U.S. Army Corps of Engineers (USACE)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 02-28-2022

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PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
SPK-2019-00899			

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME

First - Carolyn Middle - Last - Buckman

Company - California Department of Water Resources

E-mail Address - Carolyn.Buckman@water.ca.gov

8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)

First - Middle - Last -

Company -

E-mail Address -

6. APPLICANT'S ADDRESS:

Address- 901 P Street, Suite 411b

City - Sacramento State - CA Zip - 95814 Country - USA

9. AGENT'S ADDRESS:

Address-

City - State - Zip - Country -

7. APPLICANT'S PHONE NOs. w/AREA CODE

a. Residence b. Business (916) 651-2987 c. Fax

10. AGENTS PHONE NOs. w/AREA CODE

a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, ______________________ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Delta Conveyance Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)

Rivers and wetlands with in the Sacramento-San Joaquin Delta

14. PROJECT STREET ADDRESS (if applicable)

Address N/A

City - State- Zip-

15. LOCATION OF PROJECT

Latitude: ◦N See Cont. Sheet Longitude: ◦W See Cont. Sheet

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID See Continuation Sheet Municipality

Section - Township - Range -

17. DIRECTIONS TO THE SITE

The proposed project will have work areas with in Sacramento, San Joaquin, Contra Costa, and Alameda counties. Portions of the proposed project work area can be accessed by public roads, but much of the project area is currently accessible only by private roadway.

See Continuation Sheet

18. Nature of Activity (Description of project, include all features)

New facilities proposed for the Delta Conveyance Project include, but are not limited to, the following:

• Two 3,000 cfs Intake facilities on the federal project levees along the Sacramento River between Freeport and confluence with Sutter Slough
• Tunnel reaches and tunnel shafts
• New Southern Forebay
• Pumping plant
• South Delta Conveyance Facilities
• Other ancillary facilities likely constructed within Delta/surrounding area to support construction of the conveyance facilities

See Continuation Sheet for more project details,including details on each of the project components, and construction timing.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

DWR's underlying, or fundamental, purpose in proposing the project is to develop new diversion and conveyance facilities in the Delta necessary to restore and protect the reliability of State Water Project (SWP) water deliveries and, potentially, Central Valley Project (CVP) water deliveries south of the Delta, consistent with the State's Water Resilience Portfolio.

See Continuation Sheet for more information.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

The proposed project would likely include substantial discharge of fill material into waters of the United States for various components including, but not limited to, the features listed under Block 18.

See Continuation Sheet for details.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

See Continuation Sheet

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See Continuation Sheet
or
Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

The Applicant will design the proposed project to avoid and minimize impacts to waters of the U.S., where practicable. The Applicant will provide compensatory mitigation for any unavoidable effects.

See Continuation Sheet.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See Continuation Sheet

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
USFWS	Biological Opinion	Expected 2021			
NMFS	Biological Opinion	Expected 2021			
SWRCB	Water Quality Cert	Expected 2022			
See Cont. Sheet					

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

Carolyn Buckman Digitally signed by Carolyn Buckman Date: 2020.06.15 09:57:40 -07'00' | 2020-06-15

SIGNATURE OF APPLICANT | DATE | SIGNATURE OF AGENT | DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

A. Background

As stated in the Notice of Preparation (NOP), issued by the Department of Water Resources (DWR) on January 15, 2020, "DWR's underlying, or fundamental, purpose in proposing the project is to develop new diversion and conveyance facilities in the Delta necessary to restore and protect the reliability of State Water Project (SWP) water deliveries and, potentially, Central Valley Project (CVP)[1] water deliveries south of the Delta, consistent with the State's Water Resilience Portfolio."

As directed by the Governor, DWR has initiated the environmental planning process, with issuance of the NOP, under the California Environmental Quality Act (CEQA) for a single tunnel option to modernize Delta conveyance. Modernizing Delta conveyance is referenced in the State's Water Resilience Portfolio, which describes the framework to address California's water challenges and support long-term water resilience and ecosystem health. Delta conveyance, along with other complementary projects described in the State's Water Resilience Portfolio are intended to address California's water needs, including actions to improve water recycling, recharge depleted groundwater reserves, strengthen existing levee protections and improve Delta water quality.

The NOP identified a proposed Delta Conveyance Project to include new intake facilities located along the Sacramento River between Freeport and the confluence of the Sacramento River with Sutter Slough. The new conveyance facilities would include a tunnel to convey water from the new intakes to the existing SWP Banks Pumping Plant. The NOP identified two optional corridors between the intakes and the SWP Banks Pumping Plant: Central Corridor and Eastern Corridor. DWR is submitting this application (SPK-2019-00899) to the Army Corps of Engineers (USACE) because development of the project would result in discharges into waters of the U.S.[2]

The Delta Conveyance Project would involve the construction and operation of new conveyance facilities in the Delta that would be added to the existing SWP infrastructure, creating a dual-conveyance system. New intake facilities as new points of diversion would be located in the north Delta along the Sacramento River with a tunnel and appurtenant facilities to convey water to the existing SWP Banks Pumping Plant. DWR has included two intakes in this application out of the three intake options identified in the NOP[3].

The existing SWP water conveyance facilities located in the Delta include Clifton Court Forebay, the John E. Skinner Delta Fish Protective Facility (Skinner Fish Facility), and the Harvey O. Banks (Banks) Pumping

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[1] The potential connection to the Central Valley Project was included in the Notice of Preparation, but at this time the Bureau of Reclamation is not participating in development of the Proposed Delta Conveyance Project.

[2] DWR has identified the eastern corridor as the proposed project for the purposes of preparing a complete application for permits under Section 404 and Section 10. It should be noted that the identification of the eastern corridor as the proposed project should be considered preliminary and should not be construed as a decision by DWR regarding its preferred project. DWR will identify and fully evaluate two separate corridors in its range of alternatives in compliance with CEQA, and will make a final determination regarding the alternative it will approve at the close of that process once a sufficient record has been prepared.

[3] DWR's January 15, 2020 application to USACE and NOP presented three potential intake locations (2, 3, and 5) for the proposed project's two 3,000 cfs intake facilities. Similar to the selection of the eastern corridor, DWR is advancing intake locations 3 and 5 as part of the proposed project for purposes of meeting the requirements for a complete application under Section 404 and Section 10. The identification of the intake locations within the proposed project in this application is preliminary and should not be construed as a decision by DWR regarding its preferred project.

Plant. Both of these facilities, located in the south Delta, enable DWR to divert and convey water into the California Aqueduct for deliveries to SWP contractors located to the south of the Delta.

B. Additional Application Form 4345 Data

The following information is provided as a supplement to **ENG FORM 4345** and is provided in the same order in which information is requested on the form.

Block 13. NAME OF WATERBODY

The proposed project is located in the Sacramento-San Joaquin Delta and would affect waters of the U.S. within the Delta. The aquatic resources affected by the proposed project can be found in **Attachment 1, Mapbook of Impacts.** The proposed project would involve the construction of temporary or permanent facilities in the following navigable waters: Black Slough, Burns Cutoff, Italian Slough, Sacramento River, Snodgrass Slough, Stockton Deep Water Ship Channel/San Joaquin River, Turner Cut, and unnamed tributaries to Snodgrass Slough. The proposed project would also include subsurface tunnel crossings under the following navigable waters: Beaver Slough, Disappointment Slough, Hog Slough, Italian Slough, Middle River, Mokelumne River, Old River, Snodgrass Slough, the Stockton Deep Water Ship Channel/San Joaquin River, Sycamore Slough, Whiskey Slough, White Slough, Woodward Canal, and unnamed tributaries to Snodgrass Slough and Italian Slough. The proposed project facilities are listed in Table 1 below.

Table 1 – Navigable Waters Potentially Affected by the Proposed Project

Construction Feature	Navigable Water	Latitude	Longitude
Road ROW	tributary to Snodgrass Slough	38.365798	-121.509292
Road ROW	tributary to Snodgrass Slough	38.365792	-121.509349
Road ROW	tributary to Snodgrass Slough	38.365631	-121.509613
Temporary Intake Work Area	Sacramento River	38.381019	-121.520706
Intake	Sacramento River	38.350732	-121.532845
Temporary Intake Work Area	Sacramento River	38.351561	-121.532145
Intake	Sacramento River	38.384698	-121.515845
Intake	Sacramento River	38.381511	-121.520628
Intake	Sacramento River	38.375955	-121.52349
Temporary Intake Work Area	Snodgrass Slough	38.341612	-121.530196
Temporary Intake Work Area	Snodgrass Slough	38.34116	-121.529567

Road ROW	tributary to Snodgrass Slough	38.313343	-121.502141
Road ROW	Snodgrass Slough	38.313632	-121.505186
Barge Landing	Stockton Deep Water Ship Channel/SJR	37.987422	-121.397354
Temporary Barge Landing Work Area	Stockton Deep Water Ship Channel/SJR	37.987516	-121.397381
Shaft Location	Burns Cutoff/SJR	37.966377	-121.371391
Shaft Location	Stockton Deep Water Ship Channel/SJR	37.966467	-121.370553
Shaft Location	Stockton Deep Water Ship Channel/SJR	37.965889	-121.369804
Temporary Shaft Work Area	Black Slough	37.98524	-121.423468
Road ROW	Black Slough	37.98536	-121.423482
Temporary Levee Access Road	Black Slough	37.985072	-121.423447
Road ROW	Turner Cut	37.934699	-121.431014
Temporary Forebay Work Area	Italian Slough	37.85898	-121.583217
Tunnel	tributary to Snodgrass Slough	38.31775	-121.501862
Tunnel	tributary to Snodgrass Slough	38.317133	-121.500993
Tunnel	Snodgrass Slough	38.270239	-121.467003
Tunnel	Snodgrass Slough	38.269564	-121.466749
Tunnel	Mokelumne River	38.259097	-121.462851
Tunnel	Beaver Slough	38.204313	-121.449064
Tunnel	Hog Slough	38.1727	-121.445848
Tunnel	Sycamore Slough	38.143856	-121.442902
Tunnel	White Slough	38.083149	-121.436717
Tunnel	Disappointment Slough	38.042551	-121.432589

Tunnel	Stockton Deep Water Ship Channel/SJR	37.994687	-121.430359
Tunnel	Whiskey Slough	37.961432	-121.463265
Tunnel	Middle River	37.919287	-121.51562
Tunnel	Middle River	37.918529	-121.51647
Tunnel	Woodward Canal	37.913775	-121.521816
Tunnel	Old River	37.878528	-121.576647
Tunnel	Italian Slough	37.838251	-121.597924
Tunnel	Italian Slough	37.838246	-121.597231
Tunnel	tributary to Italian Slough	37.829047	-121.600497
Tunnel	tributary to Italian Slough	37.828591	-121.600495
Tunnel	tributary to Italian Slough	37.827703	-121.600365

Block 15. LOCATION OF PROJECT

The location of the proposed project is shown in **Attachment 2, Proposed Delta Conveyance Project Overview Map**. The northern-most component of the project is located at approximate Latitude 38.385309° North and Longitude -121.515186° West, while the southern-most component is located at approximate Latitude 37.780396° North and Longitude -121.599061° West.

Block 16. OTHER LOCATION DESCRIPTIONS

The components of the proposed project are located within Sacramento, San Joaquin, Contra Costa, and Alameda Counties.

Block 17. DIRECTIONS TO THE SITE

Portions of the proposed project work areas can be accessed from public roads such as Interstate 5, State Route 160, Highway 12, and Highway 4; but much of the project area is currently accessible only by private access roads or general farm roads. See the figures at **Attachment 2, Proposed Delta Conveyance Project Overview Map** for locational information.

Block 18. NATURE OF ACTIVITY

Project Facilities

See **Attachment 2, Proposed Delta Conveyance Project Overview Map,** for an overview map of proposed project facilities.

The proposed project consists of the following facilities:

- Intake C-E-3 – 3,000 cfs with Vertical Flat Plate Fish Screens
- Intake C-E-5 – 3,000 cfs with Vertical Flat Plate Fish Screens
- Tunnels
- Tunnel Reception Shaft at Intake C-E-3
- Tunnel Maintenance Shaft at Intake C-E-5
- Dual Tunnel Launch Shaft Sites and Ring Levee on Glanville Tract
- Tunnel Maintenance Shaft on New Hope Tract
- Tunnel Maintenance Shaft on Brack Tract
- Tunnel Reception Shaft on Terminous Tract
- Tunnel Maintenance Shaft on King Island Tract
- Tunnel Launch Shaft and Tunnel Reception Shaft on Lower Roberts Island
- Tunnel Maintenance Shaft on Lower Jones Tract
- Tunnel Maintenance Shaft on Victoria Island
- Tunnel Launch Shaft Site on Byron Tract (at the northern embankment of the Southern Forebay and Pumping Plant site)
- Dual Tunnel Launch Shaft Sites on Southern Byron Tract
- Dual Reception Shaft Sites adjacent to SWP Banks Pumping Plant approach channel
- Pumping Plant (at the northern embankment of the Southern Forebay)
- Southern Forebay (including Emergency Spillway and Emergency Outlet)
- South Delta Conveyance (dual tunnels connecting the Southern Forebay and Banks Pumping Plant approach channel)
- Deposit and Storage of Tunnel Material
- Roadway Modifications
- Barge Landing at Lower Roberts Island
- Rail-Served Material Depots
- Power Supply Alignments
- Emergency Response Facilities

Calculations regarding the size of the proposed project footprint are shown in Table 2, below.

