

Draft Supplement to
City of Stockton
Regional Wastewater Control Facility
Modifications Project
Environmental Impact Report

State Clearinghouse No. 2018092017

Outfall Relocation Project

Prepared for:

City of Stockton
Municipal Utilities Department
2500 Navy Drive
Stockton, CA 95206

February 2022

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Prepared for:

City of Stockton Municipal Utilities Department
2500 Navy Drive
Stockton, CA 95206

Contact: Deedee Antypas, Deputy Director of Wastewater Operations
deedee.antypas@stocktonca.gov

Prepared by:

Robertson-Bryan, Inc.
3100 Zinfandel Drive, Suite 300
Rancho Cordova, CA 95670

Contact: Michelle Brown, PE, Project Manager
Robertson-Bryan, Inc.
Telephone: (916) 405-8933
michelle@robertson-bryan.com

Ascent Environmental, Inc.
455 Capitol Mall, Suite 300
Sacramento, CA 95814

Contact: Andrea L. Shephard, PhD, Project Manager
Ascent Environmental, Inc.
Telephone: (916) 842-3179
andrea.shephard@ascentenvironmental.com

February 2022

TABLE OF CONTENTS

Section	Page
LIST OF ABBREVIATIONS	IV
1 INTRODUCTION	1-1
1.1 Proposed Changes to Project	1-1
1.2 Purpose and Intended Uses of This Draft Supplemental EIR.....	1-1
1.3 CEQA Updates Since Certification of the EIR.....	1-2
1.4 Scope of This Draft Supplemental EIR.....	1-2
1.5 Agency Roles and Responsibilities.....	1-5
1.6 Public Review Process.....	1-7
1.7 Draft Supplemental EIR Organization.....	1-7
1.8 Standard Terminology.....	1-8
2 EXECUTIVE SUMMARY	2-1
2.1 Introduction.....	2-1
2.2 Summary Description of the Project.....	2-1
2.3 Summary of Environmental Impacts and Recommended Mitigation Measures	2-3
2.4 Summary of Alternatives Analysis.....	2-3
2.5 Areas of Controversy and Issues to Be Resolved	2-3
3 PROJECT DESCRIPTION	3-1
3.1 Project Location.....	3-1
3.2 Project Background.....	3-1
3.3 Project Purpose and Objectives.....	3-1
3.4 Project Site Description.....	3-3
3.5 Project Components.....	3-4
3.6 Project Construction	3-17
3.7 Project Operation and Maintenance.....	3-21
4 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES	4-1
Approach to the Environmental Analysis.....	4-1
4.1 Hydrology and Water Quality	4-3
4.2 Terrestrial Biological Resources	4-13
4.3 Aquatic Biological Resources.....	4-29
5 CUMULATIVE IMPACTS	5-1
5.1 Regulatory Background	5-1
5.2 Geographic Context	5-1
5.3 Related Projects.....	5-1
5.4 Cumulative Impacts by Resource Topic	5-3
6 ALTERNATIVES ANALYSIS	6-1
6.1 Introduction.....	6-1
6.2 Alternatives Considered, but Not Analyzed in Detail.....	6-2
6.3 Alternatives Selected for Detailed Analysis	6-3
6.4 Environmentally Superior Alternative	6-6

7 OTHER CEQA-MANDATED SECTIONS7-1
 7.1 Growth Inducement 7-1
 7.2 Significant and Unavoidable Adverse Impacts..... 7-4
 7.3 Significant and Irreversible Environmental Changes 7-4
 8 REPORT PREPARATION8-1
 9 REFERENCES.....9-1

