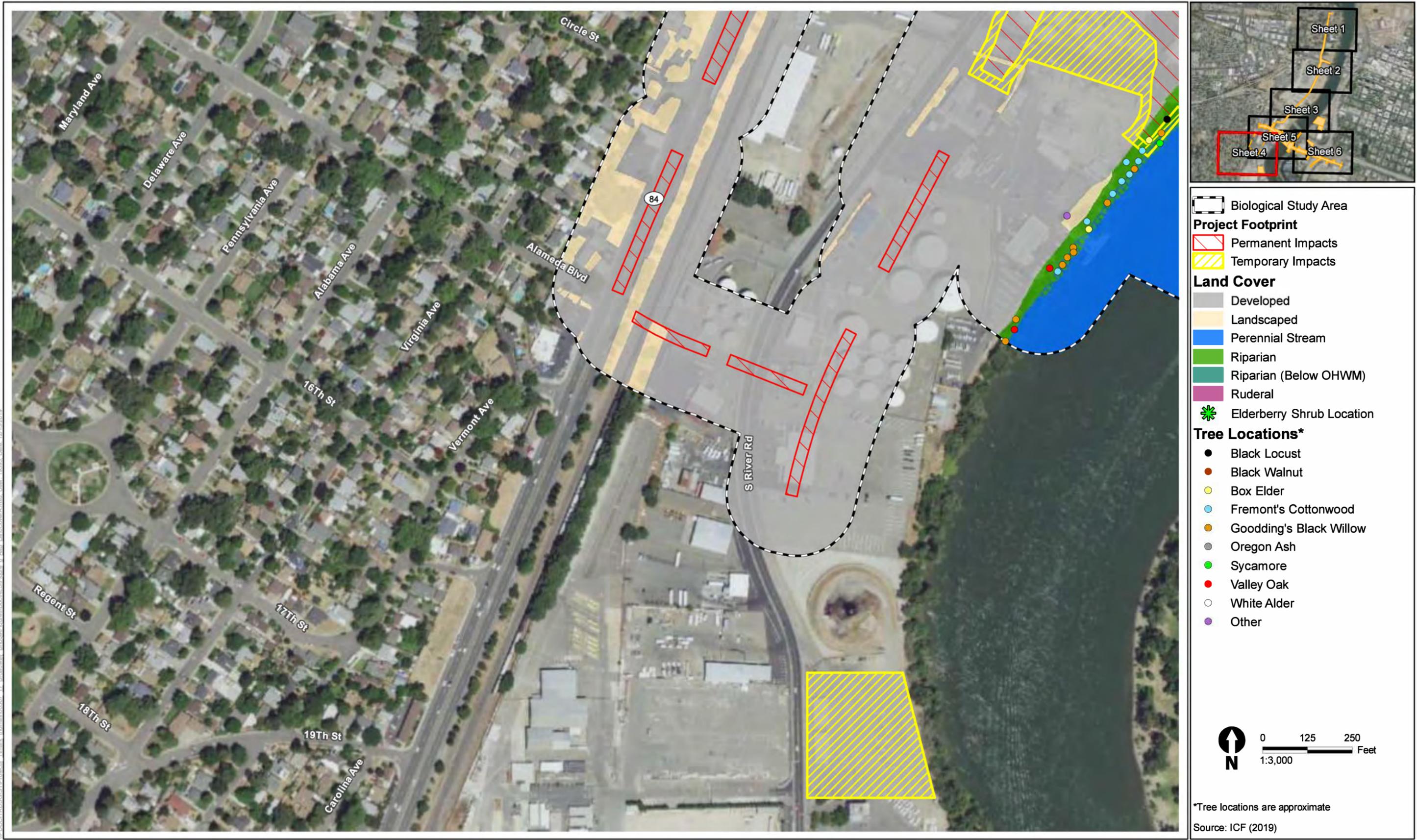


Figure 8d
Alternative B Land Cover and Project Impacts

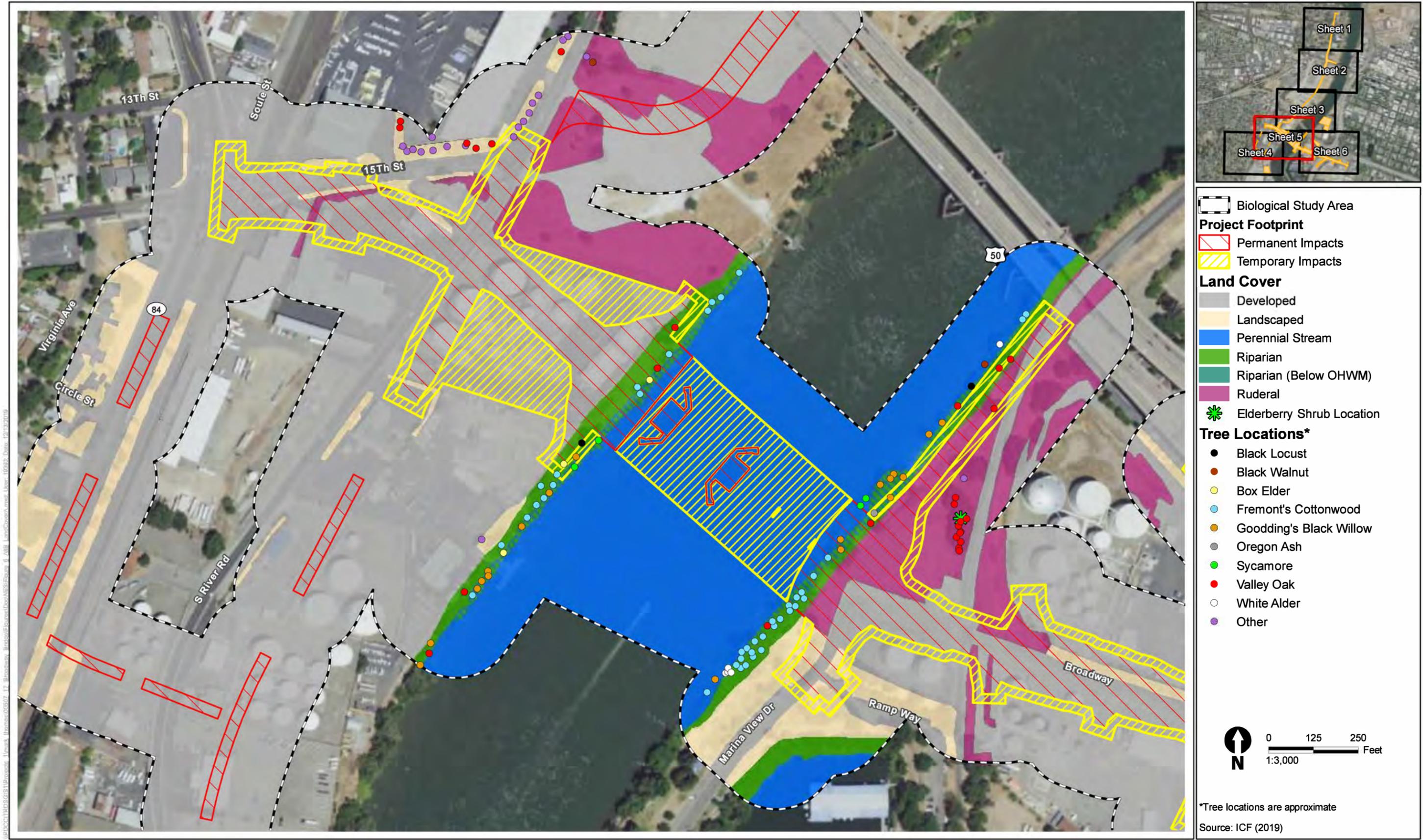
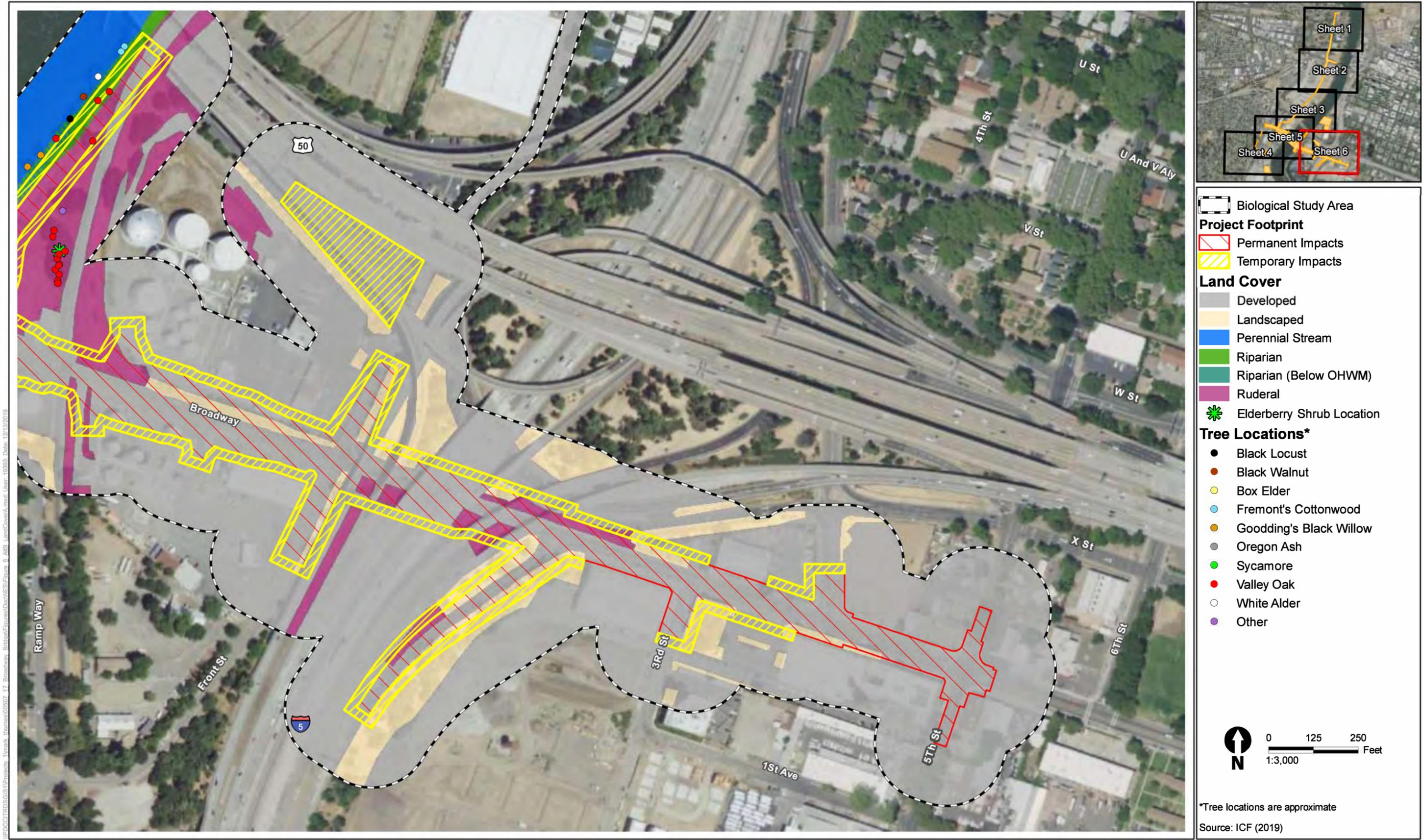


Figure 8e
Alternative B Land Cover and Project Impacts



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Figure 8f
Alternative B Land Cover and Project Impacts

*Tree locations are approximate

Source: ICF (2019)