Table 2. Proposed Project Footprint

Footprint	Sum of Acres
Permanent Subsurface Footprint	538.90
Permanent Surface Footprint	3253.62
Temporary Surface Footprint	1294.01
Total (acres)	**5086.54**

The proposed project facilities would be designed for long-term operations to be protected from the 200-year flood event, sea level rise for Year 2100, freeboard criteria, and wind fetch wave run-up. The sea level rise would be based upon the Ocean Protection Council's guidance for a project that is considered high risk, or the most conservative scenario, with a 10.2-foot sea level rise by Year 2100. For the constructed facilities, the criteria do not require that the facilities need to be initially designed for the Year 2100 sea level rise; but be designed to be adaptable over time to protect the facilities with sea level rise. Some of the facilities would be removed following construction and, in these cases, flood management protection during construction could be based upon a 100-year flood event and sea level rise for the construction period.

Description of Project Facilities

Intakes

The Delta Conveyance Project would allow for the diversion of water from the Sacramento River in the north Sacramento-San Joaquin River Delta (Delta), which would be conveyed to the SWP Banks Pumping Plant in the south Delta.

Two intakes (Intakes C-E-3 and C-E-5) would be located along the Sacramento River eastern bank between Freeport and the Sacramento River confluence with Sutter Slough. Each intake would have a capacity of 3,000 cfs. The Intake C-E-3 site would be located at approximately River Mile 39.4, approximately one mile upstream of the community of Hood. The Intake C-E-5 site would be located at approximately River Mile 36.8, immediately upstream of the northeast end of Randall Island. The boundaries of the total site used for construction of Intake C-E-3 and facilities would encompass 243 acres and the post-construction site would encompass 123 acres. The boundaries of the total site used for construction of Intake C-E-5 and facilities would encompass 247 acres and the post-construction site would encompass 112 acres.

The locations of construction features described for Intakes C-E-3 and C-E-5 are referenced in the mapbook as "Intake" and "Intake Work Area".

Intakes: Construction

Constructed facilities at each intake would include an intake structure with vertical flat plate screens, sedimentation basins, sedimentation drying lagoons, a control structure to regulate flows into and through the intake, a tunnel shaft which provides an inlet to the tunnel system, power facilities, emergency generators and fuel tanks, a fueling station, an office and vehicle storage, a storage enclosure for stop logs, fish screen panels and gates, electrical and control buildings, water and wastewater facilities, communications facilities, surveillance facilities, fencing and signage, and access control gates. Emergency response facilities also would be provided at Intake C-E-3 to serve multiple-intake construction sites. The facilities would include an ambulance with two full-time staff during work hours, recuse boat, and a fire truck with a full-time crew. During construction, each intake site would also include ground improvement and slurry cutoff wall material preparation areas and installation equipment, dewatering systems, and cranes.

Construction of each intake along the riverbank would require re-location of the Sacramento River Flood Control Project Levee (Project Levee) and State Route 160 prior to construction. To maintain existing flood protection levels for the areas protected by the Project Levee, the jurisdictional Project Levee would be constructed in two phases. Initially, a slurry wall would be installed to the east of the existing riverbank within each intake's construction site to support a temporary USACE Project Levee. State Route 160 would be relocated on top of the temporary levee. As excavation continues on each intake site, a new USACE Project Levee would be constructed around the perimeter of the sedimentation basins (and tunnel reception shaft at Intake C-E-3) with connections to the existing Project Levee at the north and south ends of each intake structure location. The intake structures, sedimentation basins, and tunnel reception shaft (drop shaft) would be designed to flood control standards that could accommodate the 200-year flood event with sea level rise. Slurry walls would be constructed along the existing location of the Project Levee and State Route 160, and a cofferdam would be constructed along the bank of the Sacramento River to provide a workspace for each intake structure's construction.

Work in the river at each intake, related to placement of cofferdams, would be confined to the summer season (June through October) to protect fisheries resources and minimize the potential for adverse flood impacts. On the river side, a trestle would be installed on temporary piers along the water side of the existing levee and a sheet pile cofferdam would be constructed partially within the river channel from the trestle for the full perimeter of the intake structure at a predetermined distance from the permanent structure walls (about 5 feet). The sheet piles would extend above the river level to a contractor-selected height (above typical flood levels, but somewhat lower than the top of the intake structure). The cofferdam and trestle would support construction of the concrete intake structure. The cofferdam would remain in place for the full duration of construction of each intake structure.

Sheet pile training walls would extend in an arc reaching back to the finished grade along the levee upstream and downstream from each intake structure. The training walls transition the face of the intake structure to the existing river embankment and levee. The training walls provide improved river hydraulics and facilitate vehicular access to the operating deck and Highway 160. Each training wall would extend at a continuous radius of 200' from the structure toward the limits of the jurisdictional levee. These walls would remain in place after construction as a permanent structure and would be installed to approximately finished grade.

Once the cofferdam is in place, the landward side would be excavated to each intake structure's subgrade. For Intake C-E-3, about 85,000 cubic yards or earth material would be excavated from inside the cofferdam. The excavation elevations, not including piers, would be expected to reach about -26 feet to -31 feet within the cofferdam. For Intake C-E-5, about 90,000 cubic yards of earth material would be excavated from inside the cofferdam (including piers). The excavation elevations, not including piers, would be expected to reach about -27 feet to -32 feet within the cofferdam.

After excavation, foundation piers would be installed and a concrete tremie seal would be poured within the cofferdam, around the piers, to minimize the flow of ground water into the cofferdam and create a working surface. After the tremie seal is installed, all aspects of each intake structure, including structural concrete and mechanical and electrical features would be constructed within the protected area. All water removed from the cofferdam would be treated to meet water quality and other regulatory requirements prior to discharge back into the river.

The table below provides the estimated pile and drilled pier quantities and preliminary estimated tip elevations based on NAVD88 datum. However, not all of the piles identified in the table below would be placed in the High Tide Line. For more information on the piles, see Table 3.

Table 3. Preliminary Estimated Pile and Drilled Pier Information

Intake Number	Length of cofferdam and training wall sheet pile system (feet)	Approximate number of individual sheet piles	Preliminary cofferdam sheet pile tip elevations (ft)	Approximate number of drilled piers within cofferdam	Preliminary pipe pile tip elevation
C-E-3	3,545	1,722	-80	1,250	-100
C-E-5	3,723	1,862	-80	1,325	-100

At the end of construction, over the course of 3 months between June and October, the cofferdam would be removed, a log boom would be installed to protect the cofferdam, and rip rap would be placed from the river bed toe of the existing embankment up to the top of the concrete-filled sheet pile at the front (front porch) of each intake and along the training walls to reduce erosion potential. Riprap would extend a short distance (about 100 feet) upstream and downstream of the structure to prevent scour, provide fish refugia habitat, and smooth out the variable topography along the face of each intake. A minor amount of mechanical (clam shell) dredging would be used to prepare the subgrade for riprap placement. At each of the intakes, about 4,000 cubic yards of existing material would be excavated from in front of and around each intake structure for riprap placement. Dredged material would be placed on a small barge and disposed of at a suitable off-site location.

Following construction of each intake structure, the perimeter levee (the embankment around the perimeter of the sedimentation basin and tunnel inlet channel) would become the permanent USACE Project Levee at the site. After the permanent levee is in place, the temporary levee can be removed once State Route 160 is moved to its permanent location behind the intake structure. Both intake sites would be designed to provide for public access to portions of the site, including use of the intake structure as observation decks along the Sacramento River and walking paths around the sedimentation basin area.

Intakes: Operation

As a part of the proposed project, at each intake, water would flow from the Sacramento River through the vertical flat plate fish screens through a perforated baffle system. Water would continue through the intake structure and a control gate at the back of the structure would control the flow rate through the screens, then discharge the water through concrete box conduits into the sedimentation basins. A control structure at the back of the sedimentation basins would hold the water in the basins at a constant water level relative to the river level and allow the diverted water to flow into the tunnel inlet.

Once operational, dredging is not anticipated to be required at the intake sites based on the best available information and bathymetric surveys over the past decade.

At locations where facilities are within a navigable water, including cofferdams at intakes and barge landings and intake structures, multi-dimensional hydraulic modeling would be conducted to determine if adjacent levees would need to be modified to safely contain maximum water surface elevations during peak storm events. Initial one dimensional modeling for the intakes show that Sacramento River water surface levels at the USACE design flood flows raise the upstream water surface elevations (WSEL) under that condition by an amount below the Central Valley Flood Protection Board (CVFPB) and USACE threshold of 0.1 foot. Because this maximum increase in elevation would be entirely localized, downstream surface elevation changes during intake construction would be insignificant and changes to river depth and width at any location would also be insignificant. Consequently, boat passage and river use in the Sacramento River and its tributaries would not be affected. The intakes would be designed to ensure that pumping velocities would have minimal impacts to aquatic species and, as such, any changes in flow velocities would unlikely be perceptible to operators of marine vessels or recreational watercraft or otherwise affect navigation.

Tunnels and Tunnel Shafts

Tunnels would be used to convey water from the intakes to the SWP Banks Pumping Plant approach channel. Consequently, impacts to surface resources would be avoided or minimized.

Under the proposed project, the tunnels would include a single main tunnel from Intakes C-E-3 and C-E-5 to the Southern Forebay and two short tunnel segments from the new Southern Forebay to the SWP Banks Pumping Plant approach channel.

Using a Tunnel Boring Machine (TBM), the proposed tunnels would be constructed underground with the bottom of the tunnels up to 190 feet below the ground surface. The material removed from excavation of the tunnels is the reusable tunnel material (RTM) and would be moved backwards through the tunnel to the tunnel launch shaft and then transported for reuse or storage. The RTM would be tested for the presence of hazardous materials at launch shaft locations and, if appropriate, reused for embankments at the Southern Forebay. The RTM could also be considered for use by others to improve embankments or other purposes in the Delta. Construction of the tunnels would require a series of launch, reception, and maintenance shafts. Flood management for tunnel shafts could include built up shaft pads to protect tunnel shafts from overland flows during flood events and groundwater upwelling during high river stages, use of ring levees, and/or levee modifications on specific islands or tracts with tunnel shafts.

The subsurface tunnel elements would pass under the following named waterways: Snodgrass Slough, Mokelumne River, Beaver Slough, Hog Slough, Sycamore Slough, White Slough, Disappointment Slough, Stockton Deep Water Ship Channel, Whiskey Slough, Middle River, and Old River. All tunnels would be located at below surface depth sufficient to ensure that navigation on surface waterways would not be affected.

The tunnels would also be engineered to withstand seismic events and other potential hazards that could result in below-ground failure. Concrete lined tunnel structures generally perform well in seismic events, as they are generally flexible in relation to the ground and subject to the same movements as the ground in which they are embedded.

For areas with direct fault crossings, results of future geotechnical investigations would be used to determine the anticipated magnitude of fault offsets as well as the degrees of flexibility for the tunnel lining system within the fault zone. Based on these results, a special lining consisting of joints could be designed to accommodate some rotation and/or movement of the tunnel structure within the ground to provide flexibility during seismic movement with minimal impact on the tunnel structure, or compressible backfill could be used in the fault zone behind the tunnel rings to provide flexibility. If the results from the geotechnical investigations indicate the potential for larger offsets (such as ground rupture), an oversized tunnel, with either a special lining section or an oversized vault excavation, for that portion of the tunnel within the fault zone, would be considered.

Tunnel Launch Shaft Sites: Overview

The Tunnel Launch Shafts would provide access to tunnel locations for the TBM and related equipment and materials as well as for workers. These shafts would also allow for excavated RTM to be removed. Tunnel launch shaft sites would include areas for surface storage of tunnel liner segments, aggregate (mixture of gravel, crushed stone, and similar materials), concrete batch plants, offices and support buildings, and RTM handling and storage.

The tunnel launch shafts would be sited at the following locations:

- Dual Tunnel Launch Shaft Sites and Ring Levee on Glanville Tract: The Glanville Tract Tunnel Launch Shaft Site would be larger than other launch shaft sites (approximately 620 acres, including 33 acres total for both launch shafts) because there would be two launch shafts on this site which would increase the areas for tunnel liner segment and RTM storage. The tunnel launch shafts would be located adjacent to Diersson Road to the west of Interstate 5 and most of the facilities and storage would be located to the east of Interstate 5.
- Tunnel Launch Shaft Site on Lower Roberts Island: The post-construction site and the construction site would include 422 acres, including 196 acres for RTM handling.
- Dual Tunnel Launch Shaft Sites on Southern Byron Tract: The construction and post-construction site acreages for these shafts would be included within the description of the Southern Complex, below.
- Tunnel Launch Shaft Site on Byron Tract (at the northern embankment of the Southern Forebay and Pumping Plant site): The construction and post-construction site acreages for this shaft would be included within the description of the Southern Complex, below.