Appendices

Appendix A Project Thermal Plume GraphicsA-1

Figures

Figure 3-1 Project Location..... 3-2
 Figure 3-2 Key Features in Project Vicinity 3-3
 Figure 3-3 Existing Site Conditions..... 3-5
 Figure 3-4 Project Features..... 3-7
 Figure 3-5 RWCF Modifications Project Facilities Not Being Constructed as a Result of Proposed Outfall Relocation 3-9
 Figure 3-6 Typical Cured-in-Place Pipe Install 3-11
 Figure 3-7 Proposed Project Site Plan and Profile 3-13
 Figure 3-8 Proposed Outfall Detail..... 3-15
 Figure 3-9 Sediment Settling Tank and Staging Area Locations 3-17
 Figure 3-10 Trees to Be Removed for Outfall Construction..... 3-18
 Figure 4.3-1 November Median-Case Thermal Plume, Based on Effluent Temperature of 75.9°F, River Temperature of 61.9°F (14.0°F Temperature Differential), Effluent Flow of 52.0 mgd, and River Velocity of 0.71 fps..... 4-50
 Figure 4.3-2 November Worst-Case Thermal Plume, Based on Effluent Temperature of 74.4°F, River Temperature of 52.9°F (21.4°F Temperature Differential), Effluent Flow of 48.7 mgd, and River Velocity of 0.05 fps 4-51
 Figure 4.3-3 March Median-Case Thermal Plume, Based on Effluent Temperature of 74.6°F, River Temperature of 61.2°F (13.4°F Temperature Differential), Effluent Flow of 32.2 mgd, and River Velocity of 0.86 fps..... 4-52
 Figure 4.3-4 March Worst-Case Thermal Plume, Based on Effluent Temperature of 69.6°F, River Temperature of 49.5°F (20.1°F Temperature Differential), Effluent Flow of 52.0 mgd, and River Velocity of 0.05 fps 4-53

Tables

Table 2-1	Summary of Environmental Impacts and Mitigation Measures.....	2-4
Table 3-1	Construction Equipment Required for Each Project Element.....	3-20
Table 4.2-1	Special-Status Plant Species Known to Occur in the Project Region and Their Potential for Occurrence in the Project Site	4-16
Table 4.2-2	Special-Status Animal Species Known to Occur in the Project Region and Their Potential for Occurrence in the Project Site	4-18
Table 4.3-1	Principal Occurrences of Chinook Salmon, Steelhead, Delta Smelt and Green Sturgeon in the Lower Reach of the San Joaquin River	4-30
Table 4.3-2	Delta Smelt Thermal Tolerance Studies	4-30
Table 4.3-3	Steelhead Thermal Tolerance Studies.....	4-31
Table 4.3-4	Chinook Salmon Thermal Tolerance Studies.....	4-32
Table 4.3-5	Sturgeon Thermal Tolerance Studies.....	4-34
Table 4.3-6	Upper Temperature Limits and Preferred Temperature Ranges for Native and Introduced Resident Fish Species Occurring in the San Joaquin River	4-35
Table 4.3-7	CORMIX Input Parameters for New RWCF Outfall Configuration.....	4-39
Table 4.3-8	CORMIX Flow and Temperature Input Parameters for Plume Scenarios Modeled	4-40
Table 4.3-9	Underwater Noise Criteria for Injury and Adverse Behavioral Effects to Fish.....	4-44
Table 5-1	Geographic Scope of Cumulative Impacts.....	5-1
Table 5-2	Cumulative Projects List.....	5-2
Table 6-1	Environmental Analyses Summary.....	6-6

LIST OF ABBREVIATIONS

°F	degrees Fahrenheit
BMI	benthic macroinvertebrates
BMP	best management practices
CCR	California Code of Regulations
CCTV	closed-circuit television
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CIPP	cured-in-place pipe
City	City of Stockton
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSLC	California State Lands Commission
CVFPB	Central Valley Flood Protection Board
CWA	Clean Water Act
dB	decibels
dbh	diameter at breast height
Delta	Sacramento–San Joaquin Delta
DPS	Distinct Population Segment
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEPS	final effluent pump station
MBTA	Migratory Bird Treaty Act
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
PBF	physical and biological feature
PRC	Public Resources Code
RD 404	Reclamation District 404
RWCF	Regional Wastewater Control Facility
RWQCB	Regional Water Quality Control Board
SJMSCP	San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SRWTP	Sacramento Regional Wastewater Treatment Plant
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TMDL	total maximum daily loads
TSS	total suspended solids
UILT	upper incipient lethal temperature
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
μPa	micropascal