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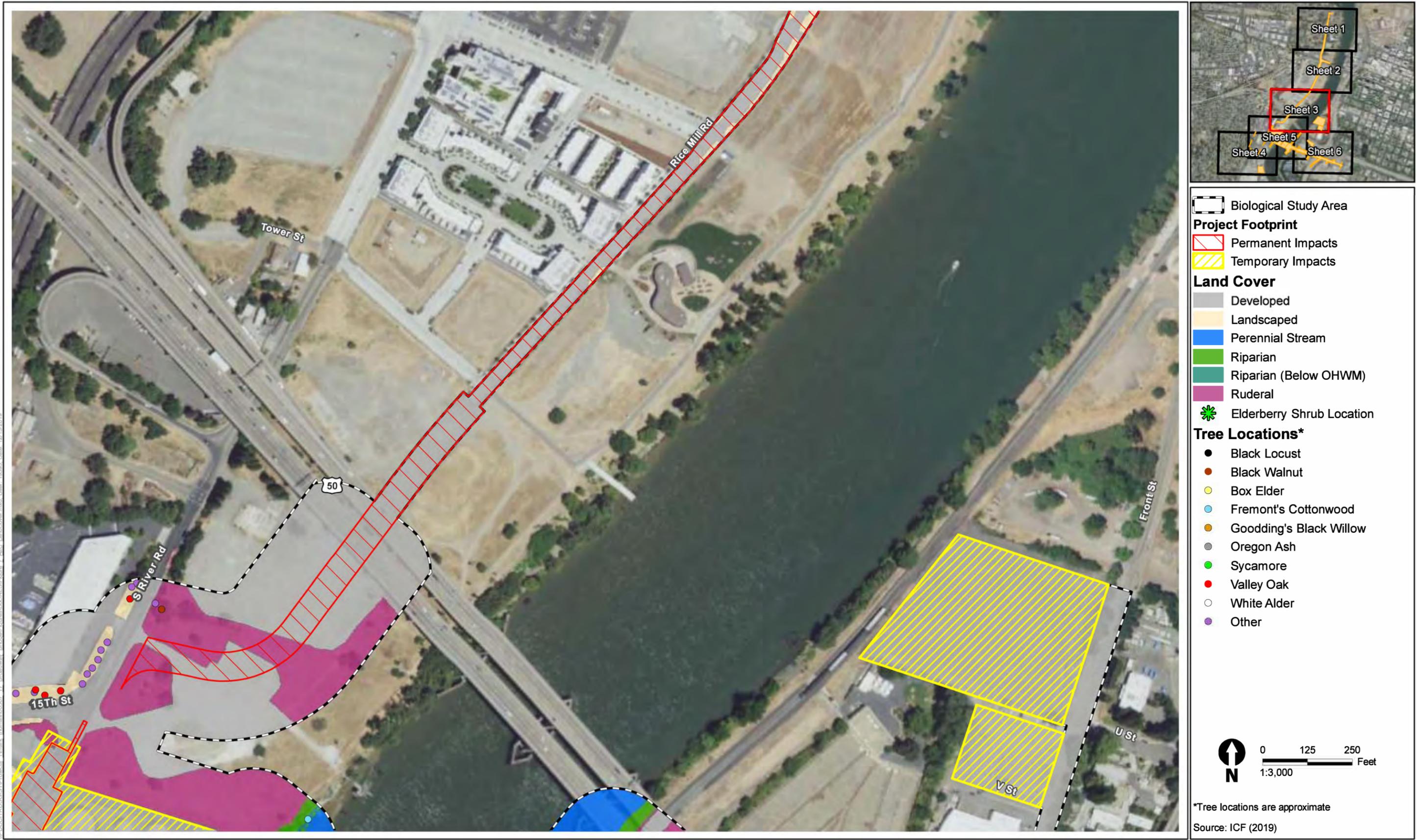


Figure 9a
Alternative C Land Cover and Project Impacts

*Tree locations are approximate
 Source: ICF (2019)



Figure 9b
Alternative C Land Cover and Project Impacts



Biological Study Area

Project Footprint

- Permanent Impacts
- Temporary Impacts

Land Cover

- Developed
- Landscaped
- Perennial Stream
- Riparian
- Riparian (Below OHWM)
- Ruderal
- Elderberry Shrub Location

Tree Locations*

- Black Locust
- Black Walnut
- Box Elder
- Fremont's Cottonwood
- Goodding's Black Willow
- Oregon Ash
- Sycamore
- Valley Oak
- White Alder
- Other

0 125 250 Feet
1:3,000

*Tree locations are approximate
Source: ICF (2019)



Figure 9c
Alternative C Land Cover and Project Impacts

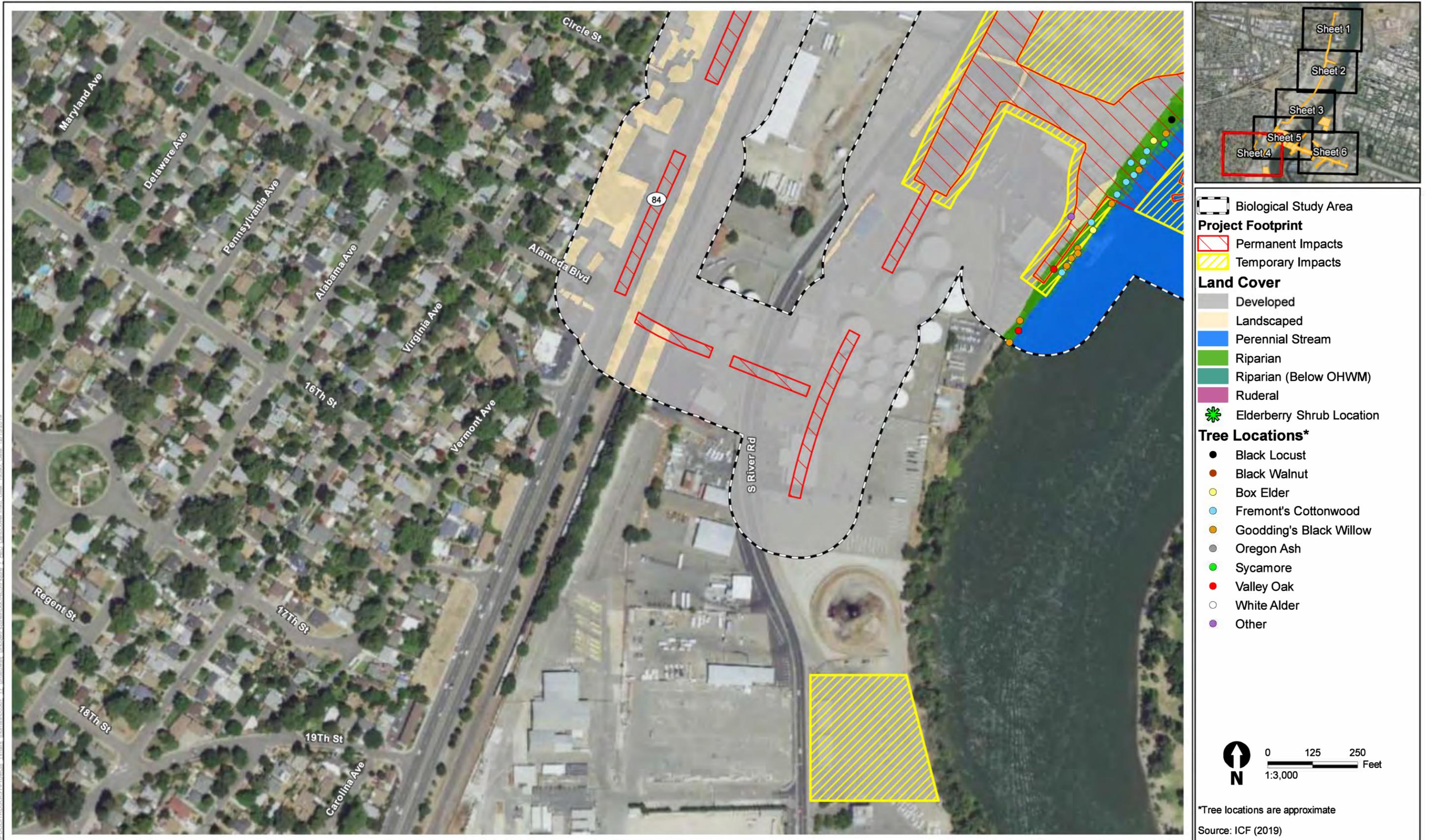
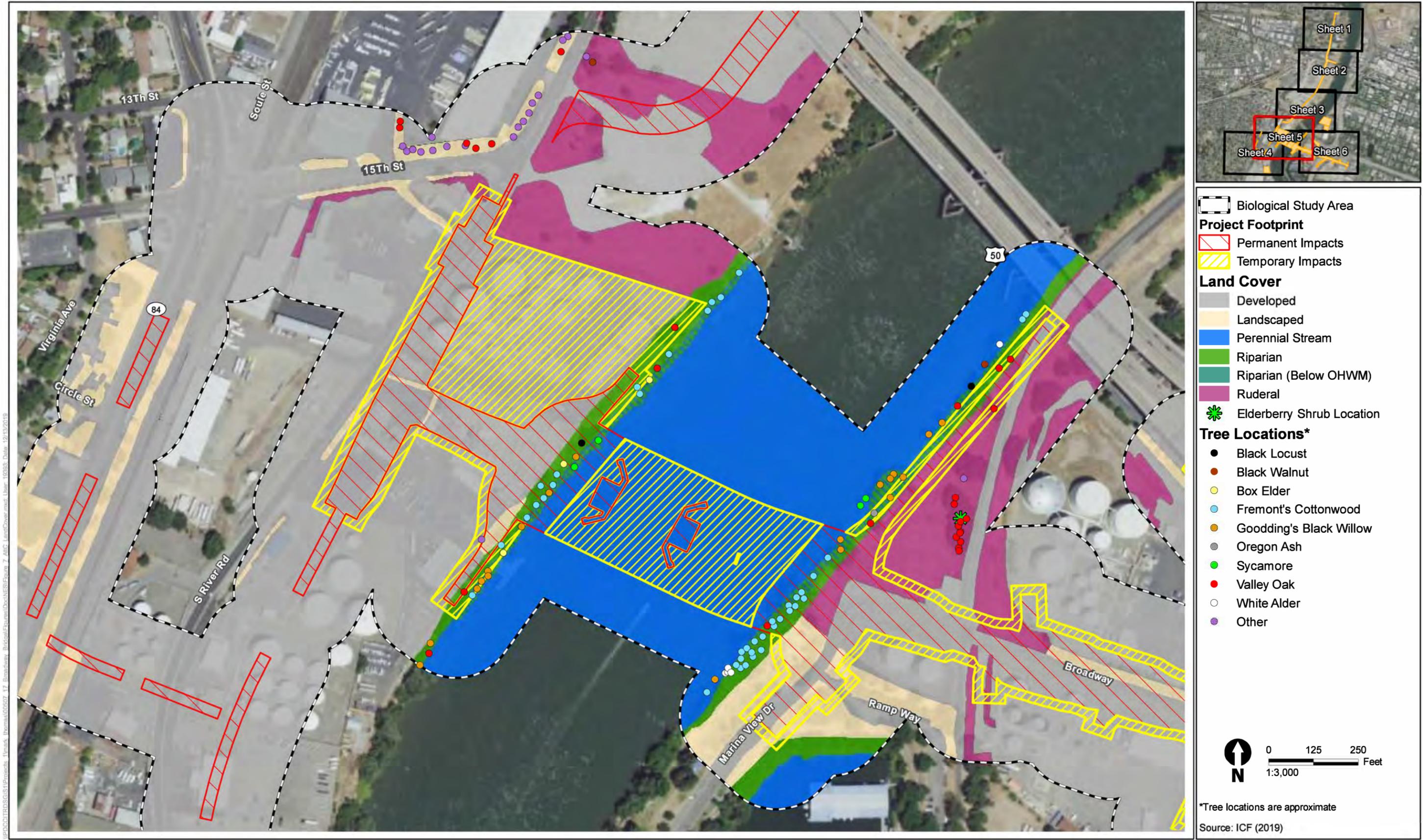


Figure 9d
Alternative C Land Cover and Project Impacts



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Figure 9e
Alternative C Land Cover and Project Impacts