On-site emergency response facilities would be provided at the tunnel launch sites in accordance with California Division of Occupational Safety and Health (Cal/OSHA) criteria for an underground jobsite, including a tunnel launch shaft site.

Emergency response facilities would be provided at every tunnel launch shaft site including a helipad and an ambulance with two full-time staff during work hours. The Southern Forebay/Pumping Plant/South Delta Conveyance area would include two ambulances to support three launch shaft sites.

The locations of construction features described for tunnel launch shafts are referenced in the mapbook as "Shaft Location" and "Shaft Work Area".

Tunnel Launch Shaft Sites: Construction

Construction activities for tunnel launch shaft sites would include clearing and grubbing, implementation of security fencing, water quality protection, ground improvement, sheet piles, power supplies, concrete batch plant, grout preparation for tunnel liner segment installation by the TBM, appurtenant buildings and parking/staging areas, and tunnel launch shaft pad. All facilities except for the launch shaft, RTM storage, and fence would be removed following construction.

Each tunnel launch shaft site would be configured to protect the final shaft opening from the 200-year peak flood from surrounding water bodies, overland flows, and sea level rise for the Year 2100. To provide this protection, a pad would be constructed above the ground surface using soil materials either excavated from the tunnel launch shaft site or purchased and hauled from commercial borrow facilities in the general vicinity of the tunnel launch shaft site. The pad would be conically shaped with slopes that could allow construction of access roads to the top of the pad. The elevation of the pad during construction may be lower than that of the final configuration, but would be designed to protect the surrounding land from artesian groundwater pressure that may be encountered during construction of the shaft and to protect the shafts from flooding from surrounding water bodies. The tunnel launch shaft sites include two shafts that would both be located on one elevated pad.

Following construction of the pad, slurry walls or diaphragm walls (vertical walls within deep trenches) would be installed around the proposed shaft diameter to minimize connections to groundwater in the area. The shaft would be excavated within the slurry walls or diaphragm walls. If groundwater enters the shaft site prior to construction of the slurry walls or diaphragm walls, underwater excavation of the shaft would be required. Wet excavation methods would use clamshell buckets to remove soil material from inside the ring created by the walls and a circular reinforced concrete lining would be placed.

To close off the bottom of the shaft, a base slab would be installed underwater using divers to place reinforcement steel and tremie placement of concrete. The water from the dewatering operations would be tested for water quality constitutes per the National Pollutant Discharge Elimination System (NPDES) permit requirements and treated on-site, if necessary, and stored for on-site reuse or conveyed to a receiving water body.

Tunnel Reception Shaft Sites: Overview

Tunnel Reception Shafts would provide access to the tunnel to allow removal of the TBM at the end of each tunnel drive (up to about 15 miles in length). Tunnel reception shaft sites would not include areas for tunnel liner segment or RTM storage.

The tunnel reception shaft sites would include the following:

- Tunnel Reception Shaft at Intake C-E-3: The construction and post-construction site acreages for this shaft would be included within the description of Intake C-E-3, above.

- Tunnel Reception Shafts on Terminous Tract: The Terminous Tract Tunnel Reception Shaft Site would be located on a site north of State Route 12 and west of Interstate 5. The post-construction site and the construction site would include 15 acres to accommodate two tunnel reception shafts.
- Tunnel Reception Shaft on Lower Roberts Island: The post-construction site and the construction site would be included within the description of the Tunnel Launch Shaft on Lower Roberts Island, above.
- Dual Reception Shaft Sites adjacent to SWP Banks Pumping Plant approach channel: The Dual Tunnel Reception Shaft Sites at the SWP Banks Pumping Plant approach channel would be located to the west of Byron Highway. The construction and post-construction site acreages for these shafts would be included within the description of the Southern Complex, below.

The locations of construction features described for tunnel reception shafts are referenced in the mapbook as “Shaft Location” and “Shaft Work Area”.

Tunnel Reception Shaft Sites: Construction

Construction methods for tunnel reception shafts would be identical to those described for tunnel launch shafts, above.

Construction activities for tunnel reception shaft sites would include clearing and grubbing, installation of security fencing, water quality protection, ground improvement and stabilization, sheet piles, grout or slurry preparation, appurtenant buildings and parking/staging areas, and tunnel reception shaft pad.

Tunnel Maintenance Shaft Sites: Overview

Tunnel maintenance shafts, which would be located about every 4 to 6 miles between the launch and reception shafts, would be installed to provide tunnel access for inspections; replacement or repair of the TBM cutter head, main bearing, and other TBM components; and maintenance activities that could not be conducted from within the tunnel. Tunnel maintenance shaft sites would be smaller than the launch shaft sites because the launch shafts would need storage areas associated with launching and operating the TBM.

The tunnel maintenance shaft sites would include the following:

- Tunnel Maintenance Shaft at Intake C-E-5: The construction and post-construction site acreages for this shaft would be included within the description of Intake C-E-3, above.
- Tunnel Maintenance Shaft on New Hope Tract: The New Hope Tract Tunnel Maintenance Shaft Site would be located on a site north of West Walnut Grove Road and west of Interstate 5. The post-construction site and the construction site would include 7 acres.
- Tunnel Maintenance Shaft on Brack Tract: The Brack Tract Tunnel Maintenance Shaft Site would be located on a site north of West Walnut Grove Road and west of Interstate 5. The post-construction site and the construction site would include 7 acres.
- Tunnel Maintenance Shaft on King Island Tract: The King Island Tunnel Maintenance Shaft Site would be located along Eight Mile Road and west of Interstate 5. The post-construction site and the construction site would include 11 acres.

- Tunnel Maintenance Shaft on Lower Jones Tract: The Lower Jones Tract Tunnel Maintenance Shaft Site would be located along Lower Jones Road and west of Interstate 5. The post-construction site and the construction site would include 16 acres.
- Tunnel Maintenance Shaft on Victoria Island: The Victoria Island Tunnel Maintenance Shaft Site would be located along State Route 4 near Byron Tract. The post-construction site and the construction site would include 12 acres.

The locations of construction features described for tunnel maintenance shafts are referenced in the mapbook as "Shaft Location" and "Shaft Work Area".

Tunnel Maintenance Shaft Sites: Construction

Construction methods for tunnel maintenance shafts would be identical to those described for tunnel launch shafts, above.

Activities associated with the construction of the tunnel maintenance shaft sites would include clearing and grubbing, implementation of security fencing, water quality protection, ground improvement, sheet piles, grout or slurry preparation, appurtenant buildings and parking/staging areas, and tunnel maintenance shaft pad. Temporary cranes would be moved to the maintenance shaft sites if needed; therefore, no gantry cranes would be provided at maintenance shafts.

<u>Southern Complex</u>

The main tunnel would terminate at a complex in the south Delta near the existing SWP pumping facilities. This area, known as the Southern Complex, would include a number of facilities associated with conveying water out of the tunnel into the SWP facilities. The Southern Complex includes:

- Tunnel launch shaft (described above)
- Pumping plant: to move water from the main tunnel to the surface
- Southern Forebay: water storage facility to regulate flow pumped out of the main tunnel
- South Delta Conveyance: two tunnels and water control structures to convey water from the forebay to the California Aqueduct

The total area of the Southern Complex during construction would be 2,125 acres and the post-construction site would encompass 1,314 acres. These facilities are described in more detail below.

Pumping Plant

The construction and post-construction site acreages for the Pumping Plant are included in the description of the Southern Complex, above.

The Pumping Plant would be constructed at the location of a launch shaft site on Byron Tract. The tunnel launch shaft site would be used as the inlet structure to the below ground Pumping Plant wet well. Water would flow by gravity from the intakes through the tunnel to a vertical shaft adjacent to the Pumping Plant wet well for continued conveyance into the Southern Forebay. Most of the Pumping Plant facilities would be located above-ground on a raised site pad to protect the facilities from the 200-year flood event with anticipated sea level rise in Year 2100, freeboard height, and wind wave run-up height.

The Pumping Plant site would include the Pumping Plant; electrical building with the switchgear; heating and air conditioning equipment adjacent to the electrical building; electrical substation; emergency generator building with an isolated fuel tank; equipment storage building with offices, welding shop, machine shop, and equipment storage; and storage facility for bulkhead panels that would be used to isolate portions of the Pumping Plant during maintenance procedures. Gantry cranes and other cranes would be located outside of the Pumping Plant buildings to move equipment during maintenance procedures. The Pumping Plant would include emergency overflow weir-type openings to convey water into the Southern Forebay if hydraulic transient-surge conditions occurred in the tunnel, such as during a power failure.

Construction activities for the Pumping Plant would include clearing and grubbing, implementation of security fencing, water quality protection, ground improvement, sheet piles, power supplies, concrete batch plant, appurtenant buildings, and parking/staging areas.

Southern Forebay

The construction and post-construction site acreages for the Southern Forebay are included in the description of the Southern Complex, above.

The Southern Forebay would be located on Byron Tract near the existing SWP Clifton Court Forebay. The Southern Forebay would not be connected to the Clifton Court Forebay.

Water from the tunnel would move into the Southern Forebay through the Pumping Plant on the northern bank of the Southern Forebay. Water would be discharged into the South Delta Conveyance facility control structures for continued conveyance to the SWP Banks Pumping Plant approach channel.

The Southern Forebay would provide temporary operational storage for Delta Conveyance Project water to balance inflow at the intakes with outflow at Banks Pumping Plant. The inflow and outflow could vary throughout a typical day based on diversions at the intakes and operations of the SWP Clifton Court Forebay and Banks Pumping Plant. The Southern Forebay capacity would be 9,000 acre-feet to provide sufficient operational storage to balance flows from the Southern Forebay and Clifton Court Forebay at the SWP Banks Pumping Plant.

The Southern Forebay would be constructed with levees (embankments) placed above the ground surface to contain the stored water and protect the forebay from flood events. The Southern Forebay would be designed to be protected from the 200-year flood event with anticipated sea level rise in Year 2100, and with sufficient freeboard height and internal wave run-up height above the defined storage capacity. The ground within the embankments would be graded to maintain drainage across the forebay. Toe drains with collector pumps would be installed around the outside of the embankments to minimize seepage on adjacent land.

The Southern Forebay would be designed to withstand seismic events and in accordance with criteria from many regulatory agencies, including embankments to meet the DWR Division of Safety of Dams (DSOD) criteria for a jurisdictional dam. Two of those regulating agencies, DSOD and USACE, would require specific design criteria for the embankments of the Southern Forebay, including dam breach and flood routing studies. The freeboard height would be designed to meet the DSOD criteria of at least 3 feet and to provide protection from wave run-up due to wind fetch based on Bureau of Reclamation 2012 Freeboard Criteria and Guidelines for Computing Freeboard Allowances for Storage Dams.

Prior to construction, ground improvement, slurry walls, and external seepage collectors with small pumps would be installed to support the embankment and minimize groundwater elevation changes during construction and operations. Due to the likely presence of soft, compressible or weak foundation soils at the Southern Forebay site, significant ground improvement and peat soil excavation would occur prior to construction. The embankments would be constructed to limit and reduce potential crest sagging or cracking, including providing additional height at the embankment crests where appropriate.

Construction activities for the Southern Forebay would include clearing and grubbing, implementation of security fencing, water quality protection, removal of unsuitable foundation and preloading soils, ground improvement, forebay embankment construction as RTM becomes available, finish embankments, and construct emergency spillway and emergency outlet. Approximately 5,260,000 cubic yards of RTM would be anticipated to be used for Southern Forebay embankment construction.

The Southern Forebay would include an emergency spillway with sufficient capacity to safely convey the maximum volume of flow from the intakes to prevent the perimeter embankments from being overtopped. The emergency spillway would consist of a concrete lined weir and chute over the Southern Forebay embankment engineered to provide erosion resistance and have enough length, width, and height to adequately contain emergency spillway flows. A discharge channel connection to Italian Slough would provide conveyance of overflow releases.

An emergency outlet works would be provided with sufficient capacity to allow for evacuation of the reservoir within the period of time mandated by DSOD. The emergency outlet would consist of a gated pipe through the base of the embankment and would be located on the northeast side of the forebay. This emergency outlet would be used to lower the reservoir in the event of an emergency.

Recreational facilities would be provided at the constructed Southern Forebay, including public parking and a walking or bike path around the top of the embankment.

The locations of construction features described for the southern forebay are referenced in the mapbook as “Forebay” and “Forebay Work Area”.

South Delta Conveyance

The construction and post-construction site acreages for the South Delta Conveyance are included in the description of the Southern Complex, above.

Construction activities for the South Delta Conveyance control structures would include clearing and grubbing, implementation of security fencing, water quality protection, ground improvement, sheet piles, power supplies, concrete batch plant, appurtenant buildings, and parking/staging areas.

The South Delta Conveyance facilities would connect the Southern Forebay to the SWP Banks Pumping Plant approach channel downstream from the Skinner Fish Facility. The Forebay Outlet Structure would be located on the southwestern side of the Southern Forebay. The Forebay Outlet Structure would include two drop shafts with stop logs (steel gates) to allow separate operations of two tunnels. The two tunnels would convey flow under Byron Highway, Union Pacific Railroad (UPRR), several high voltage transmission lines, and private property designated by the United States Fish and Wildlife Service (USFWS) as Critical Habitat for Contra Costa goldfields (*Lasthenia conjugens*) and vernal pool fairy shrimp (*Branchinecta lynchi*). The two tunnels would continue to the South Delta Outlet and Control Structure located along the SWP Banks Pumping Plant approach channel. This facility would include a series of radial gates to control flows and would be designed with two sets of stop logs to allow separate operations of the two tunnels. Erosion protection provisions would be constructed downstream of the Delta Outlet and Control Structure to protect the earthen walls of the California Aqueduct.

The flow in the California Aqueduct from Clifton Court Forebay would be mixed with the flows from the Southern Forebay. The California Aqueduct Control Structure includes a series of radial gates to control flows and would be constructed within the existing California Aqueduct immediately upstream of the South Delta Outlet and Control Structure. Erosion protection provisions would be constructed downstream of the California Aqueduct Control Structure to protect the earthen walls of the California Aqueduct.

The locations of construction features described for the South Delta Conveyance facilities are referenced in the mapbook as “Outlet and Control Structure” and “Outlet and Control Structure Work Area”.

<u>RTM Handling and Storage</u>

RTM handling and storage locations would include:

- Glanville Tract Launch Shaft Site
    - Conveyors would move the RTM to the handling and storage sites located to the east of Interstate 5.
- Lower Roberts Island Launch Shaft Site
    - RTM storage would occur partially on the Lower Roberts Island Tunnel Launch Shaft; however, most of the RTM would be placed near the Lower Roberts Island barge landing to facilitate access of this material for levee maintenance throughout the Delta.
- Byron Tract Launch Shaft Site
    - At the Byron Tract Tunnel Launch Shaft Site, the RTM would be used to form the Southern Forebay embankments and most RTM would not be stored permanently on Byron Tract.
- Southern Byron Tract Tunnel Launch Shaft Site
    - At the Dual Southern Byron Tract Tunnel Launch Shaft Sites, the RTM would be used to form the Southern Forebay embankments and most RTM would not be stored permanently on Byron Tract.

<u>Power Facilities</u>

Power supplies would be needed at construction sites for the intakes, tunnel shafts, Southern Forebay, Pumping Plant, South Delta Conveyance, barge landings, railroad sidings, consolidation centers, and road modifications. Power supplies would also be needed during operations at sites for the intakes, Southern Forebay gate structures, Pumping Plant, South Delta Conveyance control structures, barge landings, railroad sidings, and consolidation centers. Minor power could be needed for instrumentation and security at some permanent shaft sites.

To minimize construction of new power lines, the ability to use or replace (re-power) existing power lines was analyzed based upon the locations of the potential facilities, power demands during construction and operations, and capacity of existing power lines. Some of the facilities would be located in areas not currently served by existing power lines; therefore, either new power poles with lines or underground cables would be installed to serve those areas.

There are several different methods which would be considered to extend power connections to the proposed project facilities, including:

- Modification of existing power pole corridors with above-ground distribution/transmission lines to replace lines or add lines on existing power poles. Installation of new lines would occur within a 15-foot wide work area along the existing pole line using boom trucks and utility trucks. Use of the boom trucks would allow replacement of lines on poles separated from a roadway by a drainage ditch. If necessary, existing poles would be replaced.
- Addition of new above-ground power poles to extend the existing distribution/transmission lines to specific sites. Installation of new power poles and lines would occur within a 30-foot wide area to allow for drilling of the pole foundation, installation of the poles, and stringing of the lines with trucks with augers, flatbed trucks to haul the poles, boom trucks to string the line, and utility trucks. The new lines would be connected to the existing lines using boom trucks and utility trucks.
- Addition of new underground power cables to extend the existing distribution/transmission lines to specific sites. Construction of underground power cables would occur within a 30-foot wide work areas and include excavation of a trench for the bedding and the conduits within the trench. The trench would be backfilled and the ground surface would be restored. The cable would be pulled through the conduit. Directional drilling could be used under waterways, freeway intersections, and drainage infrastructure or in sensitive wildlife areas. The trenches would be less than 5 feet deep and dewatering would not be anticipated. Where possible, underground power cables would be installed simultaneous with road improvements or new access roads.

<u>Roadway Modifications</u>

More than 15 local roads could provide direct access to potential proposed project construction sites in the Delta. Many of these roads are characterized as rural two-lane paved roadways with 10-foot wide lanes and minimal shoulders. These roads are used by local and agricultural vehicles and traffic. Overall conditions and pavement conditions on existing roads that could provide direct access to potential proposed project construction sites range from poor to good.

Selection of the roadways used for construction would be based upon other uses of the roads by the communities, including proximity to communities, schools, emergency responders, wildlife areas, and recreation areas; and use of the roadways as major commute corridors (e.g., State Routes 4 and 12). Roadways would also be selected to minimize the miles traveled by construction equipment and employees.

Construction of many proposed project facilities would occur in locations that are not currently served by roads or that are served by roads that are characterized by traffic congestion and/or poor road conditions. Some of the roads are located on top of levees that have foundation problems. Therefore, construction of the proposed project would require road improvements, new access roads, and new interchanges along Interstate 5 and State Routes 4 and 12.

To reduce traffic issues during construction, a series of transportation projects would be considered to access the proposed project construction sites. The potential roadway projects could include:

- Parallel access or haul roads to provide construction and operations access to avoid using levee roads.
- Expansion of existing roads to provide wider paved areas, including wider shoulders.
- Realignment of roads to accommodate new interchanges or rail-served materials depots.
- New access interchanges.
- Modification of the railroad bridge across the California Aqueduct near Byron Highway. No piers would be installed because the existing piers allow for modification of railroad alignment. No in-water construction would occur.
- New roadway bridge across Burns Cut near the Port of Stockton and Lower Roberts Island with installation of about 80 piles and bridge abutments.
- New railroad bridge across Burns Cut near the Port of Stockton and Lower Roberts Island with installation of about 50 piles and bridge abutments.
- Park-and-Ride Centers to provide a central location for employees and materials to transfer from numerous employee vehicles or small trucks to buses and larger trucks.
- Asphalt overlays for existing roads following construction.

The proposed project would include new access roads to Intakes C-E-3 and C-E-5, and all tunnel shafts; re-location of existing roadways to implement rail-served materials depot adjacent to Franklin Boulevard and Byron Highway; and establishment of six park-and-ride centers located along Interstate 5 at Lambert Road, Charter Way, and Flag City, at Rio Vista near State Route 12, at Byron Tract near State Route 4, and at Bethany Road near Byron Highway. The locations of the park-and-ride centers are referenced in the mapbook as “Park and Ride”.

<u>Barge Landings</u>

Construction of tunnel launch shaft sites would require deliveries of TBM components, equipment, tunnel liner segments, aggregate, cement, and other building materials. The use of barge landings would reduce the number of truck trips on highways and local roadways. These deliveries would otherwise result in a large number of truck trips during the construction period. The barge landings could also be used to transfer RTM to other locations for reuse.

Barge landings could be removed at the end of the construction phase, used to transfer RTM to other locations, or provided to the local agencies.

The proposed project would include a barge landing on the northern bank of Lower Roberts Island on San Joaquin River along the Stockton Deep Water Ship Channel (SDWSC). Materials could be delivered by barge from existing ports near the Delta, including Port of Stockton, Port of Pittsburg, and Port of

West Sacramento as well as commercial mooring facilities (e.g., facility in Rio Vista used to load barges with rock).

Construction activities for the barge landing site would include clearing and grubbing, implementation of security fencing, water quality protection, ground improvement, sheet piles, and importation of soil.

The barge landing site pad would be 1,200 feet long by 600 feet wide. A combi-wall consisting of king and sheet piles would be used to construct a vertical bulkhead at the waterside of barge landing site. The king piles would be at a depth of approximately -40 feet and the sheet piles would be at a depth of approximately -25 feet. The length of the bulkhead wall would be approximately 1,300 feet. The wall would be comprised of approximately 411 king piles and 411 sheets.

Commercial vessel traffic currently occurs on the SDWSC which has adequate width for vessel traffic to pass. The narrowest section of SDWSC is near the Port of Stockton where the width narrows to approximately 400 feet, and the channel depth is 35 feet at mean lower low water and 40 feet at average high tide. SDWSC can accommodate fully loaded oceangoing Panamax-size vessels at high tide. Barge transport for the proposed project would have minimal impacts on commercial traffic on the SDWSC with coordination with the Bar Pilots and United States Coast Guard. The San Joaquin River width at the barge landing site ranges from 492 feet (on the upstream side) to 597 feet. The barge landing would extend 40 to 60 feet into the waterway depending upon the water surface elevation. A barge would extend approximately 50 feet more into the waterway. Therefore, during loading and unloading activities at the barge landing, there would be approximately 485 feet of remaining width. The ability to construct the barge landing and continue to support other navigation traffic in the waterways was therefore determined to be adequate for construction of barge landings in the SDWSC.

The locations of construction features described for the barge landing are referenced in the mapbook as “Barge Landing” and “Barge Landing Work Area”.

<u>Rail-Served Materials Depot</u>

Railroads could be used to deliver large amounts of construction materials such as tunnel liner segments, TBM equipment, and aggregate to the construction site and/or remove large amounts of excavated material, including RTM. The two railroad companies in the proposed project area include the Union Pacific Railroad (UPRR) and Burlington Northern Santa Fe Railroad (BNSF). Use of railroads would require construction of a rail-served material depot with rail sidings. The rail siding would be designed to allow the train to leave or pick-up rail cars, hold the rail cars, and load or off-load the rail cars. The depot would include areas where trains would move off the main line to deposit the rail cars and areas to transfer the materials to trucks. The sidings could also be used to move RTM and other soil material from the construction site to trains to be hauled to other areas for reuse and/or disposal.

Rail-Served Materials Depot locations for the proposed project were identified based on proximity to tunnel launch shaft sites. Three Rail-Served Materials Depots for manifest trains would be used for the proposed project, as summarized below:

- Along the UPRR Sacramento-Lathrop rail line near Franklin Boulevard and Twin Cities Road to serve the Glanville Tract tunnel launch shaft site.
- A new depot would be constructed on Lower Roberts Island.

- Along the UPRR Lathrop – Byron rail line parallel to the Byron Highway to serve the tunnel launch shaft sites at the Southern Forebay location.

Block 19. PROJECT PURPOSE

Just as CEQA requires an EIR to include a statement of project objectives as is described in the proposed Delta Conveyance Project's Notice of Preparation (NOP), the National Environmental Policy Act (NEPA) requires that an EIS include a statement of purpose and need to which the federal agency is responding in proposing the alternatives, including the proposed action (40 CFR 1502.13).

The overall purpose for this project is develop new diversion and conveyance facilities in the Delta necessary to restore and protect the reliability of State Water Project (SWP) water deliveries south of the Delta, consistent with the State's Water Resilience Portfolio.

The above stated purpose, in turn, gives rise to several project objectives. In proposing to make physical improvements to the SWP Delta conveyance system, the project objectives are:

- To address anticipated rising sea levels and other reasonably foreseeable consequences of climate change and extreme weather events.
- To minimize the potential for public health and safety impacts from reduced quantity and quality of SWP water deliveries south of the Delta resulting from a major earthquake that causes breaching of Delta levees and the inundation of brackish water into the areas in which the existing SWP pumping plants operate in the southern Delta.
- To protect the ability of the SWP to deliver water when hydrologic conditions result in the availability of sufficient amounts, consistent with the requirements of state and federal law, including the California and federal endangered species acts and Delta Reform Act, as well as the terms and conditions of water delivery contracts and other existing applicable agreements.
- To provide operational flexibility to improve aquatic conditions in the Delta and better manage risks of further regulatory constraints on project operations.[4]

Block 20. REASON FOR DISCHARGE

The construction of the proposed project would require the discharge of fill material into waters of the U.S. Discharge of fill material would be associated with construction of the two intake facilities and associated structures on the Sacramento River, a barge landing on the Stockton Deep Water Ship Channel, tunnel launch and reception shaft facilities and work areas including sites for storage of RTM along the tunnel corridor, the Southern Forebay, the pumping plant and associated outlet and control structures which would transfer water from the Southern Forebay into the Banks Pumping Plant approach channel, levee improvements, and access roads.

Block 21. TYPE OF MATERIAL BEING DISCHARGED AND AMOUNT IN CUBIC YARDS

The total amount of fill material to be discharged into waters of the U.S. during construction of the conveyance facilities is estimated to exceed 1 million cubic yards. The estimated volume of fill material to be permanently discharged in waters of the U.S. for each project component is set out in Table 4. The volume of fill that would be discharged to accommodate temporary project components is set out in

[4] These objectives are subject to refinement during the process of preparing a Draft EIR.