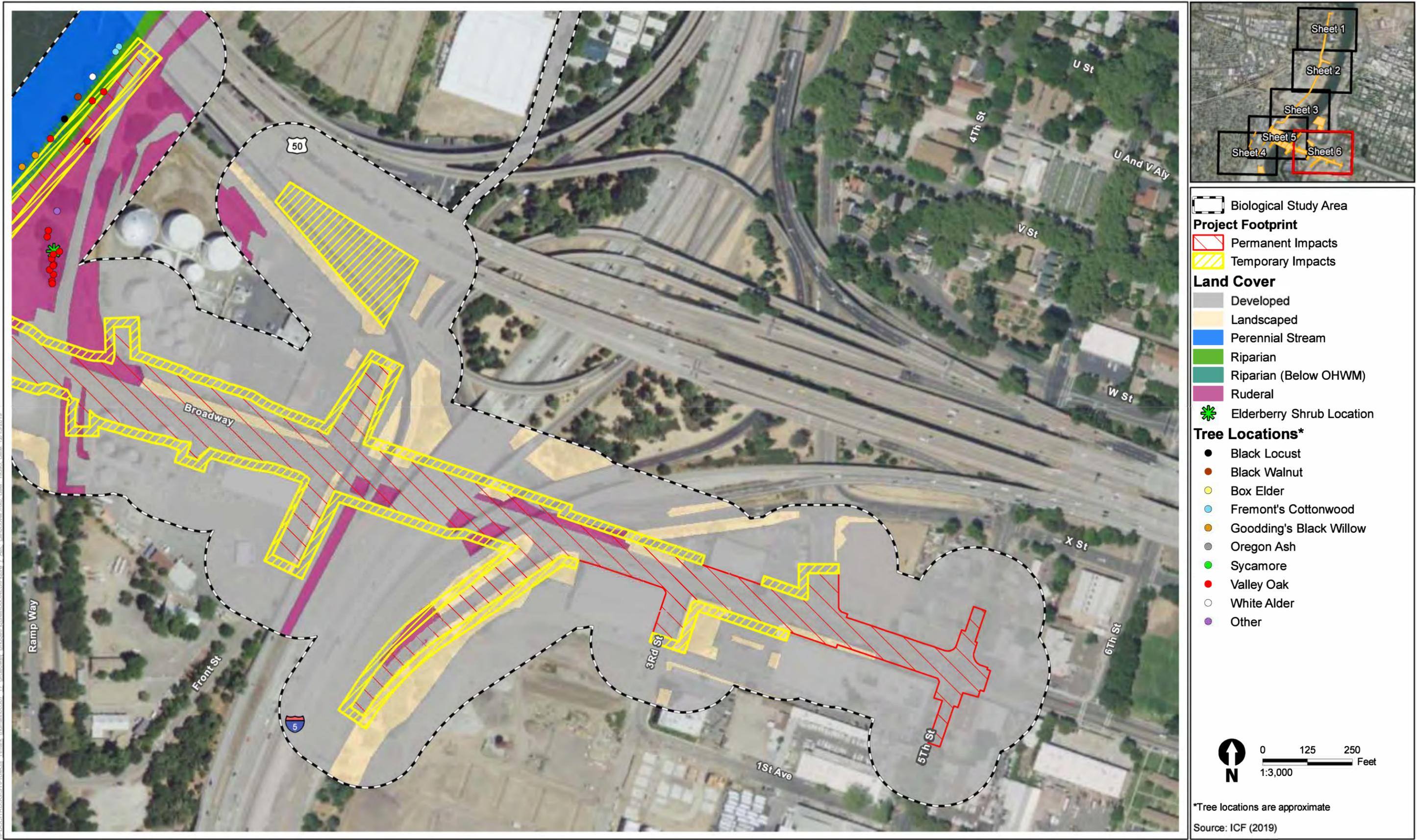


Figure 9f
Alternative C Land Cover and Project Impacts

Proposed Bridge

Construction chemicals may be accidentally spilled into watercourses during in-water work. A typical construction site uses many chemicals or compounds, including gasoline, oils, grease, paint, solvents, lubricants, and other petroleum products. Many petroleum products contain a variety of toxic compounds and impurities; they tend to form oily films on the water surface, altering oxygen diffusion rates. Concrete, soap, trash, and sanitary wastes are other common sources of potentially harmful materials at construction sites. Washwater from equipment and tools and other waste accidentally spilled on the construction site can lead to introduction of pollutants into surface waters or seepage into groundwater. The impact of toxic construction-related materials on water quality depends on the duration and time of activities. Construction occurring in the dry season is less likely to cause soil and channel erosion or runoff of toxic chemicals into a stream. However, low summer flows are less able to dilute pollutants that do enter the watercourse.

Roadway Modifications

Heavy metals, oil, grease, and polycyclic aromatic hydrocarbons are common pollutants in road runoff, and roadside landscaping can introduce pesticides and fertilizers. These pollutants are typically washed off the roadway surfaces by rainfall and enter storm water runoff. Urban runoff from vehicles on bridges can be discharged into streams during rain events, in vehicle accidents, and through normal wear and tear. Runoff in significant quantities occurs only during heavy storms that in turn cause these pollutants to be greatly diluted. These storms cause some high flows in the drainage systems, which dilute the pollutants as they are carried from the source.

The construction contractor would be required to regularly inspect and maintain the BMPs to ensure that they are in good working order, as required in the Construction General Permit SWPPP. The contractor would implement appropriate hazardous material management practices, spill prevention, and other good housekeeping measures to reduce the potential for chemical spills or releases of contaminants, including any non-storm water discharge to drainage channels. Implementation of these measures would minimize the potential for surface water and groundwater contamination.

Overall, post-construction bridge and roadway runoff is not expected to adversely affect water quality in the Sacramento River, as the runoff from the majority of the impervious surfaces would be collected and diverted to the storm drain system and potential project LIDs rather than to the river itself.

4.2.1.5 *Temperature, Oxygen, Depletion and Other Parameters*

Changes in temperature, dissolved oxygen levels, or other parameters of a water body could violate water quality standards or WDRs. These changes could cause algal blooms and adversely affect sensitive aquatic life. Low dissolved oxygen levels can be the result of algal blooms.

Pollutants including bacteria and potential viruses from pet waste is not anticipated from the proposed project.

A possible pollutant from the proposed project would be minimal amounts of trash and debris. The project may include trash receptacles at various locations along the pedestrian areas to

enable users to properly dispose of trash and prevent it from entering the surrounding aquatic environment.

4.2.1.6 Flood Control Functions

As previously described in Section 3.1.3.2.3 *Floodplains*, the project site is located within the 100-year Flood Zone AE and Flood Zone X or unshaded City of West Sacramento (areas of minimal flood hazard). Bridge structures within a 100-year flood hazard area could impede or redirect flood flows. In addition, alteration of drainage patterns of the site or area, including through the alteration of the course of a stream or river, could result in flooding onsite or offsite.

Proposed Bridge

The new bridge would be designed according to the following criteria defined in the California Department of Water Resources' FloodSafe California Urban Levee Design Criteria.

- Levees protecting urban areas are assumed to have a minimum crown elevation equal to the 1-in-200 Azimuth-over-Elevation Positioning (AEP) WSE plus 3 feet.
- Non-urban state/federal project levees are assumed to meet the authorized minimum elevation.
- Levees act as weirs and do not breach if overtopped.

The bridge design will be analyzed for impacts from the 200-year flood (Q200), 100-year flood (Q100), and the 50-year flood (Q50). Based on studies conducted for the I Street Bridge Replacement Project, approximately 1.25 miles upstream of the proposed project and similar in scope, a bridge in this segment of the Sacramento River would result in an increase of WSE of 0.02 feet immediately upstream of the project and a 0.06-0.07 foot reduction in WSE immediately downstream of the project for all three flood evaluations. The effect of the proposed project on WSE and stream flow are anticipated to be negligible.

In addition to DWR's FloodSafe California Urban Levee Design Criteria, the proposed bridge would be designed in accordance with hydraulic design criteria established in the Caltrans Local Assistance Procedures Manual. The criteria dictate that the facility be capable of conveying the base or Q100 and passing the Q50 "without causing objectionable backwater, excessive flow velocities or encroaching on through traffic lanes." The same criteria also recommend a minimum freeboard clearance of 2 feet above the 50-year floodwater surface elevation (WSE50) to provide clearance for drift. Due to the potential for significant drift during high flows in this channel, increasing the freeboard clearance to 3 feet above the WSE50 is reasonable.

Roadway Modifications

Roadway improvements are not expected to increase flood risk because (1) new impervious area is expected to be minimal; (2) drainage system improvements would be designed to accommodate storm drain infrastructure capabilities and prevent ponding; and (3) roadways would be at-grade and therefore would not obstruct or redirect flows.

4.2.1.7 Storm, Wave and Erosion Buffers

The proposed project is not located within a tidally-influenced area nor a wetland. It is located approximately 80 miles inland from the coast and therefore would not be vulnerable to large storm waves that typically threaten coastline areas. The proposed project would not change the potential for storm waves to affect upland areas or existing erosion buffers (i.e., wetlands).

4.2.1.8 Erosion and Accretion Patterns

Proposed Bridge

Accretion refers to the gradual accumulation of sediments along channel banks via the deposit by water, of solid material – whether mud, sand, or other sediments due to factors such as channel geomorphology and flow obstructions. Because the proposed project is located in an area primarily composed of dense and compact soil that is not easily erodible, accretion is not expected to occur.

Roadway Modifications

Land disturbance activities, such as grading and excavation during construction, would loosen the soil and could remove the protective cover of vegetation, thereby reducing the natural soil resistance to rainfall impact erosion

As noted above, implementation of erosion and sediment control BMPs during construction would prevent or minimize sediment and suspended solids from entering the river. The project design also will include permanent erosion control elements to ensure that storm water runoff does not cause soil erosion, thus reducing or avoiding permanent impacts on water quality.

4.2.1.9 Aquifer Recharge/Groundwater

Proposed Bridge

Construction activities related to installing bridge columns may require groundwater dewatering should groundwater be encountered below the riverbed and along the bridge landings. The piles would be driven to a depth of approximately 70 feet below the original ground elevation. As previously mentioned, a Limited Threat Discharge Permit would not be needed if the water within the encasements that comes in contact with the cement is pumped out, placed in a container, and hauled to a hazardous waste facility where it would be properly treated and disposed. However, if it is discharged to the Sacramento River or nearby storm drains, monitoring and treatment of constituents associated with concrete (e.g., pH, hardness) would need to be conducted in compliance with the conditions of the Limited Threat Discharge Permit prior to discharge.

Roadway Modifications

As previously described, groundwater during the I Street Bridge Replacement Geotech Study (GEI Consultants 2014) was found at a depth of approximately 15 to 25 feet below ground surface. Roadway improvements and utility installation and trenching would require excavation of approximately 5 feet below ground surface.

Should the proposed project require groundwater dewatering during construction activities, groundwater resources would be minimally affected because the required excavations would intersect only the shallow water table on a temporary basis during the construction period. Although this could result in short-term, localized alterations in groundwater levels near the surface in the immediate vicinity of the construction site, the reduction would not cause a widespread, regional drawdown and likely would be quickly recharged due to saturated groundwater characteristics. Changes to groundwater occurrence and levels from project construction and operation, if groundwater levels are affected at all, would not detrimentally affect regional groundwater production or change the existing water quality. Groundwater dewatering would not be necessary for project operation and maintenance activities.

The majority of the region's water supply comes from surface water, not groundwater resources. Water used during project construction may be trucked in or extracted from nearby fire hydrants, and the use would be temporary. In addition, the project would not need continual water supplies for operation and maintenance activities. Therefore, groundwater levels would not be affected from water used during project construction or operation.

4.2.1.10 Baseflow

Baseflow is the portion of streamflow that comes from groundwater seepage during a drought or after an extended dry period with little rain to replenish the stream. During periods of low surface flow (dry season), the shallow groundwater table can play a large role in providing baseflows to the Sacramento River. As previously described, the proposed project would not affect groundwater levels on a long-term basis, if at all, and therefore would not affect the baseflow levels in the Sacramento River during the dry season.

4.2.2 Anticipated Changes to the Biological Characteristics of the Aquatic Environment

The following section addresses biological resources that may be affected by the proposed project and is based on the project NES.

4.2.2.1 Special aquatic sites

Special aquatic sites, referred to as environmentally sensitive areas, would be protected with barrier fencing or stakes during construction, and would be identified on the construction plans (ICF 2020). Please see the project NES (ICF 2020) for more information regarding potential impacts of the project on environmentally sensitive areas.

4.2.2.2 Habitat for Fish and Other Aquatic Organisms

The proposed project would result in the temporary disturbance to and permanent loss of aquatic habitat area and volume, including foraging and rearing habitat for juvenile Chinook salmon and steelhead. Table 13 shows the temporary and permanent loss of aquatic habitat that would result from constructing the proposed project.

Installation of sheet pile cofferdams to isolate the in-water construction areas for piers 4 and 5 from the water column during pier construction would result in temporary disturbance of aquatic

habitat (substrate and water column) equal to the enclosed area and volume of the in-water cofferdams. The proposed dimensions of each cofferdam are 35 feet by 95 feet, or 3,325 square feet. Together, the two cofferdams would result in temporary disturbance of 6,650 square feet (0.15 acre) of substrate habitat and up to 325,850 cubic feet of water column habitat below the OHWM (based on a water surface elevation of +19 feet). The temporary cofferdams would remain in place for 2 months in the first in-water construction season. Similarly, installation of piles for the temporary trestles would result in temporary disturbance to substrate and water column habitat equal to the total area and volume of the in-water piles used to support the temporary trestles. The temporary trestle piles would remain in place throughout the duration of construction, although the work platforms would be removed at the end of the first in-water construction season before the onset of winter. A total of approximately 234 16-inch-diameter pipe or H piles that would be installed below the OHWM to support the temporary trestles would result in temporary disturbance to 327 square feet (0.007 acre) of substrate habitat and up to 16,023 cubic feet of water column habitat below the OHWM. (Four of the 238 piles for the temporary trestles would be installed above the OHWM.) Similarly, a total of 16 16-inch diameter pipe or H piles would be installed in the wetted channel to anchor the temporary barges, resulting in temporary disturbance to 22 square feet (0.0005 acre) of substrate habitat and up to 1,078 cubic feet of water column habitat below the OHWM. Together, this would result in total temporary disturbance to 6,999 square feet (0.16 acre) of substrate habitat and 342,951 cubic feet of water column habitat below the OHWM.

Installation of the new bridge piers (piers 2 through 5) and piles for the new bridge fender system would result in permanent loss of aquatic habitat (substrate and water column) equal to the cumulative area (substrate) and volume (water column) of the in-water piers and bridge fender piles. Two 75-foot-wide by 95-foot-long piers (piers 2 and 3) that would be installed in the river to support the movable span of the new bridge (bascul bridge) would result in a permanent loss of up to 13,500 square feet (0.31 acre) of substrate habitat and up to 661,500 cubic feet of water column habitat below the OHWM. The footprint of piers 2 and 3 for the vertical lift and swing bridge types would be less. Similarly, two piers (piers 4 and 5) that would be installed in the river to support the fixed spans of the new bridge would result in a permanent loss of 360 square feet (0.01 acre) of substrate habitat and up to 17,640 cubic feet of water column habitat below the OHWM.

Placement of rock revetment (riprap) on the waterside slope of the new bridge abutments below the OHWM also would result in permanent loss of natural substrate habitat equal to the net increase in area of rock revetment. Up to 824 linear feet of shoreline (398 linear feet on the City of Sacramento shoreline and 426 linear feet on the City of West Sacramento shoreline), covering up to 24,126 square feet (0.55 acre) of the bank below the OHWM, would be lined with RSP (assumed 1/4-ton stone weight, machine positioned [Method B]). A total of 2,949 cubic yards of RSP would be placed below the OHWM, and a total of 4,216 cubic yards would be placed above the OHWM. The RSP above and below the OHWM would cover a total of 58,622 square feet (1.35 acre).

Table 13. Amount of Temporarily and Permanently Affected Aquatic Habitat in the Sacramento River

Feature/Habitat	Temporary Impact		Permanent Impact	
	Alternative B	Alternative C	Alternative B	Alternative C
Temporary Cofferdams				
Substrate Area (square feet [acres])	6,650 (0.15)	9,000 (0.21)	NA	NA
Water column volume (cubic feet)	325,850	441,000	NA	NA
Temporary Trestles				
Substrate Area (square feet [acres])	327 (0.007)	327 (0.007)	NA	NA
Water column volume (cubic feet)	16,023	16,023	NA	NA
Piers 2 and 3				
Substrate Area (square feet [acres])	NA	NA	13,500 (0.31)	13,500 (0.31)
Water column volume (cubic feet)	NA	NA	661,500	661,500
Piers 4 and 5				
Substrate Area (square feet [acres])	NA	NA	360 (0.01)	360 (0.01)
Water column volume (cubic feet)	NA	NA	17,640	17,640
Piles for Bridge Fender System				
Substrate Area (square feet [acres])	NA	NA	84 (0.002)	84 (0.002)
Water column volume (cubic feet)	NA	NA	4,106	4,106
Shoreline Rock Revetment				
Substrate Area (square feet [acres])	NA	NA	24,126 (0.55)	19,431 (0.45)
Total				
Substrate Area (square feet [acres])	6,999 (0.16)	9,349 (0.21)	38,070 (0.87)	33,375
Water column volume (cubic feet)	342,951	458,101	683,246	683,246

4.2.2.2.1 Fish Passage (Beneficial Uses)

Fish passage may be limited during in-water construction work, but obstructions would be temporary. All in-water construction work and pile driving (in-water and shore-based within 250 feet of the Sacramento River), installation of cofferdams, removal of temporary sheet piles, and placement of rock revetment would be conducted during the time periods allowed by the regulatory agencies to avoid or minimize causing disturbance and injury to, or mortality of, special-status fish species in the affected reaches of the Sacramento River. In addition, in-water work would be conducted during daylight hours only to provide fish in the affected reaches of the Sacramento River with an extended quiet period during nighttime hours for feeding and unobstructed passage (ICF 2020).

Avoidance and minimization measures described in the project NES (ICF 2020) would further avoid or minimize the potential for construction-related effects on fish passage in the project area.

4.2.2.3 Wildlife Habitat

Wildlife habitat would be protected from temporary impacts with avoidance measures (i.e., seasonal restrictions) and fencing around the project area to prevent the presence of wildlife in the construction site.

Avoidance and minimization measures described in the project NES (ICF 2020) would further avoid or minimize the potential for construction-related effects on wildlife habitat in the project area.

4.2.2.3.1 Wildlife Passage (Beneficial Uses)

Wildlife passage may be temporarily limited due to fencing around the project site to prevent the presence of wildlife in the construction site, but passage would not be inhibited post-project. In addition, removal or replacement of riparian areas may affect trees that would support birds, such as Swainson's hawk.

Avoidance and minimization measures described in the project NES would further avoid or minimize the potential for construction-related effects on wildlife passage in the project area.

4.2.2.4 Special Status, Endangered, or Threatened Species

The project could result in the potential loss or disturbance of nesting species state listed as threatened. Special-status species potentially affected by the project include the state-listed Swainson's hawk (*Buteo swainsoni*) and the CDFW fully protected white-tailed kite (*Elanus leucurus*). Alternative C would result in slightly greater impacts on cottonwood riparian forest (0.02 acre of permanent and 0.41 acre of temporary impacts) than Alternative B. Elderberry shrubs that represent habitat for the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) would not be directly impacted. Both alternatives also could disrupt the species ability to disperse between the elderberry shrub and the nearby cottonwood riparian forest habitat, which could result in injury to or mortality of beetles.

Western pond turtles (*Emys marmorata*) (a California species of special concern) could be injured or killed by construction equipment and activities under both build alternatives. Construction noise or activity could disturb turtles or cause them to avoid the BSA. Alternative C would affect more cottonwood riparian forest habitat that could be used for nesting and cover (0.02 acre of permanent and 0.41 acre of temporary impacts) and more perennial stream habitat (0.25 acre of permanent and 0.04 acre of temporary impacts) relative to Alternative B.

The project also could affect habitat for a variety of special status fish species. These fish include species with both federal and state listing status: Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley spring-run Chinook salmon (*O. tshawytscha*), Central Valley fall/late fall-run Chinook salmon (*O. tshawytscha*), Central Valley steelhead (*O. mykiss*), North American green sturgeon (*Acipenser medirostris*), delta smelt (*Hypomesus transpacificus*), longfin smelt (*Spirinchus thaleichthys*), and Pacific lamprey (*Entosphenus tridentata*). Fish species with state legal status that could have habitat affected include white sturgeon (*Acipenser transmontanus*), Sacramento splittail (*Pogonichthys macrolepidotus*), Sacramento hitch (*Lavinia exilicauda exilicauda*), hardhead (*Mylopharodon conocephalus*), and

western river lamprey (*Lampetra ayresii*). Adverse project impacts to fish species include temporary effects of underwater noise produced by pile driving and other in-water activities, increased turbidity and sedimentation, potential discharges of or exposure to contaminants, temporary and permanent effects on riparian and shaded riverine aquatic cover habitat (vegetation removal, bridge and bike path construction); and permanent effects on aquatic habitat (construction of bridge piers, shade, and placement of RSP) in the Sacramento River.

Avoidance and minimization measures described in the project NES (ICF 2020) would further avoid or minimize the potential for construction-related effects on endangered or threatened species in the project area.

4.2.2.5 Invasive Species

During construction, the operation of barges and other in-water equipment originating from outside the project area could result in the introduction and spread of aquatic invasive species, including the Asian overbite clam (*Corbula amurensis*), quagga mussel (*Dreissena bugensis*), zebra mussel (*Dreissena polymorpha*), hydrilla (*Hydrilla verticillata*), and Brazilian elodea (*Egeria densa*) (California Department of Fish and Game 2008).

The proposed project has the potential to create additional disturbed areas for a temporary period and to introduce and spread invasive plant species to uninfected areas within and adjacent to the project area. This would be of particular concern for natural communities of special concern, where non-native invasive plants could outcompete and replace native vegetation. No plant species designated as federal noxious weeds have been identified in the project area (ICF 2020).

Avoidance and minimization measures described in the project NES (ICF 2020) would avoid or minimize the potential for project-related effects due to the introduction and spread of invasive aquatic and plant species in the project area.

4.2.3 Anticipated Changes to the Human Use Characteristics of the Aquatic Environment

4.2.3.1 Existing and Potential Water Supplies; Water Conservation

The project would not require the use of water supplies and therefore would not affect beneficial uses of the Sacramento River related to municipal and domestic, industrial process and service, and agricultural water supplies.

4.2.3.2 Recreational or Commercial Fisheries

The project would affect only a small section along the Sacramento River, would not affect fishery supplies, and therefore would not affect recreational or commercial fisheries. Consequently, the proposed project would not affect beneficial uses of the Sacramento River related to non-contact water recreation (i.e., fishing).

4.2.3.3 Other Water Related Recreation

Boating and other water recreation activities are common in the Sacramento River. The new bridge would be designed so as not to affect the ability of boaters, water skiers, and swimmers to use the river. Therefore, the proposed project would not affect the beneficial use of the Sacramento River related to water contact recreation.

4.2.3.4 Aesthetics of the Aquatic Ecosystem

Please see the project Visual Impact Assessment (ICF 2019) for a more detailed discussion of the visual and aesthetic changes of the proposed project. The new bridge would change the aesthetics of the project area, including the aesthetics of the aquatic ecosystem. The largest visual change would be the introduction of a new bridge across the Sacramento River. From West Sacramento the new bridge would be visible from adjacent commercial and industrial areas and from local roadways that are directly next to the bridge and proposed roadway improvements. From Sacramento, the new bridge would be visible from Broadway west of I-5, the eastbound US 50/Business 80-ramp connection to southbound I-5, the Sacramento River Bike Trail, and the riverbanks along Miller Park. The new bridge would also be visible by those standing at the water's edge, boaters on the river, and travelers crossing the existing Pioneer Bridge. In addition, new RSP added to prevent erosion near the bridge would be visible along the shoreline. The RSP would weather and darken and would appear similar to other RSP installations along the river. The aesthetic change would be localized, and the proposed project would have a minimal impact on the aesthetics of the aquatic system.