Table 5. Most fill volumes were calculated based on the intersection of the project footprint and aquatic resource delineation GIS layers, using an estimated depth for each aquatic resource type. These estimated depths are provided in the estimate assumption column of the tables below. Fill volumes that were calculated using engineering information, rather than GIS, are also indicated in the estimate assumption column.

Construction of the proposed project facilities would be anticipated to be approximately 16 years; however, the duration of construction at most locations would vary and would not extend for this full construction period.

Table 4. Estimate of Permanent Fill Volume into Waters of the U.S.

	Depth Estimate Assumption	Fill Volume (cubic yards)	Fill Material
Lower Roberts Island Barge Landing			
Agricultural Ditch	3 foot depth	5974	Excavated soil, RTM, imported soil backfill, steel sheet piles
Tidal Channel	engineering calculation	41000	
Southern Forebay			
Agricultural Ditch	3 foot depth	198164	Excavated and imported soil, RTM, concrete, riprap, pipe piles, slurry cutoff wall
Alkaline Wetland	1 foot depth	5289	
Depression	6 foot depth	483	
Natural Channel	3 foot depth	1752	
Seasonal Wetland	1 foot depth	17048	
Sacramento River Intakes (C-E-3 and C-E-5)			
Agricultural Ditch	3 foot depth	3482	Excavated soils, concrete, cofferdam, riprap, sheet pile, steel pipe piers, imported soil, slurry cutoff wall
Scrub Shrub Wetland	2 foot depth	399	
Tidal Channel	engineering calculation	190350	
Lower Roberts Island Levee Improvement Area			
Forested Wetland	2 foot depth	237	Imported soil and rock
Outlet and Control Structure			
Agricultural Ditch	3 foot depth	2914	Concrete, excavated soil, steel sheet pile, gravel
Conveyance Channel	engineering calculation	45000	
Vernal Pool	1 foot depth	634	
Road Right of Ways			
Agricultural Ditch	3 foot depth	88779	Imported soil, gravel, concrete, steel sheet piles, pipe piles, rock, steel piles
Depression	6 foot depth	14865	
Emergent Wetland	3 foot depth	32021	
Forested Wetland	2 foot depth	5004	
Lake	6 foot depth	5901	

Natural Channel	3 foot depth	901	
Scrub Shrub Wetland	2 foot depth	4793	
Seasonal Wetland	1 foot depth	2336	
Tidal Channel	engineering calculation	300	
Vernal Pool	1 foot depth	492	
Shaft Locations			
Agricultural Ditch	3 foot depth	9715	Imported soil, RTM, excavated soil, concrete
Scrub Shrub Wetland	2 foot depth	436	
Seasonal Wetland	1 foot depth	184645	
Tidal Channel	engineering calculation	60	
Shaft Work Areas			
Agricultural Ditch	3 foot depth	39762	Imported soil, RTM, and concrete
Depression	6 foot depth	1372	
Scrub Shrub Wetland	2 foot depth	2331	
Tidal Channel	engineering calculation	119	

Table 5. Estimate of Temporary Fill Volume into Waters of the U.S.

	Depth Estimate Assumption	Fill Volume (cubic yards)	Fill Material
Lower Roberts Island Barge Landing Work Area			
Agricultural Ditch	3 foot depth	74	Excavated soil, RTM, imported soil backfill, steel sheet piles
Tidal Channel	engineering calculation	41000	
Southern Forebay Work Area			
Agricultural Ditch	3 foot depth	132764	Excavated and imported soil, RTM, concrete, riprap, pipe piles, slurry cutoff wall
Alkaline Wetland	1 foot depth	36243	
Conveyance Channel	engineering calculation	0	
Emergent Wetland	3 foot depth	3464	
Natural Channel	3 foot depth	3383	
Seasonal Wetland	1 foot depth	25815	
Tidal Channel	engineering calculation	33000	
Sacramento River Intake Work Areas			
Agricultural Ditch	3 foot depth	5288	Excavated soils, concrete, cofferdam, riprap, sheet pile, steel pipe piers, imported soil, slurry cutoff wall
Forested Wetland	2 foot depth	2126	
Scrub Shrub Wetland	2 foot depth	384	
Tidal Channel	engineering calculation	190350	

Lower Roberts Island Levee Access Road			
Agricultural Ditch	3 foot depth	19833	Imported soil and gravel
Forested Wetland	2 foot depth	225	
Tidal Channel	engineering calculation	146	
Outlet and Control Structure Work Area			
Agricultural Ditch	3 foot depth	1579	Excavated soil, concrete, steel sheet pile, gravel
Conveyance Channel	engineering calculation	58000	
Vernal Pool	1 foot depth	300	
Shaft Work Areas			
Agricultural Ditch	3 foot depth	16015	Imported soil, concrete, RTM
Depression	6 foot depth	1372	
Scrub Shrub Wetland	2 foot depth	2331	
Tidal Channel	engineering calculation	60	

Block 22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED

Construction of the proposed project would result in unavoidable impacts to waters of the U.S. Several aquatic types were identified and delineated within the Study Area. Descriptions of the aquatic types are provided below, including general characterizations of the associated vegetation expected to occur within each type of aquatic habitat. This section sets out the surface area of the discharge for each type of waters of the U.S. that would be affected as a result of the proposed project based on a delineation of these waters. This delineation has not been verified by the USACE.

<u>Aquatic Types Within the Study Area</u>

Perennial Wetlands

Emergent Wetland

Emergent wetlands within the study area are dominated by herbaceous emergent plants such as California tule (*Schoenoplectus californicus*; OBL), hard-stem tule (*S. acutus*; OBL), narrow-leaf cattail (*Typha angustifolia*; OBL), broad-leaf cattail (*T. latifolia*; OBL), and floating water primrose (*Ludwigia peploides*; OBL). The vegetation assemblages typically associated with this wetland type are almost exclusively dominated by species rated as obligate on the National Wetland Plant List (Lichvar et al. 2016). These areas have a persistent vegetative aerial signature and evidence of inundation or saturation is present on most aerial images evaluated.

This wetland class typically occurs at the edges of ponds or lakes, along the margins of tidal channels, on in-channel islands of major tidal channels within the Delta, and where seepage occurs on the landside of levees. Average water depth in this type of feature is estimated to be around 3 feet.

Scrub-Shrub Wetland

Scrub-shrub wetlands within the study area are dominated by woody vegetation less than 20 feet tall and include shrubs typically associated with riparian areas such as sandbar willow (*Salix exigua*; FACW), Himalayan blackberry (*Rubus armeniacus*; FAC), red twig dogwood (*Cornus sericea* [syn. *C. alba*]; FACW) buttonwillow (*Cephalanthus occidentalis*; OBL), and California wild rose (*Rosa californica*; FAC). Fremont's cottonwood (*Populus fremontii* [syn. *P. deltoides*]; FAC) seedlings or saplings may also be present. The vegetation assemblages typically associated with this wetland type include species rated as obligate, facultative wetland, and facultative on the National Wetland Plant List (Lichvar et al. 2016). Herbaceous species are generally lacking or are a minor component of the vegetation assemblage as the canopy cover in scrub-shrub wetlands is high and low-growing herbaceous species do not receive sufficient light for survival. Evidence of saturation or inundation is more variable as compared to the emergent wetland class; however, the vegetation community is persistent due to the dominance of perennial shrubs.

The scrub-shrub wetland class typically occurs at the periphery of depressions, ponds, and lakes; along the margins of tidal and non-tidal channels; and on in-channel islands in the Delta. Average water depth in this type of feature is estimated to be around 2 feet.

Forested Wetland

Forested wetlands are defined by woody vegetation that is 20 feet tall or taller with a tree canopy cover equal to or greater than 25 percent. Riparian trees common in the study area include Goodding's black willow (*Salix gooddingii*; FACW), red willow (*S. laevigata*; FACW), box elder (*Acer negundo*; FACW), Oregon ash (*Fraxinus latifolia*; FACW), Fremont's cottonwood, white alder (*Alnus rhombifolia*; FACW), black walnut (*Juglans hindsii*; FAC), and valley oak (*Quercus lobata*; FACU). Forested wetlands generally have a shrub component, typically in canopy openings and along the forested edge. The presence of an herbaceous layer is variable. The vegetation assemblages typically associated with forested wetlands include species rated as facultative wetland and facultative on the National Wetland Plant List (Lichvar et al. 2016). Species with obligate or facultative upland ratings are occasional in forested wetlands, and generally not the dominant species represented in the habitat.

Forested wetlands within the study area are located along the edges of tidal and non-tidal channels, and on in-channel islands located within tidally influenced waterways. Evidence of saturation or inundation is variable on aerial images as compared to the emergent wetland class; however, the vegetation community is persistent due to the dominance of perennial tree species. Average water depth in this type of feature is estimated to be around 2 feet.

Seasonal Wetlands

Vernal Pool

Vernal pool wetlands are topographic depressions that are usually found within annual grassland habitats. There is a water-restricting soil horizon, often high in clay content and indurated, located near the soil surface that prevents water from infiltrating deep into the soil horizons and away from the root zone. These depressions fill with rainwater and may remain inundated through spring or early summer. Vernal pools often occur in complexes of many small pools that are hydrologically interconnected via overland surface flow through swales when pools are full. Water may also move below the soil surface as water infiltrates and travels above the hardpan or claypan layer into adjacent pools. Vernal pools support distinct herbaceous vegetation assemblages and many of the plant species that occur in this wetland type are endemic to California. Vernal pool wetlands can support a variety of floristic diversity, ranging from common to rare. Commonly encountered species typical of vernal pool habitats within the study area include popcorn flower (*Plagiobothrys* spp.; OBL to FACW), Fremont's tidy tips (*Layia fremontii*; OBL), goldfields (*Lasthenia* spp*.;* OBL to FACU), coyote thistle (*Eryngium* spp.; OBL to FACW), calicoflower (*Downingia* spp.; OBL), and pale spike rush (*Eleocharis macrostachya*; OBL). The wet phase of vernal pools is dominated by plants rated as obligate or facultative wetland on the National Wetland Plant List (Lichvar et al. 2016). As the vernal pools draw down as a result of evaporation and increased evapotranspiration in late spring and early summer, annual upland grasses sometimes colonize and become dominant in these seasonal wetland habitats.

Vernal pool wetlands within the study area are located primarily in areas that are relatively undeveloped without substantial land alteration. This wetland type occurs on lands with hummocky surfaces, primarily at the northernmost portion of the study area south of North Stone Lake, and along the western side of the San Joaquin Valley near Clifton Court Forebay. Average water depth in this type of feature is estimated to be around 1 foot.

Alkaline Wetland

Alkaline wetland is a type of seasonal wetland influenced by strongly alkaline or saline soils. Alkaline wetlands often support alkaline or saline tolerant shrubs such as iodine bush (*Allenrolfea occidentalis*; FACW), alkali heath (*Frankenia salina*; FACW), bush seepweed (*Suaeda nigra*; OBL), and saltbush (*Atriplex* spp.; FACW to FAC). The shrub layer may be co-dominate with salt-tolerant grasses including salt grass (*Distichlis spicata*; FAC) and alkali sacaton (*Sporobolus airoides*; FAC). This wetland type may have large unvegetated areas as a result of salt accumulations at or near the soil surface. Alkaline wetland habitats are dominated by an assemblage of plants with facultative wetland or facultative ratings on the National Wetland Plant List (Lichvar et al. 2016).

Evidence of seasonal saturation or inundation may be present on wet season aerial imagery, and salt crust presents bright white signatures during dry season imagery. Alkaline wetlands are primarily located in the southern portion of the study area on lands without substantial land alteration, or in small patches at the periphery of agricultural fields or along canals. Average water depth in this type of feature is estimated to be around 1 foot.

Seasonal Wetland

Seasonal wetlands are the most broad and diverse of the wetland types identified in this report. These wetlands are primarily colonized by herbaceous species that are common throughout the Central Valley and Delta. The vegetation assemblages typically associated with seasonal wetlands primarily include species rated as facultative wetland and facultative on the National Wetland Plant List (Lichvar et al. 2016), and often include ruderal species such as tall flatsedge (*Cyperus eragrostis*; FACW), Santa Barbara sedge (*Carex barbarae*; FAC), soft rush (*Juncus effusus*; FACW), fiddle dock (*Rumex pulcher*; FAC), curly dock (*R. crispus*; FAC), and perennial rye grass (*Festuca perennis* [syn. *Lolium perenne];* FAC). Species with obligate or facultative upland ratings typically comprise a lesser percentage of the plant community. The vegetation composition is influenced primarily by landscape position, influence of ground water, soil texture, and runoff and drainage properties, as well as anthropogenic and natural disturbances.