4.2.3.5 Parks, National and Historic Monuments, National Seashores, Wild and Scenic Rivers, Wilderness Areas, etc.

The Sacramento River is not a designated Wild and Scenic River, nor is it designated as a national or historic monument or located in a wilderness area. No national and historic monuments, national seashores, or wilderness areas are located in the project area. Miller Park runs along the east side of the Sacramento River. Access to Miller Park and the Sacramento Marina would not be affected during construction because a detour would be available to permit access. The project alternatives would close approximately 3,400 feet of the Sacramento River Bike Trail north and south of Broadway and would detour to the bike lane on Front Street between the Sacramento Marina and where the Sacramento River Bike Trail meets the R Street bicycle/pedestrian bridge. Because these impacts would be temporary, the proposed project would result in a limited impact on resources associated with special designations

4.2.3.6 Traffic/Transportation Patterns

An identified purpose of this proposed project is to alleviate traffic growth in other areas of the West Sacramento and Sacramento regions. As a result, the proposed project build alternatives would introduce more vehicular travel to the project area. Road modifications proposed in the project in the City of West Sacramento are primarily based on city development plans that would be otherwise implemented in a no-build alternative. Similarly, the West Broadway Specific Plan in Sacramento would implement many of the road modifications in the no-build alternative.

4.2.3.7 Energy Consumption or Generation

No hydropower facilities are located in the project area, and construction and operation of the proposed project would not require high consumption of energy. Therefore, the proposed project would not affect energy consumption or generation capabilities.

4.2.3.8 Navigation

As described in Section 1.3.1.1 *Build Alternatives*, the Sacramento River is considered to be a navigable waterway of the United States. Under the provisions of the General Bridge Act of 1946, as amended, the proposed location and plans for bridges over navigable waters of the United States must be approved by the U.S. Coast Guard, prior to commencing construction. In order to comply with the U.S. Coast Guard requirement to maintain navigation along the river, the new bridge would be a movable bridge. The bridge design has been developed to accommodate river boat traffic and navigation under the proposed bridge and therefore would not impede riverine navigation.

4.2.3.9 Safety

As previously stated, the proposed project would increase vehicular travel in the area while alleviating traffic at other Sacramento River crossings and areas in West Sacramento and Sacramento. With construction of the proposed bridge and associated roadway modifications, protected pedestrian pathways and bicycle travel lanes would ensure pedestrian and bicyclists a safe way to cross the Sacramento River and travel along the roadways while reducing potential conflict with motorized vehicles.

4.2.4 Temporary Impacts to Water Quality

4.2.4.1 Physical/Chemical Characteristics of the Aquatic Environment

Short-term or temporary construction impacts on water quality could occur during grading, demolition, and other construction activities related to the proposed project. Construction activities would comply with a variety of restrictions and agency requirements, such as permits from the Central Valley Regional Water Board, USACE, and CDFW. Implementation of the SWPPP, and performance standards of Caltrans and Sacramento and Yolo County storm water ordinances would minimize the potential for construction-related surface water pollution—and would ensure that water quality in the Sacramento River would not be compromised by erosion and sedimentation during construction. Short-term impacts on physical/chemical characteristics of the aquatic environment during construction are described further in Section 4.2.1 *Anticipated Changes to the Physical/Chemical Characteristics of the Aquatic Environment*.

4.2.4.2 Biological Characteristics of the Aquatic Environment

Please see the project NES (ICF 2020) for information regarding short-term impacts of the project on biological characteristics of the aquatic environment. Avoidance and minimization measures described in the project NES would avoid or minimize the potential for construction-related effects on biological resources in the project area.

4.2.4.3 Human Use Characteristics of the Aquatic Environment

As described in Section 4.2.3 *Anticipated Changes to the Human Use Characteristics of the Aquatic Environment*, the proposed project would not affect human uses, including designated beneficial uses, of the Sacramento River in the short-term during construction of the new bridge.

4.2.5 Long-term Impacts During Operation and Maintenance

4.2.5.1 Physical/Chemical Characteristics of the Aquatic Environment

Following completion of the proposed project, there is potential for long-term water quality impacts from operation and maintenance activities, such as bridge maintenance, inspections, and repairs. Long-term impacts include alterations in drainage patterns on the bridge, bridge approaches, and roadways and alterations in polluted surface runoff.

The proposed project would adhere to the Statewide Caltrans Stormwater Permit requirements. Compliance with these requirements by implementing post-construction BMPs would ensure that storm water pollution during operation and maintenance of the project would be minimal. Standard facilities used to handle storm water onsite would be an array of structural elements or facilities that would serve to manage, direct, and convey the storm water. Project design measures, such as LID measures, are a means of complying with municipal storm water permits. Implementation of post-construction BMPs would minimize impacts on water quality during long-term operations at the site. Long-term impacts on physical/chemical characteristics of the aquatic environment are described further in Section 4.2.1 *Anticipated Changes to the Physical/Chemical Characteristics of the Aquatic Environment*.

4.2.5.2 Biological Characteristics of the Aquatic Environment

Please see the project NES (ICF 2020) for information regarding long-term impacts of the project on biological communities. Avoidance and minimization measures described in the project NES would further avoid or minimize the potential for construction-related effects on aquatic habitat in the project area.

4.2.5.3 Human Use Characteristics of the Aquatic Environment

As described in Section 4.2.3 *Anticipated Changes to the Human Use Characteristics of the Aquatic Environment*, the proposed project would not affect human use characteristics, including designated beneficial uses, of the Sacramento River in the long-term during bridge operation and maintenance.

4.3 Impact Assessment Methodology

Potential impacts resulting from implementing the proposed project were analyzed by comparing existing conditions, as described in the Environmental Setting, to conditions during construction and operation and maintenance of the project. The qualitative analysis assesses the direct and indirect, short- and long-term impacts related to surface hydrology, flood hazards, groundwater recharge, and surface water and groundwater quality as described below.

- **Surface Water Hydrology:** The surface water hydrology impact analysis considered potential changes in the physical characteristics of water bodies, impervious surfaces, and drainage patterns in the project area as a result of project implementation.
- **Flood Hazards:** The impact analysis for flood risk was conducted using FEMA NFIP maps to determine whether the project area overlaps with existing designated 100-year floodplains.
- **Groundwater Recharge:** Impacts on groundwater recharge were assessed by comparing existing sources of recharge versus recharge capabilities following project implementation. Recharge is determined by the ability of water to infiltrate into the soil.
- **Surface Water and Groundwater Quality:** Impacts of the proposed project on surface water and groundwater quality were analyzed using existing information on water quality conditions (i.e., 303[d]-listed water bodies), and potential sources of water contaminants generated by bridge construction, operation, and maintenance activities. The analysis also considered the potential for water quality objectives to be exceeded, beneficial uses to be compromised, and further degradation of impaired waters as a result of the proposed project.

4.4 Alternative -Specific Impact Analysis

The proposed project under consideration includes two bridge alignments for the new bridge over the Sacramento River, two roadway design alternatives for portions of the roadway design in both Sacramento and West Sacramento, and installation of a fiber optic line in the City of West Sacramento. The storm water drainage management plan, and construction storage and staging elements apply to each proposed bridge alignment and roadway design alternatives.

- Alternative B would realign 15th Street between Jefferson Boulevard and South River Road, consistent with the approved mobility network, to connect the new bridge to the roadway network in West Sacramento. The bridge would connect to Broadway on the Sacramento side.
- Alternative C would connect to South River Road at a new intersection between 15th Street and Circle Street on the West Sacramento side and would connect to Broadway on the Sacramento side.

Table 14 displays the estimated temporary disturbed soil area for each build alternative within the project area. Implementation of the SWPPP is expected to attenuate and minimize the amount of sediments released from the construction site. Additionally, implementation of in-water construction measures to contain sediments during construction activities would minimize sediment risk.

Table 14. Temporary Disturbed Soil Area per Build Alternative

	Alternative B		Alternative C	
	Interim Year	Design Year	Interim Year	Design Year
Acres	7.152	7.126	7.485	7.459

Each project build alternative would increase impervious area within the project area. Alternative B would result in a 2.0 acre net increase in impervious surfaces and Alternative C would result in a 2.2 acre net increase in impervious surfaces.

No Build Alternative

Under the No Build Alternative, no bridge would be built; however, road modifications associated with City of West Sacramento development plans and with City of Sacramento West Broadway Specific Plan would still be constructed. There would be no associated impacts on water quality due to the bridge, but impacts on water quality due to road modifications would need to be addressed and mitigated. The No Build Alternative does not meet the purpose and need of the proposed project.

4.5 Cumulative Impacts

This cumulative analysis examines the effects of the proposed project in combination with other current projects, probable future projects, and projected future growth along the Sacramento River on either the Sacramento or West Sacramento side. The geographic context for the analysis of cumulative impacts associated with surface water hydrology and water quality is the Lower Sacramento Valley Watershed. The context for groundwater hydrology is the Sacramento Valley Groundwater Basin. The context for cumulative hydrology and water quality impacts is geographic and is a function of whether impacts could affect surface water features/watersheds, municipal storm drainage systems of the Cities of West Sacramento and Sacramento, or groundwater in these areas - each of which has its own physical boundary. This analysis accounts for anticipated cumulative growth within the potentially affected geographic area as represented by full implementation of the county and city General Plans. Current and future planned development are identified in the Bridge District Specific Plan, Riverfront Street Extension Project, Yolo Rail Relocation and Pioneer Bluff and Stone Lock Reuse Master Plan areas (west of the proposed project) in the City of West Sacramento, and in the Broadway Complete Streets Plan and Project, West Broadway Specific Plan, and Central City Mobility Project areas (east of the proposed project) in the City of Sacramento, as described in Section 2.3 *Regional and Local Requirements*.

4.5.1 Contribution to Significant Cumulative Water Quality Impacts

Development of the project combined with other past and future development within the potentially affected geographic area could degrade storm water quality through an increase in impervious surface area and increase in contaminated runoff, which ultimately could violate water quality standards, affect beneficial uses, and/or further impair 303(d)-listed waters within

the Lower Sacramento Valley Watershed and the Sacramento Valley Groundwater Basin. Water quality of storm water runoff varies with surrounding land uses, topography, and amount of impervious cover—as well as with the intensity (energy) and frequency of irrigation or rainfall. During construction, runoff may contain sediments and other construction materials and wastes (e.g., concrete debris) resulting from activities such as site clearing and grubbing, demolition and removal of existing structures and pavement, cut-and-fill activities, grading and excavation, paving, building construction, tree removal, and landscaping. During operation, runoff may contain oil, grease, and metals accumulated in the streets and driveways, in addition to pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas. The highest pollutant concentrations are generally in storm water runoff generated at the beginning of the wet season and during the first flush, where approximately 80% of total accumulated pollutants are washed off surfaces with the first 0.5 inch of rainfall, with street surfaces as the primary source of pollutants in urban areas.

Planned development could affect water quality if the land use changes, the intensity of land use changes, and/or drainage conditions are altered to facilitate the introduction of pollutants to surface water or groundwater resources. Changes in land use would alter the associated type and amount of pollutants in storm water runoff (e.g., higher fecal coliform concentrations in runoff from residential lands compared to commercial lands). Increased intensity of land use would increase the potential pollutant loads. Alterations in drainage patterns could increase pollutant loads by increasing the amount of storm water runoff transporting pollutants, could cause or contribute to erosion if the rate of runoff is increased, and could expose vulnerable areas to infiltration or runoff.