Seasonal wetlands are the most prevalent and widespread of all wetland classes mapped within the study area. Evidence of saturation or inundation is variable on aerial images, especially in areas with a high degree of anthropogenic modification and which may be subject to regular disturbance such as agriculture or winter flooding for migratory bird and waterfowl management. Numerous seasonal wetlands were mapped in active agricultural fields in the Delta. While the size and shape of seasonal wetlands in farmed fields is subject to a degree of annual variation which may result from on-going farming practices, some evidence of wet season inundation or saturation is visible in a typical year. Although ground water levels are controlled on Delta islands using a system of pumps and drainage ditches to maintain water levels on the subsided islands, a high water table persists in some areas. Upland crops planted in these areas may be subject to failure or may be impossible to harvest; therefore, aerial signatures indicating reduced growth and/or vigor in crops such as corn or areas within cropped fields that were seldom planted were interpreted as indications of wetland conditions and these areas were categorized as seasonal wetland. Average water depth in this type of feature is estimated to be around 1 foot.

Non-Tidal Waters

Agricultural Ditch

Agricultural land cover is common throughout the study area, most notably on Delta islands. Agricultural ditches are used for irrigation and drainage purposes. Agricultural ditches within the study area, particularly ones on Delta islands, may have been constructed in wetlands or may partially drain wetlands and, therefore, are potentially jurisdictional. Agricultural ditches range in size from 1 to 75 feet in width. These features are generally unvegetated with unconsolidated mud bottoms as a result of regular maintenance activities conducted to maintain capacity for drainage and water delivery. Tule and cattail species may colonize ditch side-slopes if there is a lapse in the vegetation maintenance cycle. Average water depth in this type of feature is estimated to be around 3 feet.

Natural Channel

Non-tidal natural channels are present primarily along the northeast and southwest portions of the study area. Natural channels include large perennial rivers that qualify as TNW, intermittent streams that qualify as RPW, and ephemeral channels that qualify as non-RPW. All features mapped to this class are assumed to have an OHWM as indicated by a change in vegetative character or break in bank slope, as evidenced on aerial imagery or DEM. The substrate in natural channels may be mud, sand, gravel, and/or cobble depending on geographic location. Natural channels within the study area include waterways such as drainages to Stone Lake and tributaries to the Cosumnes River and Italian Slough. Average water depth in this type of feature is estimated to be around 3 feet.

Depression

Depressions are open-water ponds that are permanently or seasonally inundated, with little to no rooted vegetation on an unconsolidated or mud bottom. These features may be artificially filled as a result of agricultural or stormwater detention, or may result from a high water table. Depressions are less than 20 acres in size and generally have a water depth of less than 6 feet. These water bodies are often created by excavation, and are diked or otherwise artificially impounded.

Depressions may be colonized by floating plant species such as common duckweed (*Lemna minor*; OBL), mosquito fern (*Azolla* spp.; OBL), or water hyacinth (*Eichhornia crassipes*; OBL), but generally lack rooted vegetation except on depression margins. Average water depth in this type of feature is estimated to be around 6 feet.

Tidal Waters

Tidal Channel

Tidal channels in the Delta are natural or constructed perennial riverine waterways, though most within the study area have been modified with leveed banks that are reinforced with rock revetment. In-channel water velocity and depth fluctuate under tidal influence, and the channel bottom is generally composed of mud or unconsolidated sediments with varying amounts of sand, silt, and clay.

Emergent wetlands that occur along the margins of tidal channels and in-channel islands that are also commonly encountered in the study area, notably along Old River and Middle River, were mapped separately from the tidal channel aquatic type.

Conveyance Channel

Conveyance channels include rock or cement-lined linear channels. These are constructed water features which are associated with the SWP or CVP. These features are generally straight as a result of excavation and are diked or have reinforced banks. Vegetation is generally absent due to water depth or a lack of rooting substrate. Control structures are present that periodically affect tidal influence, but conveyance channels experience tidal fluctuation when water is brought into the system, generally on a flood tide.

Surface Area of Discharge of Fill Material

The proposed project would result in the discharge of fill material into approximately 334.62 acres of waters of the U.S. The acres of waters that would be affected by surface fill are set out in Table 6 below. Locations of fill impacts are identified in **Attachment 1, Mapbook of Impacts**. Some of the impacts may be overestimated; for example, the location or configuration of some tunnel launch shaft, maintenance shaft, or reception shaft sites may be modified to further avoid wetlands and other waters, and the barge landing and bridge crossings are currently designed to be constructed on piles only, which would reduce the amount of estimated fill acreage.

Table 6. Acres of Filled Waters

Aquatic Type	*Permanent Fill (Acres)*	*Temporary Fill (Acres)*
Wetlands	**141.15**	**40.12**
Alkaline wetland	3.28	22.46
Emergent Wetland	6.62	0.72
Forested Wetland	1.62	0.73
Scrub Shrub Wetland	2.47	0.02
Seasonal Wetland	126.46	16.00
Vernal Pool	0.70	0.19
Other Waters	**106.30**	**47.05**
Agricultural Ditch	68.76	36.27
Conveyance Channel	21.45	0.95
Depression	1.73	0.00
Natural Channel	0.55	0.70
Tidal Channel	13.81	9.13
TOTAL	**247.45**	**87.17**

Block 23. DESCRIPTION OF AVOIDANCE, MINIMIZATION, AND COMPENSATION

The Applicant has designed the proposed project to avoid and minimize, to the maximum extent practicable, adverse impacts to waters of the U.S. However, unavoidable losses of aquatic resources would occur as a result of the project. The Applicant would provide appropriate compensatory mitigation for these unavoidable effects to aquatic resources in accordance with USACE regulations and policies.

Avoidance and Minimization Measures (AMMs)

The proposed project would be designed to avoid impacts to waters of the U.S. to the maximum extent practicable. The measures listed below and summarized in **Attachment 3, Avoidance and Minimization Measures,** describe the types of AMMs that would likely be implemented for the proposed project as it pertains to waters of the U.S. However, the Applicant will continue to develop AMMs through the environmental review process. Measures that would be implemented to avoid and minimize impacts to aquatic resources and species that use aquatic habitats are intended to reduce project impacts to waters of the U.S.

Table 7. Summary of the Avoidance and Minimization Measures

Title	Summary
Worker Awareness Training	Includes procedures and training requirements to educate construction personnel on the types of sensitive resources in the proposed project area, the applicable environmental rules and regulations, and the measures required to avoid and minimize effects on these resources.
Construction Monitoring	Standard practices and measures that will be implemented prior, during, and after construction to avoid or minimize effects of construction activities on sensitive resources (e.g., special-status species, habitat), and monitoring protocols for verifying the protection provided by the implemented measures.
Stormwater Pollution Prevention Plan Compliance	Includes measures that will be implemented to minimize pollutants in stormwater discharges during and after construction, and that will be incorporated into a stormwater pollution prevention plan to prevent water quality degradation related to pollutant delivery from proposed project area runoff to receiving waters.
Erosion and Sediment Control Plan	Includes measures that will be implemented for ground-disturbing activities to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities, and that will be incorporated into plans developed and implemented as part of the National Pollutant Discharge Elimination System permitting process for covered activities.
Spill Prevention and Control Plan and Hazardous Materials Management Plan Compliance	Includes measures to prevent and respond to spills of hazardous material including those that could affect waters of the U.S., including navigable waters, as well as emergency notification procedures.
Reusable Tunnel Material Handling and Storage	Includes measures for handling, storage, and disposal of reusable tunnel material.
Dewatering Considerations	Includes measures to minimize dewatering volumes and measures and requirements to treat and discharge dewatering flows.

Compensatory Mitigation

The Applicant would provide compensatory mitigation to offset unavoidable impacts to waters of the U.S. associated with the proposed discharges. In some cases, restoration actions that the Applicant intends to implement to provide habitat for species may also serve as compensatory mitigation for the loss of aquatic resources (e.g. created emergent marsh may function as both habitat for delta smelt and longfin smelt, as well as compensatory mitigation for discharges into emergent marsh habitat). The proposed compensatory mitigation would be subject to specific success criteria and monitoring requirements, assurances of permanent protection, and long-term maintenance and monitoring commitments pursuant to the requirements of the Mitigation Rule. In some cases, proposed mitigation would likely afford significantly higher function and value than that of waters proposed for discharge.

Compensation ratios, which are developed by USACE, must be, to the extent practicable, sufficient to replace lost aquatic resource functions. It is anticipated that mitigation ratios would be at a minimum of 1:1, but may be greater to account for such factors as the type of mitigation proposed (e.g., preservation), the likelihood of success, and the differences between the functions lost at the impact sites and the functions expected to be produced by the compensatory mitigation. The Applicant may propose a combination of several methods of mitigation, including restoration, enhancement, establishment, and preservation. The Applicant recognizes that USACE does not typically accept preservation as the only form of mitigation and, where preservation is proposed, USACE generally requires substantially greater ratios of replacement to impact. Different ratios would likely be developed for each affected aquatic resource type, and further, for each functional ranking within each aquatic resource type. Impacts to some lower functioning aquatic resources, such as seasonal wetland and agricultural ditches, may be mitigated out-of-kind with higher functioning aquatic resource types.

The Applicant will propose compensatory mitigation using one or more of the following approaches:

- Purchase of credits at a USACE approved mitigation bank
- Payment into a USACE approved in-lieu fee program
- On-site (adjacent to the project footprint) restoration or enhancement of aquatic resources converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities
- On-site (adjacent to the project footprint) creation of aquatic resources
- Off-site (within the Delta) restoration or enhancement of aquatic resources converted to uplands due to past land use activities (such as agriculture) or functionally degraded by such activities
- Off-site (within the Delta) creation of aquatic resources

<u>Purchase of Mitigation Bank Credits or Payment into In-lieu Fee Program</u>

DWR may purchase bank credits and/or make payments into an in-lieu fee program to compensate for impacts. DWR would utilize programs that have been USACE-approved and have service areas that encompass areas in which the proposed impacts would occur.

<u>On-Site Restoration, Enhancement, and/or Creation</u>

Much of the Delta consists of degraded or converted habitat that is generally functioning as upland. DWR would seek opportunities to conduct on-site restoration, enhancement, and/or creation in areas adjacent to project footprints. It is anticipated that some of the compensatory mitigation would fall into this category.

<u>Off-Site Restoration, Enhancement, and/or Creation</u>

Within the immediate vicinity of the project area, much of the land has been subject to agricultural or other land uses which have degraded or even eliminated wetlands that existed historically. DWR would evaluate sites within the Delta to determine their potential for restoration, enhancement, and/or creation. It is anticipated that most of the compensatory mitigation obligation would be satisfied through this approach.

Prior to submitting a draft and final mitigation plan to USACE, the Applicant will prepare a preliminary mitigation plan that will identify mitigation options, including methods and locations, that may be used to adequately compensate for unavoidable impacts to aquatic resources. The Applicant will seek input from USACE regarding these options and will prepare a final mitigation plan that reflects USACE guidance.

Block 25. ADDRESSES OF ADJOINING PROPERTY OWNERS

Please see **Attachment 4, Adjacent Landowner Mailing List.**

Block 26. LIST OF OTHER CERTIFICATES/APPROVALS

AGENCY	TYPE OF APPROVAL	STATUS
USFWS	Biological Opinion/Incidental Take Statement	Expected 2021
NMFS	Biological Opinion/Incidental Take Statement	Expected 2021
CDFW	2081(b) Incidental Take Permit	Expected 2021
CDFW	Streambed Alteration Agreement	Expected 2021
SWRCB	Change in Point of Diversion	Expected 2021
SWRCB	Water Quality Certification/WDR	Expected 2022

C. Additional Information

In addition to the supplemental data above, the following **additional information** is provided to assist USACE in the permit process.

1. NEPA

In order to comply with the NEPA, the federal lead agency will develop an EIS for the proposed Delta Conveyance Project, which is intended to provide the analysis for all federal actions that are necessary for implementation of the proposed project.

2. WATER QUALITY CERTIFICATION

A Clean Water Act Section 401 Water Quality Certification (WQC) will be required from the State Water Resources Control Board (SWRCB). Because the proposed project crosses multiple Regional Water Boards' jurisdiction and issuance of water right authorization is required, the SWRCB will be responsible for issuing a water quality certification.

DWR has not yet submitted the application for the Section 401 WQC; this will likely happen in late 2021. In addition, implementation of the proposed Delta Conveyance Project will require the SWRCB to authorize a change in the point of diversion for the SWP, amending DWR's water right. Preliminary coordination with the SWRCB has begun and is ongoing.

3. ENDANGERED SPECIES

The federal action agency will determine if its action may affect a listed species or critical habitat and develop a biological assessment (BA) consistent with this determination. If the action is likely to adversely affect the listed species or critical habitat, the federal action agency will request formal consultation with the Services (United States Fish and Wildlife Service and National Marine Fisheries Service) and this consultation will result in the Services' issuance of biological opinions. It is anticipated the proposed Delta Conveyance Project will have effects on listed species requiring formal consultation.

DWR will work with USACE to define the scope of the Section 7 consultation process and development of the BA. Submittal of a BA is anticipated for late-2020. Informal coordination with the Services has begun and is ongoing.

4. CULTURAL RESOURCES

The National Historic Preservation Act (NHPA), 16 U.S.C. §§ 470a to 470w-6, is the primary federal law governing the preservation of cultural and historic resources in the United States. The law establishes a national preservation program and a system of procedural protections which encourage the identification and protection of cultural and historic resources of national, state, tribal and local significance. Federal law, 54 U.S.C. §306108, which is commonly known as "Section 106" of the NHPA, requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The Section 106 process is governed by federal regulations issued by the ACHP, "Protection of Historic Properties" (36 CFR Part 800) (August 5, 2004).

It is anticipated that the USACE will be the lead federal agency pursuant to Section 106. An area of potential effect (APE) for purposes of Section 106 compliance has not yet been identified, nor have surveys been conducted. DWR will work with USACE to define the APE and assist with compliance with Section 106.

5. ANALYSIS OF ALTERNATIVES

The Applicant will develop an analysis of alternatives pursuant to the Section 404(b)(1) Guidelines (40 C.F.R. section 230.10(a)-(d)) to support the USACE's findings and permit decision under Section 404. The analysis of alternatives will be submitted to USACE separate from this application.

6. 408 AUTHORIZATION

A Section 408 permission under Section 14 of the Rivers and Harbors Act of 1899 (RHA) will be required for the proposed Delta Conveyance Project. To construct the proposed water conveyance facility, and potentially associated mitigation, the USACE facilities potentially altered requiring Section 408 permission are the Sacramento River Flood Control Project (SRFCP) and the Stockton Deep Water Ship Channel (Stockton DWSC).

The process for securing Section 408 permission is set forth in the Department of the Army, U.S. Army Corps of Engineers, Circular No. EC 1165-2-220 and involves (1) precoordination; (2) submit Review Plan (3) written request; (4) required documentation (including environmental compliance, if applicable); (5) district-led Agency Technical Review (ATR); (6) Summary of Findings; (7) division review; (8) headquarters review; (9) notification; and (10) post-permission oversight. Not all the steps will apply to every Section 408 request. In simple cases, steps may be combined or be undertaken concurrently.

The Section 408 permission process, as defined by EC 1165-2-220, also requires a "Statement of No Objection" letter from the non-federal sponsor, which is the Central Valley Flood Protection Board

(CVFPB) for the proposed Delta Conveyance Project. On May 22, 2020, the CVFPB sent the "Statement of No Objection" letter to USACE.

The Applicant expects that Section 408 permission will be obtained concurrently with Section 404 and 10 permit authorizations. Early coordination with USACE regarding Section 408 permission has been initiated and is ongoing. The 408 application is expected to be submitted in mid-2022.

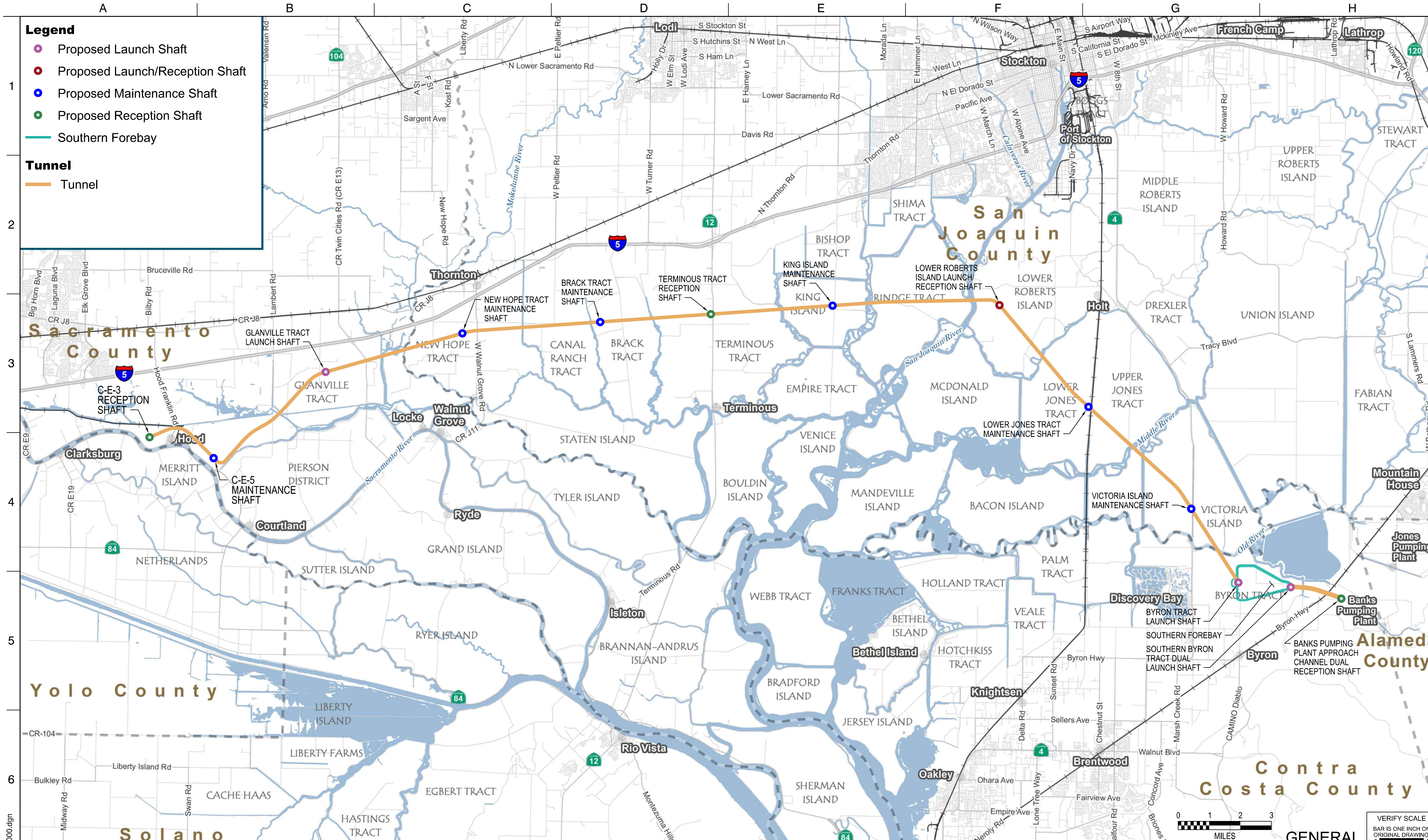
Attachments

Attachment 1 – Mapbook of Impacts

Attachment 2 – Proposed Delta Conveyance Project Overview Map

Attachment 3 – Avoidance and Minimization Measures

Attachment 4 – Adjacent Landowner Mailing List



REV	DATE	DESCRIPTION	SUB.	APPD

DESIGNED | APPROVAL RECOMMENDED
DRAWN | APPROVAL BY
CHECKED

Attachment 2

Proposed Delta Conveyance Project Overview Map

PROJECT NO. W8X97000
SHEET NO. STE-G-0050GN
REV | SEQUENCE NO.

STE-G-0051GN_W8X97000.dgn

Attachment 3: Avoidance and Minimization Measures

The proposed project would be designed to avoid impacts to waters of the U.S. to the maximum extent practicable. The measures summarized below describe the types of Avoidance and Minimization Measures (AMMs) that would likely be implemented for the proposed project as it pertains to waters of the U.S. However, the Applicant will continue to develop AMMs through the environmental review process. Measures that would be implemented to avoid and minimize impacts to aquatic species and species that use aquatic habitats are intended to reduce proposed project impacts to waters of the U.S.

Table 1. Summary of the Avoidance and Minimization Measures

Title	Summary
Worker Awareness Training	Includes procedures and training requirements to educate construction personnel on the types of sensitive resources in the proposed project area, the applicable environmental rules and regulations, and the measures required to avoid and minimize effects on these resources.
Construction Monitoring	Standard practices and measures that will be implemented prior, during, and after construction to avoid or minimize effects of construction activities on sensitive resources (e.g., special-status species, habitat), and monitoring protocols for verifying the protection provided by the implemented measures.
Stormwater Pollution Prevention Plan Compliance	Includes measures that will be implemented to minimize pollutants in stormwater discharges during and after construction, and that will be incorporated into a stormwater pollution prevention plan to prevent water quality degradation related to pollutant delivery from proposed project area runoff to receiving waters.
Erosion and Sediment Control Plan	Includes measures that will be implemented for ground-disturbing activities to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas affected by construction activities, and that will be incorporated into plans developed and implemented as part of the National Pollutant Discharge Elimination System permitting process for covered activities.
Spill Prevention and Control Plan and Hazardous Materials Management Plan Compliance	Includes measures to prevent and respond to spills of hazardous material including those that could affect waters of the U.S., including navigable waters, as well as emergency notification procedures.
Reusable Tunnel Material Handling and Storage	Includes measures for handling, storage, and disposal of reusable tunnel material.
Dewatering Considerations	Includes measures to minimize dewatering volumes and measures and requirements to treat and discharge dewatering flows.

Worker Awareness Training

DWR would provide training to field management and construction personnel on the importance of protecting sensitive natural resources (i.e., special-status fish species, wildlife species, plant species, and designated critical and/or suitable habitats for these species). Training would be conducted during preconstruction meetings so that construction personnel would be aware of their responsibilities and the importance of compliance. All trainees would be required to sign a sheet indicating their attendance and completion of environmental training. The training sheets would be provided to the fish and wildlife agencies if requested. These requirements would also pertain to operations and maintenance personnel working in and adjacent to special-status species habitat and natural communities.

Construction personnel would be educated on the types of sensitive resources located in the proposed project area and the measures required to avoid and minimize effects on these resources. Materials covered in the training program would include environmental rules and regulations for the specific proposed project and requirements for limiting activities to approved work areas, timing restrictions, and avoidance of sensitive resource areas.

A fact sheet or other supporting materials containing this information would be prepared and would be distributed along with a list of contacts (names, numbers, and affiliations) prior to initiating construction activities. A representative would be appointed by the project proponent to be the primary point of contact for any employee or contractor who might inadvertently take a special-status species, or a representative would be identified during the employee education program and the representative's name and telephone number provided to the fish and wildlife agencies.

If new construction personnel are added to the proposed project, the contractor would ensure that the personnel receive the mandatory training and sign a sheet indicating their attendance and completion of the environmental training before starting work. The training sheets for new construction personnel would be provided to the fish and wildlife agencies, if requested.

Construction Monitoring

DWR would ensure that all construction and operation and maintenance activities in and adjacent to sensitive resources areas (e.g., special status fish, wildlife, and plant species habitats, and natural communities) implement best management practices (BMPs) and have construction monitored by qualified technical specialists. Depending on the resource of concern and construction timing, construction activities and areas would be monitored for compliance with water quality regulations (Stormwater Pollution Prevention Plan and water quality monitoring) and sensitive biological resources regulations (biological monitoring).

Before implementing an approved project, DWR would prepare a construction monitoring plan for the protection of special status fish, wildlife, and plant species that includes summaries of preconstruction surveys, site specific measures to be implemented, monitoring requirements, roles and responsibilities, and a monitoring log.

Stormwater Pollution Prevention Plan Compliance

Under the regulatory oversight of the State Water Resources Control Board and in compliance with the required Construction General Permit, a Stormwater Pollution Prevention Plan (SWPPP) would be required to protect adjacent water bodies related to constituent discharge from stormwater runoff and dewatering flows. The SWPPP would be prepared prior to the initiation of construction and would identify applicable best management practices (BMPs) to prevent and minimize the introduction of contaminants into surface waters. The BMPs would be implemented before, during, and after construction and, for the proposed project, would be anticipated to include site stormwater and non-stormwater management, erosion and sedimentation controls, and an inspection, monitoring, and maintenance program, such as the measures listed below.

- Temporary erosion control measures (e.g. silt fencing, straw bale barriers, fiber rolls, storm drain inlet protection, hydraulic mulch, and stabilized construction entrances) for all disturbed areas.
- Site specific structural and operational BMPs to prevent and control impacts on runoff water quality, measures to be implemented before each storm event, inspecting and maintaining BMPs, and monitoring of runoff quality by visual and/or analytical means. For the larger proposed project sites with many acres of disturbed area during construction, i.e. intakes, launch shafts, and the Southern Forebay, this would be anticipated to include the employment of on-site pump and treat systems and the utilization of Bakertanks.
- Preventing off-site runoff from entering the construction site by delineating proposed project sites with drainage ditches around the entire disturbed area and retaining sediment onsite by a system of sediment basin, traps, or other appropriate measures.
- Monitoring and providing appropriate treatment to all on-site water flows prior to reuse or discharge.
- Ensuring no disturbed surfaces would be left without erosion control measures in place during the winter and spring months.
- Implementing and monitoring post-construction erosion control measures (including silt fencing, straw bale barriers, fiber rolls, hydraulic mulch/seeding, and vegetative plantings) to ensure minimization of water quality and associated impacts.

Erosion and Sediment Control Plan

DWR would ensure the preparation and implementation of erosion and sediment control plans to control short-term and long-term erosion and sedimentation effects and to restore soils and vegetation in areas damaged by construction activities. It is anticipated that multiple erosion and sediment control plans would be prepared for proposed project-related construction activities, each taking into account site-specific conditions such as proximity to surface water, erosion potential, drainage, etc. The plans will include all the necessary Construction General Permit (CGP) requirements regarding erosion control and will specify BMPs for erosion and sediment control that are to be implemented during construction activities. These BMPs will be incorporated into the SWPPPs.