Construction of the proposed project as well as construction of other planned projects in the vicinity would result in surface disturbance through grading, trenching, and compaction associated with typical development activities. Existing vegetation would be removed, thereby increasing the potential for erosion. Consistent with municipal storm water programs for Sacramento, West Sacramento, and Caltrans, project-specific SWPPPs would include implementation of construction BMPs. In addition, other necessary site-specific permits (i.e., Water Quality Certification, Limited Threat Discharge Permit, Streambed Alteration Agreement, Section 404 Permit) would be obtained for this and other planned projects; and associated measures would be implemented to sufficiently reduce potential surface water quality impacts during construction, preventing cumulative impacts. Therefore, the proposed project would not contribute to a cumulative water quality impact during construction.

During project operation, the proposed project could contribute to degradation of water quality and a cumulative impact if the project altered land use such that the type and concentration of pollutants in storm water runoff increased. Some of the areas within the project vicinity (i.e., portions of West Sacramento and Miller Park in Sacramento) are currently unpaved, and new development projects would increase impervious surface area that would result in increased storm water runoff. Projects would be consistent with municipal storm water programs for Sacramento, West Sacramento, and Caltrans, and therefore would include post-construction design measures, such as LID and vegetative areas to allow for infiltration and water quality treatment. The proposed project does not represent a significant departure from the existing land use of the area nor a substantial increase in the impervious surface area. Storm water runoff

would be directed to existing storm water collection systems. Therefore, the proposed project would not contribute to a cumulative water quality impact during operation.

Based on the above, cumulative impacts on surface water quality, and the project's contribution to cumulative impacts on surface water quality, would not be cumulatively considerable.

4.5.2 Contribution to Significant Groundwater or Storm Water Drainage Capacity Impacts

4.5.2.1 Groundwater

Groundwater recharge in the Sacramento Valley Groundwater Basin occurs primarily through streamflow infiltration and direct recharge from soil infiltration in pervious areas. Most future projects in the groundwater basin would be redevelopment or infill projects in highly urbanized areas where recharge does not occur. Development in highly urbanized areas would not be expected to substantially increase the amount of impervious surfaces. Because this development would occur primarily in already urbanized areas with existing impervious surfaces, groundwater recharge from percolating rainfall potential would not be adversely affected, and indirect lowering of the local groundwater table is not likely to occur. However, development in areas without existing impervious surfaces would affect groundwater recharge and may result in cumulatively considerable impacts on groundwater.

Excavations requiring dewatering and subsurface features of new buildings in the project area served by the CSS to the Sacramento River, and the separated storm water system, are expected to require some level of dewatering during construction and/or operation because of shallow groundwater conditions. It is possible that dewatering would occur concurrently for various construction projects in the area. This could cause localized shifts in groundwater patterns that could cause areas of degraded groundwater quality to migrate. However, the dewatering protocol established by the cities and enforced at the city level would apply to the proposed project and other development where dewatering is needed within the cities. City staff would review all permit applications for dewatering. This would enable the Cities to determine the volumes and frequencies of discharges that would be allowed to the CSS or separated storm water system from each project to ensure that capacity is not exceeded, water quality violations do not occur, and local groundwater levels do not shift substantially.

Therefore, cumulative impacts on groundwater supply and quality, and the project's contribution to cumulative impacts on groundwater supply and quality would not be cumulatively considerable.

4.5.2.2 Storm Drainage Capacity

Planned development could increase the rate and volume of storm water runoff due to the overall increase in impervious surfaces. Increases in the rate or volume of storm water runoff can cause localized flooding if the storm drain capacity is exceeded, or if flows exceed channel capacities and are conveyed to overbank areas where flood storage may not be available. Proposed projects within the Cities of West Sacramento and Sacramento are required to comply with the stormwater drainage requirements in order to maintain adequate drainage system capacity to

convey 100-year peak flows. For the most part, projects with potential cumulative impacts would occur in areas that are already highly developed with impervious surfaces. Therefore, changes in flows that could increase localized flood risk would not be expected to be substantial. The project area is subject to flooding during 50-year, 100-year, and 200-year flood events. New development, including the proposed project, could increase impervious areas and result in greater flood flows, place impediments to flow that would raise flood levels, and/or place additional people or structures within flood-prone areas. Existing regulations and requirements, such as DWR's FloodSafe California Urban Levee Design Criteria and Caltrans' Hydraulic Design Criteria, require site-specific actions to avoid increasing flood levels and placing people or structures at risk of flood flows up to the current 100-year event condition. No current regulatory requirements fully address long-term flood risks due to accelerated sea level rise. Thus, it cannot be guaranteed that project and cumulative development requirements would address all contingencies, and the potential exists for significant flooding impacts both now and in the future. Project design would accommodate 50-year, 100-year and 200-year flood events.

All projects with potential cumulative impacts on storm drainage capacity would be required to include design features that would reduce flows to pre-project conditions, according to Caltrans MS4 Permit requirements, and other municipal storm water requirements. The proposed project would be required to design a storm water drainage system in compliance with these requirements. Thus, cumulative impacts on storm drainage capacity would likely be less than significant, and the project's contribution to impacts on storm drainage capacity would not be cumulatively considerable.

5. AVOIDANCE AND MINIMIZATION MEASURES

5.1 Introduction

Implementation of water quality measures (management measures and BMPs) are required to address project-related water quality impacts during construction, operation, and maintenance of the bridge. Key management measures include the following:

- Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss.
- Minimize the potential for erosion via limiting land disturbances such as clearing and grading and cut/fill.
- Preserve any existing terrain providing desirable drainage courses or effective filtration.
- Limit disturbance of natural drainage features and vegetation.
- Prepare and implement an approved SWPPP.
- Ensure proper storage and disposal of potential hazardous material.
- Incorporate pollution prevention into operation and maintenance procedures to reduce pollutant loadings to surface runoff.

5.2 Proposed Water Quality Protection Measures

The following measures will be implemented to avoid or minimize potential water quality and hydrology impacts of the proposed project.

5.2.1 Construction

Construction of the Broadway Bridge would involve pile driving; cofferdam installation and removal; pier installation; and placement of barge spuds; construction of the concrete bridge deck and railing; creation and use of construction staging area(s); operation of heavy construction equipment (e.g., graders, excavators) alongside the Sacramento River; road creation and road raising; new drainage facilities; embankment construction; constructing the end bridge abutments; and other related activities. Impacts from these activities would be avoided or minimized because all construction activities within the Sacramento River would comply with a variety of permits and requirements from agencies, including the State Water Board/Central Valley Water Board, USACE, CDFW, as well as the Yolo County, Sacramento County, City of West Sacramento, and City of Sacramento Public Works Departments.

Since the project is greater than one acre, it is required to be covered under the Construction General Permit issued by the State Water Board. The proposed project would implement construction BMPs based on guidance from several resources including the Caltrans Project Planning and Design Guide (California Department of Transportation 2019b), and other related local stormwater guidance documents.

The project proponent and/or construction contractor would comply with all construction site BMPs specified in the SWPPP and any other permit conditions to minimize introduction of

construction-related contaminants and mobilization of sediment in the Sacramento River. Broadly, these BMPs will address soil stabilization, sediment control, wind erosion control, vehicle tracking control, non-stormwater management, and waste management practices. The BMPs will be based on the best conventional and best available technology.

BMPs will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable and are subject to review and approval by the Counties. As part of Construction General Permit compliance, the project SWPPP will require the construction contractor to implement, monitor, and maintain appropriate BMPs. Routine inspections will be performed of the construction area to verify the BMPs are properly implemented and maintained. Contractors will be notified immediately if there is a noncompliance issue and will require compliance.

BMPs will include, but are not limited to, those presented below. The categories provided are based on Construction Site BMP Fact Sheets provided by Caltrans' Division of Construction Stormwater Program (<https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/construction-site-bmp-fact-sheets>) and the Construction BMPs provided in the California Stormwater Quality Association's BMP Handbook (California Stormwater Quality Association 2015).

5.2.1.1 Scheduling

The project may be constructed in two phases or in a single phase. The decision to construct in one or two phases will be driven by the extent of redevelopment and implementation of the approved mobility network in the Pioneer Bluff area of West Sacramento at the time project construction starts. If constructed in two phases, an interim (opening day) design phase for the proposed project would include constructing the new bridge and approach roadways with temporary pavement transitions along the existing alignment of South River Road. Construction of this first phase is expected to take approximately 36 months, with two seasons of in-water work. A subsequent phase, the design year phase, would take approximately 6 months and would complete the remaining project roadway construction consistent with full buildout of the approved mobility network. The roadway connection to the bridge and all other project improvements in Sacramento would be constructed during the first phase. If the project is built in a single phase, construction is expected to take 36 months. All in-water work within the Sacramento River will be conducted during allowable work windows to protect sensitive species.

5.2.1.2 Vehicle & Equipment Fueling and Maintenance

Equipment used in and around drainages and wetlands will be in good working order and free of dripping or leaking engine fluids. All vehicle maintenance will be performed at least 300 feet from the Sacramento River and all drainages and wetlands. Any necessary equipment washing will be carried out where the water cannot flow into the river or other drainages or wetlands.

5.2.1.3 Spill Prevention

Potential release or spillage of petroleum products such as diesel fuel, hydraulic fluid, and lubrication greases, from a vehicle or piece of equipment during maintenance or fueling could affect water quality if these petroleum products infiltrate into the soil or are washed into nearby

storm drains or directly into the Sacramento River. However, given that the volume of petroleum released during an incidental spill on a construction site is typically small (less than 25 gallons) and can be cleaned up immediately, impacts associated with petroleum spills during the construction phase are considered minor. The project proponent will comply with applicable stormwater ordinances, stormwater management plans, the project Spill Prevention, Control, & Countermeasure (SPCC) plan, and BMPs to prevent or minimize the potential release of contaminants into surface waters and groundwater. Implementation of standard construction procedures and precautions for working with petroleum and construction chemicals will further ensure that the impacts related to chemical handling during project construction will be minor. The project will include development and implementation of a hazardous material SPCC plan before construction begins. The plan will include strict onsite handling rules to keep construction and maintenance materials from entering the river, including procedures related to refueling, operating, storing and staging construction equipment and preventing and responding to spills. The plan will also identify the parties responsible for monitoring the spill response. During construction, any spills will be cleaned up immediately according to the SPCC. The Counties will review and approve the contractors' potential hazardous material SPCC plan before allowing construction to begin.

5.2.1.4 Hazardous and Concrete Waste

The following types of materials will be prohibited from being rinsed or washed into the streets, shoulder areas, or gutters: concrete; solvents and adhesives; thinners; paints; fuels; sawdust; dirt; gasoline; asphalt and concrete saw slurry; and heavily chlorinated water.

5.2.1.5 Material Delivery and Storage

Proper storage and disposal of potential hazardous material will be ensured. Any surplus concrete rubble, asphalt, or other rubble from construction will be taken to a local landfill.

5.2.1.6 Erosion and Sediment Control

An erosion and sediment control plan will be prepared and implemented for the proposed project. The potential for erosion and sedimentation will be managed using effective construction and engineering BMPs. These practices include stabilizing the soil surface, reducing erosive energy of surface flow, filtering runoff, and capturing sediment-laden water. The project proponents will require their construction contractors to implement BMPs included in the SWPPP and comply with grading ordinances that protect the river from erosion and sedimentation. The following is a list of potential erosion and sediment control measures that would likely be implemented to reduce potential project water quality impacts and comply with the Construction General Permit:

- **Silt Fence:** Temporary erosion control measures, such as sandbagged silt fences, will be applied throughout construction of the proposed project and will be removed after the working area is stabilized or as directed by the engineer. Soil exposure will be minimized through use of temporary BMPs, groundcover, and stabilization measures.

- Wind Erosion Control: Exposed dust-producing surfaces will be sprinkled daily, if necessary, until wet; this measure will be controlled to avoid producing runoff. Paved roads will be swept daily following construction activities.
- Hydroseeding: An appropriate seed mix of native species will be planted on disturbed areas upon completion of construction.
- Soil Binders: Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.
- Stockpile management: Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways. Material stockpiles will be located in non-traffic areas only. Side slopes will not be steeper than 2:1. All stockpile areas will be surrounded by a filter fabric fence and interceptor dike.
- Avoid earth or organic material from being deposited or placed where it may be directly carried into the channel.