Erosion control measures could include the following:

- Install physical erosion control stabilization features (hydroseeding with native seed mix, mulch, silt fencing, fiber rolls, sand bags, and erosion control blankets) to capture sediment and control both wind and water erosion. Erosion control may not utilize plastic monofilament netting.

- Keep emergency erosion-control supplies onsite at all times during construction, and have the contractor(s) use these emergency stockpiles as needed. DWR and/or the contractors would ensure that supplies used from the emergency stockpiles are replaced within 48 hours. DWR would also ensure that materials used in construction of erosion control methods will be removed from the work site and properly disposed when no longer needed.
- Design grading to be compatible with adjacent areas and minimize potential for disturbance of adjacent terrain and natural land features and minimize erosion in disturbed areas to the extent feasible.
- Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities.
- To the extent feasible, retain native trees and vegetation to help stabilize hillsides, retain moisture, and reduce erosion.
- Sequence clearing of native vegetation, and disturbance of soils to minimize overall time of soil disturbance.
- Implement construction management and scheduling measures to avoid exposure to rainfall events, runoff, or flooding at construction sites to the extent feasible.
- Conduct frequent site inspections (before and after significant storm events) to ensure that control measures are intact and working properly and to correct problems as needed.
- Install drainage control features (e.g., berms and swales, slope drains) as necessary to avoid and minimize erosion.
- Install wind erosion control features (e.g., application of hydraulic mulch or bonded fiber matrix).

Sediment control measures could include:

- Use detention ponds, silt traps, wattles, berms, barriers or similar measures to slow water velocity and retain sediment transported by onsite run on or runoff.
- Collect and direct surface run on and runoff at non-erosive velocities to controlled drainage courses.
- When ground disturbing activities are required adjacent surface water, wetlands, or aquatic habitat, the use of sediment and turbidity barriers, soil stabilization and revegetation of disturbed surfaces.
- Prevent mud from being tracked onto public roadways by installing gravel on primary construction ingress/egress points, rumble plates, and/or truck tire washing.
- Deposit or store excavated materials away from drainage courses and cover if left in place for more than 5 days or storm events are forecast within 48 hours.

In-River Water Quality Monitoring

Several in-water construction activities could increase suspended sediment in the water column, including, pile driving, dredging, riprap placement, and riparian corridor clearing and grubbing.

Turbidity monitoring would occur both upstream and downstream of construction activity. Water quality would be monitored upstream of the construction activity to determine baseline ambient turbidity levels.

After construction is complete, site-specific restoration efforts would include grading, post construction BMPs for erosion control, and revegetation. Revegetation would emphasize self-sustaining, local native plants, unless the owner of the property or an agency having jurisdiction requires a different but equally or more effective approach to restoring disturbed areas. All disturbed areas would be graded, with disturbed areas revegetated by seeding or other means. Once post construction BMPs are constructed and revegetation is appropriately established a Notice of Termination would be filed with the State Water Board.

Spill Prevention and Control Plan and Hazardous Materials Management Plan Compliance

A Spill Prevention and Control Plan (SPCP) and Hazardous Materials Management Plan (HMMP) would be developed and implemented to minimize effects from spills of hazardous or petroleum substances during construction and operation/maintenance of the proposed project. The plans would include measures to avoid the accidental release of chemicals, fuels, lubricants, and non-stormwater into channels and account for all applicable federal, state, and local laws and regulations including the Spill Prevention, Control, and Countermeasure (SPCC) Regulation and the Resource Conservation and Recovery Act (RCRA), such as the following measures.

- Spill prevention kits in proximity where hazardous materials would be used (e.g., crew trucks and other logical locations).
- Hazardous materials handling plan training to properly implement all reasonable means when working in or near any waterway.
- For all fueling of stationary equipment at the construction sites, containments would be provided to the degree that any spill would not enter the channel or damage wetland or riparian vegetation.

Additional BMPs designed to avoid spills from construction equipment as well as equipment used for the operation and maintenance of proposed project facilities would also be implemented, including:

- Storage of hazardous materials in double containment.
- Disposal of all hazardous and nonhazardous products in a proper manner.
- Monitoring of onsite vehicles for fluid leaks and regular maintenance to reduce the chance of leakage.
- Containment (a prefabricated temporary containment mat, a earthen berm, or other measure can provide containment) of bulk storage tanks having a capacity of 55 gallons or more.

Existing federal, state and local worker safety and emergency response regulations require that if any unforeseen hazardous conditions are discovered during construction, the contractor coordinate with the appropriate agencies including Sacramento, San Joaquin, Contra Costa, and Alameda counties for the safe handling, sampling, transportation, and disposal of encountered materials. The contractor would be required to comply with Cal/OSHA worker health and safety standards that ensure safe workplaces and work practices.

Reusable Tunnel Material Handling and Storage

In the course of constructing proposed project facilities, specifically the tunnel construction, substantial quantities of reusable tunnel material (RTM) would be generated. These materials would require handling, storage, and disposal, as well as chemical characterization, prior to any reuse. Temporary storage areas would be designated for these materials. The proposed locations of the storage areas for RTM have been designed to be close to where the material will be brought to the surface, as well as close to where reuse is expected to occur.

Placement of material in sensitive natural communities and habitat areas, such as surface waters, wetlands, vernal pool complex, alkali seasonal wetland complex or grassland, native grasslands, riparian areas, or crane roost sites, would be avoided or minimized to the extent feasible.

After the RTM is brought to the surface, it would be placed in lined temporary stockpile areas while it is tested for the potential presence of hazardous materials. Each lined area would be generally sized to accommodate 1 week of RTM production. If portions of the RTM were identified as hazardous, that material would be transported to a disposal location licensed to receive those constituents. If the RTM meets the criteria for reuse, the material would be moved to a long term on-site storage site or transported off site for subsequent reuse. Any water collected from the temporary stockpile areas would be tested and treated on-site, if necessary, and stored for on-site reuse or conveyed to a receiving water body. The testing frequency would depend upon the volume of RTM generated by the tunnel advance. As a typical guideline, testing would performed once or twice a day per RTM generation point as the tunnel is excavated.

RTM soil conditioning agents would be liquid formulations of mixtures of long-chained fatty acids or glycosides with acid, alcohol, or ether functional groups that provide good surfactant properties. The soil conditioners would consist of slightly ionized organic molecules which would not affect soil pH, nor the leachability of metals from the RTM. While the liquid formulations, when handled by workers, would pose eye and skin irritation hazards, when blended with native soil after use in a tunnel boring machine, the soil conditioners would not pose a health hazard to humans or the environment. Spill prevention plans would be implemented to prevent the liquid surfactant from entering surface waters or groundwater and all runoff on the construction site would be diverted to wastewater monitoring and treatment facilities.
Stockpiles would be sufficiently stabilized to reduce dust through water application to form a crust, placement of covers or geotextile fabric over the stockpiles, or application of soil binders or chemical soil stabilizer, or mulch.

Dewatering Considerations

Groundwater throughout most of the construction locations is likely to be located within 1 to 5 feet below the ground surface. Therefore, construction activities would either be conducted within a wet environment or groundwater would be removed from the construction area with dewatering pumps.

To minimize the dewatering volumes, slurry walls, diaphragm walls, and cutoff walls would be constructed around the intake boundaries, tunnel shafts, Pumping Plant, and the Southern Forebay. Slurry walls, diaphragm walls, and cutoff walls would extend to soils with clay to connect with competent soils and isolate the construction site from adjacent groundwater, rivers, or sloughs. Following construction of these walls, dewatering would remove the groundwater within the walls at the excavations and tunnel shafts.

Recovered dewatering flows could be stored on the construction site for construction water (e.g., preparation of grout or slurry materials), dust control, and fire suppression. Water used for grout or slurry materials would not necessarily require removal of constituents present in the groundwater because the water would not flow into the surrounding surface water. Water used for dust control would either evaporate or would flow into SWPPP water handling and treatment facilities to be tested prior to flowing into surrounding surface water bodies. However, use of dewatering flows for fire water supplies could require treatment in the same manner as dewatering flows that would directly enter into the surrounding surface water bodies.

Treatment of Dewatering Flows

Dewatering flows would be initially tested to determine if the flows needed to be treated prior to reuse or discharge. All of the proposed project facilities considered in this report would be located within the Central Valley Regional Water Quality Control Board (CV RWQCB) basin plan boundaries. Discharge of construction dewatering flows are regulated under Order R5-2016-0076-01, Waste Discharge Requirements Limited Threat Discharges to Surface Water, or its successor orders. Construction dewatering requirements would be consistent with Order R5-2016-0076-01 if the discharged flows (after treatment) comply with maximum constituent concentrations, as described below; maximum daily discharge of less than 250,000 gallons/day or over a period of time of less than 4 months; or a maximum daily discharge of more than 250,000 gallons/day and over a period of time of more than 4 months.

Treatment requirements would be developed in accordance with CV RWQCB Order R5-2016-0076-01, or its successor orders. Treatment would probably be provided on-site using self-contained "package water treatment plants," or the water would be conveyed to another proposed project construction location for centralized treatment at a package water treatment plant. The discharge water would not be conveyed to municipal water or wastewater treatment plants. Solids or other materials removed by the water treatment plants would be removed from the construction sites for disposal at facilities licensed to handle the materials.

Only water that complied with the requirements of the CV RWQCB at the time of the construction would be reused or discharged to surface water bodies. It is anticipated that the current water quality requirements could be modified in the future, and that the actual water quality criteria would be different than the following summary of existing CV RWQCB criteria.

The current water quality criteria include compliance with protections of Impaired Water Bodies (as defined in the Clean Water Act section 303(d)), including criteria to comply with Total Maximum Daily Loads (TMDLs) that have been adopted or are currently under development, as described in the CV RWQCB Final Staff Report, Section 303(d) 2018 Impaired Waters List Updates for the Central Valley Region (June 2019). The currently adopted TMDL criteria for Delta water bodies address several pesticides (diazinon and chlorpyrifos throughout the Delta) and dissolved oxygen in the Stockton Deep Water Ship Channel. TMDLs for pyrethroids (another family of pesticides) are under development by the CV RWQCB.

The current water quality criteria (Order R5-2016-0076-01) would require compliance with adopted criteria prior to discharge of dewatering flows to surface waters in the Delta. It should be noted that beneficial uses of the Delta water bodies, as regulated by the State Water Resources Control Board and CV RWQCB, may include use for municipal water supplies, and that this designation would require stringent criteria for many constituents, including pH, metals, nitrogen compounds, pesticides, dissolved oxygen, turbidity, priority pollutants, fecal coliform, and temperature. No substances would be allowed at concentrations that would adversely affect beneficial uses, including chronic toxicity, biostimulatory substances that increase aquatic growth, un-ionized ammonia, discoloration, floating materials, oil and grease, suspended solids, or settleable solids. If the electric conductivity of the groundwater would be greater than 900 micromhos/centimeter (a measure of salinity) for a discharge of at least 250,000 gallons/day for at least 180 days, then the dischargers would be required to submit a Salinity Evaluation and Minimization Plan to describe treatment to reduce the discharge of salinity. This analysis would include water quality analytical results to identify the salinity concentrations in the groundwater.

At some locations, high concentrations of specific constituents could occur at less than toxic concentrations; however, it could be appropriate to collect and haul the dewatering flows for use on another site that would not create a high potential for discharge into water bodies. For example, high boron groundwater concentrations occur near the SWP Banks Pumping Plant approach channel. If the dewatering flows included elevated boron concentrations, the dewatering flows from the control structure would be hauled to the Southern Forebay and mixed in a tank with other dewatering flows that would be stored for use in construction tasks or dust control.

A surface water monitoring program would be established as required by Order R5-2016-0076-01, or its successors. The monitoring program would be initiated prior to construction to understand seasonal water quality patterns. The monitoring program would extend for a period of time following construction.

Capacity of Channels Used for Discharge Flows

The ability to discharge dewatering flows at any construction site would also be dependent upon the proximity to surface water channel or water body with adequate capacity to assimilate the discharge flows. The intakes would be located along the Sacramento River, and it is anticipated that the dewatering flows could be discharged into the river without increasing surface water elevations or velocities because the dewatering flows would be a small percent of the flows in the Sacramento River.

The Southern Forebay and Pumping Plant construction locations would be located adjacent to Italian Slough and treated flows could be discharged to those water bodies.

Some of the tunnel shafts would not be located adjacent to major waterways; although the construction sites would be near drainage ditches or underdrains that convey surface water and/or high groundwater through pipelines to the major waterways. If the entire area served by the drainage ditches, underdrains, and pipelines would be acquired for construction shaft, the existing facilities could possibly be used to convey water to the major waterway. However, for locations where the entire areas served by local drainage facility would not be acquired for the proposed project, new pipelines would need to be installed, possibly above-ground with a pump to convey water into the major waterway. During design, hydraulic quantitative analyses of existing facilities that could be used for dewatering flows would be conducted to determine the available capacity with and without the dewatering flows and the size of new conveyance facilities.