5.2.1.7 Dewatering Operations

Before discharging any dewatered effluent to surface waters, the applicant or its contractors will obtain a Limited Threat Discharge NPDES permit from the Central Valley Regional Water Board. As part of the permit, the project proponent will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. Should dewatering be discharged into the Sacramento River or nearby storm drains, the Limited Threat Discharge NPDES permit or General Dewatering Permit for Land Discharges would require proper disposal of the water. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the best available technology that is economically achievable. Implemented measures may include the retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. For example, dewatered turbid water could be diverted to a settling tank, and/or treated in a manner to ensure compliance with water quality requirements prior to being discharged to infiltration basins or reused for dust control or landscape irrigation. Final selection of water quality control measures will be subject to approval by the Central Valley Regional Water Board.

In addition, Caltrans has a Field Guide to Construction Site Dewatering that provides the Resident Engineer with step-by-step instructions for overseeing dewatering operations on the construction site. All aspects of dewatering are addressed, from the selection of an appropriate dewatering management option to ensuring compliance with requirements specified in the Caltrans NPDES permit, Sacramento County MS4 Permit, and the State Water Board's Small MS4 Permit for operations, maintenance, and reporting. Detailed information about sediment removal methods and technologies are provided in Appendix B of the Field Guide.

5.2.1.7 Water Quality Monitoring

Baseline turbidity, pH, specific conductance, and temperatures in Sacramento River will be measured. As required by the Regional Water Board, exceedances of water quality standards specified in the Basin Plan for the Sacramento and San Joaquin River Basins will be avoided.

Implementation of the SWPPP, Caltrans BMPs, and the cities of Sacramento and West Sacramento stormwater guidance measures will minimize the potential for construction-related surface water pollution and ensure that water quality in the Sacramento River will not be compromised by erosion and sedimentation during construction. A 401 Water Quality Certification will be obtained from the Central Valley Water Board, which may contain additional BMPs and water quality measures to ensure the protection of water quality.

5.2.2 Operations

The new bridge and road design will incorporate permanent erosion control elements, primarily permanent vegetation, to ensure that stormwater runoff does not cause soil erosion.

Implementation of the project-specific long-term avoidance and minimization measures and design BMPs will also reduce or avoid impacts on water quality.

The proposed project will adhere to the requirements of the Caltrans NPDES Permit, Sacramento County MS4 Permit, and the State Water Board's Small MS4 Permit and ensure that stormwater pollution during operation and maintenance of the project will be minimal by implementing design measures recommended in Caltrans guidance documents, and post-construction BMPs. Standard facilities used to handle stormwater onsite will include an array of structural elements or facilities that will serve to manage, direct, and convey the stormwater.

Project design measures, such as LID facilities, are a means of complying with municipal stormwater permits. The proposed project design includes the installation of vegetated slopes and swales along bridge approaches where water will be treated through soil infiltration and vegetative uptake. All such stormwater drainage facilities will be designed per the Caltrans and BMP guidelines to sufficiently accommodate large storm flows. The implementation of BMPs will minimize impacts to water quality during long-term operations at the site. The BMPs include measures to ensure the post-construction controls (*e.g.*, source controls and site design) are in place to minimize water quality impacts. Regulatory compliance measures, as discussed above, will minimize the potential for surface water degradation over the long term. The project proponent will also obtain a 401 Water Quality Certification from the Central Valley Water Board that may include additional BMPs.

5.2.3 Groundwater Protection Measures

The proposed project will not substantially affect groundwater resources because, if excavations are required, they would only intersect the shallow water table temporarily with only localized and inconsequential effects to the regional groundwater system. While small amounts of construction-related dewatering are covered under the General Construction Permit, the proposed project may also need to comply with the Central Valley Regional Water Board's General Dewatering Permit for Land Discharges. In addition, Caltrans has a Field Guide to Construction Site Dewatering that provides the Resident Engineer with step-by-step instructions for overseeing dewatering operations on the construction site. All aspects of dewatering are addressed, from the selection of an appropriate dewatering management option to ensuring compliance with Caltrans NPDES permit requirements for operations, maintenance, and reporting.

5.2.4 Drainage Control Measures

The new bridge and roadways would involve minor additional impervious surface area compared to the existing watershed once construction is complete. Potential new surface flows from the project would be designed so as to mimic pre-project flows. Drainage system improvements would be designed to accommodate storm drain infrastructure capacities and prevent ponding. The proposed project will be designed in accordance with the objectives of the Caltrans NPDES Permit requirements, and related stormwater requirements to reduce runoff and volume of entrained sediment. In addition, the potential minimal increase in impervious area would not cause on- or off-site flooding.

6. REFERENCES

- California Department of Fish and Game. 2008. California Aquatic Invasive Species Management Plan. January 2008. Available: <https://wildlife.ca.gov/Conservation/Invasives/Plan>. Accessed: December 2, 2019.
- California Department of Transportation. 2014. *California Manual on Uniform Traffic Control Devices*. 2014 Edition. Revision 3 (March 9, 2018).
- California Department of Transportation. 2015. *Transportation Management Plan Guidelines*. Division of Traffic Operations, Office of Traffic Management. November.
- California Department of Transportation. 2019a. List of Eligible and Officially Designated State Scenic Highways. Available: <https://dot.ca.gov/programs/design/lap-landscape-architecture-and-community-livability/lap-liv-i-scenic-highways>. Last updated: July 2019. Accessed: December 5, 2019.
- California Department of Transportation (Caltrans). 2019b. Project Planning and Design Guide. April. Available: <https://dot.ca.gov/programs/design/manual-project-planning-design-guide> Accessed: January 14, 2020.
- California Department of Water Resources (DWR). 1995. Sacramento-San Joaquin Delta Atlas.
- California Department of Water Resources. 2004a. Bulletin 118: South American Subbasin. Available: <https://water.ca.gov/LegacyFiles/groundwater/bulletin118/basindescriptions/5-21.65.pdf>. Accessed: December 5, 2019.
- California Department of Water Resources. 2004b. Bulletin 118: Yolo Subbasin. Available: <https://water.ca.gov/LegacyFiles/groundwater/bulletin118/basindescriptions/5-21.67.pdf>. Accessed: December 5, 2019.
- California Department of Water Resources. 2010. Fact Sheet: Sacramento River Flood Control Project Weirs and Flood Relief Structures. Available: <https://water.ca.gov/LegacyFiles/newsroom/docs/WeirsReliefStructures.pdf>. Accessed: January 13, 2020.
- California Stormwater Quality Association. 2015. Construction BMP Online Handbook. January. Available (by subscription): <https://www.casqa.org/resources/bmphandbooks/construction>.
- Central Valley Regional Water Quality Control Board. 2018. Fifth Edition of the Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins. Available: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf. Accessed: February 10, 2020.
- CH2M. 2015. *Feasibility Study, Broadway Bridge, West Sacramento, California*. Prepared for City of West Sacramento in cooperation with City of Sacramento. December. Available: https://blob.cityofwestsacramento.org/city/depts/pw/major_projects/bbfs.asp. Accessed July 2019.

- City of Sacramento. 2015. Sacramento 2035 General Plan. Adopted March 3, 2015. Sacramento, CA.
- City of Sacramento. 2016. *Grid 3.0*. Adopted August 16, 2016. Sacramento, CA. Available: <https://www.cityofsacramento.org/-/media/Corporate/Files/Public-Works/Transportation/Sac-Grid/Grid30FinalReport080816.pdf?la=en>. Accessed: November 4, 2019.
- City of Sacramento. 2018. *City of Sacramento Central City Specific Plan*. Adopted April 19, 2018. Available: <http://www.cityofsacramento.org/-/media/Corporate/Files/CDD/Planning/Major-Projects/Central-City-Specific-Plan/Final-docs/CCSP-April2018-spread-layout-1.pdf?la=en>. Accessed: November 4, 2019.
- City of Sacramento. 2019. *West Broadway Specific Plan – City of Sacramento*. Website. <https://www.cityofsacramento.org/Community-Development/Planning/Major-Projects/West-Broadway-Specific-Plan>. Accessed August 26, 2019.
- City of West Sacramento. 2003. City of West Sacramento Stormwater Management Program (SWMP) Planning Document. Prepared by Larry Walker Associates. March.
- City of West Sacramento. 2009. Bridge District Specific Plan. Adopted by the City of West Sacramento on June 30, 1993, Amended by the City of West Sacramento on November 18, 2009. Available: <https://www.cityofwestsacramento.org/government/departments/community-development/planning-division/major-planning-projects/bridge-district-specific-plan>. Accessed: July 31, 2019.
- City of West Sacramento. 2014. *Pioneer Bluff Transition Plan*. December 17. Available: <https://www.cityofwestsacramento.org/Home/ShowDocument?id=6832>. Accessed August 26, 2019.
- City of West Sacramento. 2016. City of West Sacramento General Plan 2035 Policy Document. Adopted November 2016. City of West Sacramento Community Development Department. Available: <https://www.cityofwestsacramento.org/government/departments/community-development/planning-division/general-plan-2035>. Accessed: August 26, 2019.
- City of West Sacramento. 2018a. Pioneer Bluff and Stone Lock District Reuse Master Plan – Broadway Bridge Integration. Memorandum from Katie Yancy, Sr. Program Manager to Jason McCoy, supervising Transportation Planner. May 14, 2018.
- City of West Sacramento. 2018b. Water Quality: 2018 Consumer Confidence Report. Available: <https://www.cityofwestsacramento.org/government/departments/public-works/operations/water-treatment/water-quality-consumer-confidence-report>. Accessed: December 13, 2019.
- Federal Emergency Management Agency. 2020. FEMA Flood Map Service Center. FEMA Portal. Available: <https://msc.fema.gov/portal>. Accessed: March 16, 2020.

- GEI Consultants, Inc. 2014. Preliminary Geotechnical and Foundation Report. I Street Bridge Replacement. Sacramento, California. Submitted to Mark Thomas and Company. Contract Number SA-14108. August.
- HDR. 2017. *Yolo Rail Realignment Project, Phase 2A Technical Analysis of Alternatives*. Final Draft. October 14. West Sacramento, CA.
- ICF. 2019. Visual Impact Assessment for the Broadway Bridge Project. Draft Report. December.
- ICF. 2020. Natural Environment Study for the Broadway Bridge Project. Draft Report. February.
- Moyle, P. 2002. *Inland Fishes of California*. Berkeley: University of California Press.
- Natural Resources Conservation Service. 2019. Web Soil Survey. U.S. Department of Agriculture (USDA). Available: <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>. Accessed: December 13, 2019.
- Sacramento River Watershed Program. 2010. Sacramento Valley Subregion. October. Available: <http://www.sacriver.org/aboutwatershed/roadmap/watersheds/sacramento-valley-subregion>. Accessed: November 10, 2019.
- Sacramento River Watershed Program. 2020. Sacramento River Basin. Available: <http://www.sacriver.org/aboutwatershed/>. Accessed: February 10, 2020.
- State Water Resources Control Board. 2015. 2012 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) — Statewide. Available: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml. Accessed: November 10, 2019.
- State Water Resources Control Board. 2017. State Water Quality Protection Areas of Special Biological Significance. Available: https://www.waterboards.ca.gov/water_issues/programs/ocean/asbs_map.shtml. Accessed: November 10, 2019.
- Sacramento Central Groundwater Authority & GEI Consultants. 2016. Available: <https://scgah2o.saccounty.net/Pages/South-American-Subbasin-Alternative-Submittal.aspx>. Accessed: April 27, 2020.
- Sacramento Stormwater Quality Partnership. 2009. Stormwater Quality Improvement Plan. Prepared for the County of Sacramento and the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova. November. Available: [https://www.beriverfriendly.net/docs/files/File/2009_SQIP/SQIP-\(Nov09\)-MainDocument.pdf](https://www.beriverfriendly.net/docs/files/File/2009_SQIP/SQIP-(Nov09)-MainDocument.pdf). Accessed: November 19, 2019.
- Sacramento Stormwater Quality Partnership. 2013. Sacramento Stormwater Quality Partnership Hydromodification Management Plan. Prepared by Brown and Caldwell and CBEC ecoengineering for the County of Sacramento and the Cities of Sacramento, Citrus Heights, Elk Grove, Folsom, Galt, and Rancho Cordova. Original version July 29, 2011. Revised February 14, 2013. Available:

-
- http://www.beriverfriendly.net/docs/files/File/HMP/HMP_Feb2013.pdf. Accessed: January 19, 2020.
- U.S. Army Corps of Engineers. 2015. Sacramento River Bank Protection Project. Available: <https://www.spk.usace.army.mil/Missions/Civil-Works/Sacramento-River-Bank-Protection/>. Accessed: February 10, 2020.
- U.S. Geological Survey. 2019. National Watershed Boundary Dataset. Available: <http://nhd.usgs.gov/wbd.html>. Accessed: December 2, 2019
- U.S. Census Bureau. 2018a. 2018 City of Sacramento American Community Survey 1-Year Estimate. Available: <https://data.census.gov/cedsci/table?q=Sacramento%20city,%20California&hidePreview=false&tid=ACSDP1Y2018.DP05>. Accessed: April 2020.
- U.S. Census Bureau. 2018b. 2018 City of West Sacramento American Community Survey 5-Year Estimate. Available: https://data.census.gov/cedsci/table?q=west%20Sacramento%20city,%20California&g=1600000US0684816&tid=ACSDP5Y2018.DP05&vintage=2018&layer=VT_2018_160_00_PY_D1&cid=DP05_0001E. Accessed: April 2020.
- Western Regional Climate Center. 2012. Sacramento Executive Airport: Normals, Means, and Extremes Temperatures. Available: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7633>. Accessed: December 10, 2019.
- Western Regional Climate Center. 2016. Sacramento Executive Airport: Monthly Total Precipitation (inches). Available: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7633>. Accessed: December 10, 2019.

7. PREPARER(S) QUALIFICATIONS

Patty Cubanski
Watershed Scientist
8 years of experience

M.S. Coastal and Watershed Science and
Policy, California State University Monterey
Bay; B.S. Environmental Science, University
of Portland

ATTACHMENT A

Construction General Permit SWPPP Risk Level Assessment

A. CONSTRUCTION GENERAL PERMIT SWPPP RISK LEVEL ASSESSMENT

The General NPDES Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-DWQ) (Construction General Permit) regulates stormwater discharges for construction activities CWA Section 402. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the Construction General Permit. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory storm water runoff pH and turbidity monitoring, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

A.1 Summary

The Broadway Bridge Project (proposed project) involves greater than one acre of land disturbance, and therefore a SWPPP is required for the proposed project. More information on SWPPP requirements is provided in Section 2.1.1.3, Section 402—National Pollutant Discharge Elimination System. A construction site risk assessment has been performed for the Project SWPPP and the resultant risk level is Risk Level 2. The risk level was determined based on the procedure described in the General Permit and based two major elements – (1) project sediment risk (the relative amount of sediment that can be discharged, given the project and location details) and (2) receiving water risk (the risk sediment discharges pose to the receiving waters). Project Sediment Risk is determined by multiplying the R, K, and LS factors from the Revised Universal Soil Loss Equation (RUSLE) to obtain an estimate of project-related bare ground soil loss expressed in tons/acre. Receiving water risk is based on whether a project drains to a sediment-sensitive water body. A sediment-sensitive water body is either on the most recent 303d list for water bodies impaired for sediment; has a USEPA approved Total Maximum Daily Load implementation plan for sediment; or has the beneficial uses of COLD, SPAWN, and MIGRATORY.

Tables A.1 and A.2 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors. RUSLE Method 2 was used to determine these values.

Table A1. Summary of Sediment Risk

RUSLE Factor	Value	
R	117	EPA website: https://www.epa.gov/sites/production/files/2015-10/documents/fact3-1.pdf
K	0.24	SWRCB K GIS files: ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/

LS	0.52	SWRCB LS GIS files: ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/
Total predicted sediment loss (tons/acre)		14.6
<u>Overall Sediment Risk</u> Low sediment risk = < 15 tons/ acre Medium sediment risk = > 15 and < 75 tons/acre High sediment risk >= 75 tons/acre		<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High

RUSLE = Revised Universal Soil Loss Equation

Table A2. Summary of Receiving Water Risk

Receiving Water Name	303(d) Listed for Sediment-Related Pollutant*	TMDL for Sediment-Related Pollutant*	Beneficial Uses of COLD, SPAWN, and MIGRATORY*
Sacramento River	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Overall receiving water risk			<input type="checkbox"/> Low <input checked="" type="checkbox"/> High

* If "yes" is selected for any option, the receiving water risk is high

A.2 Project Sediment Risk

A.2.1 The R-Factor

The R factor is computed by using the following parameters:

Interim Year construction 3 years (estimated start on January 1)

Design Year construction 6 months (estimated start April 30 & estimated final stabilization October 27)

Erosivity Index (EI) distribution zone (Figure 1 of the Construction General Permit Risk Assessment R-Factor Calculation Notification): 23

EI Value (Table 1, the Erosivity Index (EI) Table of the Construction General Permit Risk Assessment R-Factor Calculation Notification):

Interim Year - 100% X 3 years = 300% (if project lasts for one year, EI value is 100%)

Design Year – (77.3% – 43.2%) = 34.1%

Total Project EI Value – 334.1%

Isoerodent Value for Project Area (Isoerodent Map for California in the Construction General Permit Risk Assessment R-Factor Calculation Notification): 35 R Factor = (334.1%)*(35) = 117

A.2.2 The K-Factor

The K factor was determined based on Geographic Information System files provided by the State Water Resources Control Board and are available from:

<ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/>

A.2.3 The LS Factor

The LS factor was determined based on Geographic Information System files provided by the State Water Resources Control Board and are available from:

<ftp://swrcb2a.waterboards.ca.gov/pub/swrcb/dwq/cgp/Risk/>

A.3 Receiving Water Risk

The Receiving water risk was determined to be “High” based on the fact that the Sacramento River has the designated existing beneficial uses of COLD, SPAWN, and MIGRATORY, which is included in the criteria for receiving water risk determination.

Sediment Risk Factor Worksheet		Entry
A) R Factor		
<p>Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.</p> <p>http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm</p>		
R Factor Value		117
B) K Factor (weighted average, by area, for all site soils)		
<p>The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.</p> <p>Site-specific K factor guidance</p>		
K Factor Value		0.24
C) LS Factor (weighted average, by area, for all slopes)		
<p>The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.</p> <p>LS Table</p>		
LS Factor Value		0.52
Watershed Erosion Estimate (=RxKxLS) in tons/acre		14.6016
Site Sediment Risk Factor		Low
Low Sediment Risk: < 15 tons/acre		
Medium Sediment Risk: >=15 and <75 tons/acre		
High Sediment Risk: >= 75 tons/acre		

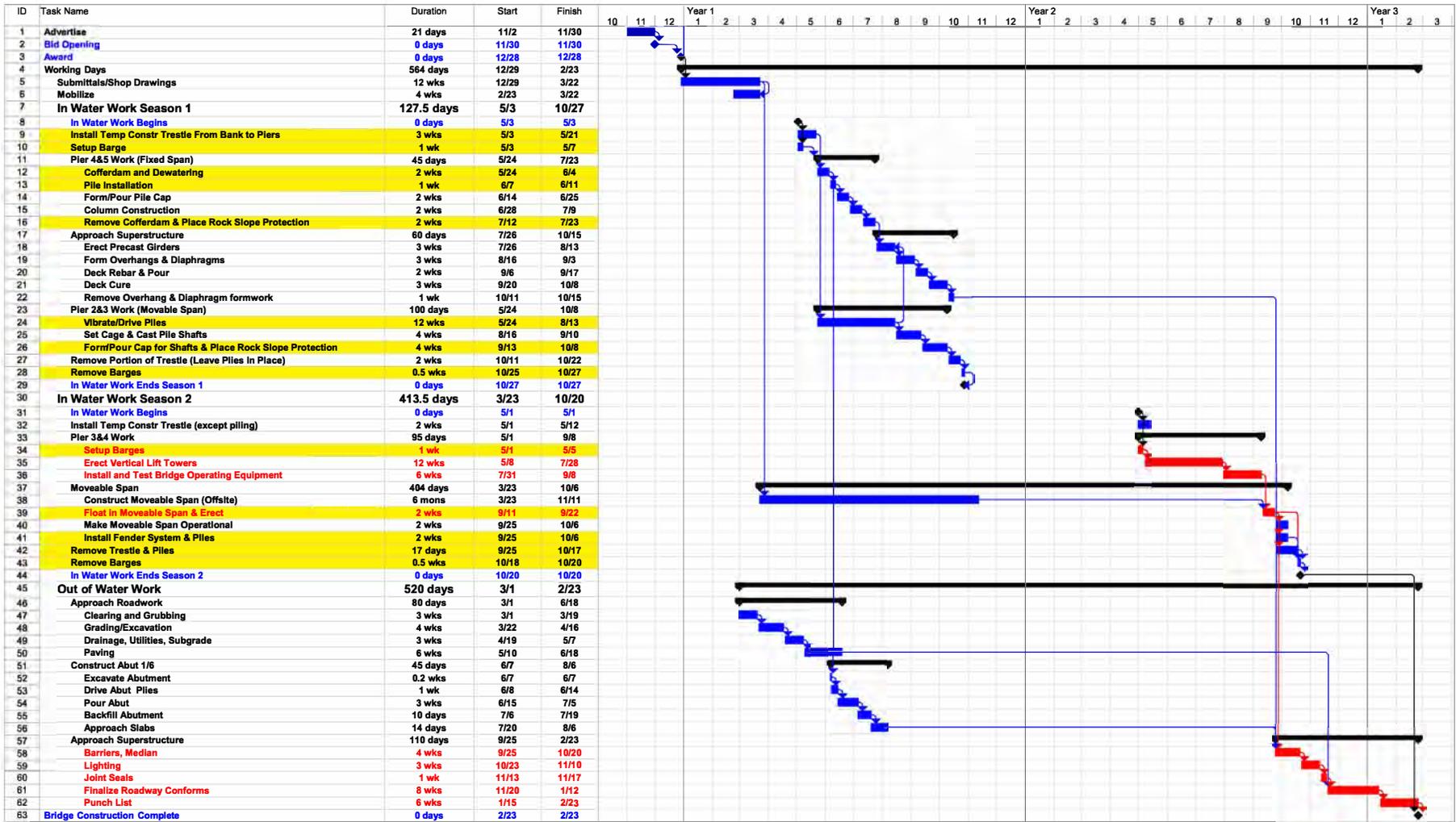
Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	yes/no	
A.1. Does the disturbed area discharge (either directly or indirectly) to a 303(d)-listed waterbody impaired by sediment (For help with impaired waterbodies please visit the link below) or has a USEPA approved TMDL implementation plan for sediment ?: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml	yes	High
OR		
A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? (For help please review the appropriate Regional Board Basin Plan) http://www.waterboards.ca.gov/waterboards_map.shtml		
Region 1 Basin Plan		
Region 2 Basin Plan		
Region 3 Basin Plan		
Region 4 Basin Plan		
Region 5 Basin Plan		
Region 6 Basin Plan		
Region 7 Basin Plan		
Region 8 Basin Plan		
Region 9 Basin Plan		

Combined Risk Level Matrix				
		<u>Sediment Risk</u>		
		Low	Medium	High
<u>Receiving Water Risk</u>	Low	Level 1	Level 2	
	High	Level 2		Level 3
Project Sediment Risk:		Low		
Project RW Risk:		High		
Project Combined Risk:		Level 2		

ATTACHMENT B
Project Schedule

Preliminary Bridge Construction Schedule

7-Day Work Week



Construction Activities with In-water Effects
 Task

Critical Task
 Milestone

Summary

ICF Graphics... 00205.17 NIES (12-13-2019)