1 INTRODUCTION

The City of Stockton (City) is implementing modifications to its Regional Wastewater Control Facility (RWCF). Modifications to the RWCF are required to maintain compliance with the RWCF National Pollutant Discharge Elimination System (NPDES) permit, extend the useful life of existing facilities, improve working conditions for facility staff, and implement components of the City's Capital Improvement and Energy Management Plan. The City certified the RWCF Modifications Project Environmental Impact Report (EIR) (State Clearinghouse No. 2018092017) in March 2019. A supplement to the RWCF Modifications Project EIR (referred to as a Supplemental EIR) is being prepared to address a change in the location of the outfall through which RWCF effluent would be discharged to the San Joaquin River (referred to herein as the Outfall Relocation Project, or "project") relative to that described and assessed in the RWCF Modifications Project EIR.

This Draft Supplemental EIR has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations [CCR] Section 15000 et seq.).

1.1 PROPOSED CHANGES TO PROJECT

The City initiated the RWCF Modifications Project to (1) increase the reliability of the liquid and solids treatment processes, (2) improve reliability in treating existing and projected flows, (3) reduce energy costs and provide reliable renewable energy alternatives, and (4) reduce nitrate plus nitrite concentrations in the final effluent to comply with the RWCF NPDES permit. Implementing the RWCF Modifications Project would result in all wastewater treatment facilities being located at the "main plant," on the east side of the San Joaquin River. As originally proposed, the RWCF Modifications Project involved constructing facilities so that the discharge of final effluent to the San Joaquin River would occur using the existing outfall on the west bank of the San Joaquin River. The City now proposes to relocate the RWCF outfall to the east side of the San Joaquin River, at the site of a previously abandoned outfall, to consolidate RWCF effluent disposal facilities and operations and maintenance activities at the main plant site. The Outfall Relocation Project is the "project" addressed in this Draft Supplemental EIR.

1.2 PURPOSE AND INTENDED USES OF THIS DRAFT SUPPLEMENTAL EIR

CEQA requires that state and local government agencies consider the environmental effects of projects over which they have discretionary authority before taking action on those projects. CEQA also requires that each public agency avoid or mitigate to a less-than-significant level, wherever feasible, the significant environmental effects of projects it approves or implements. The purpose of an EIR is "to identify the significant effects on the environment of a project, to identify alternatives to the project, and to indicate the manner in which those significant effects can be mitigated or avoided" (PRC Section 21002.1[a]). If implementing a project would result in significant environmental impacts that cannot be feasibly mitigated to a less-than-significant level, the project can still be approved, but the lead agency must issue a statement of overriding considerations that explains in writing the specific reasons to support its action based on the Final EIR and/or other evidence in the record (PRC Section 21002; CCR Section 15093).

The purpose of an EIR is not to recommend either approval or denial of the project but to provide information to the lead agency, and responsible and trustee agencies for use in the planning and decision-making process. The City of Stockton is the lead agency for the RWCF Modifications Project and was responsible for preparing the RWCF Modifications Project EIR, which was certified by the City Council on March 26, 2019. As lead agency, the City of Stockton also is responsible for preparing this Supplemental EIR. Other public agencies with jurisdiction over the project are described below, in Section 1.5, "Agency Roles and Responsibilities."

1.3 CEQA UPDATES SINCE CERTIFICATION OF THE EIR

The RWCF Modifications Project EIR was prepared in accordance with CCR Sections 15086–15087 and PRC Section 21153 as written when the notice of preparation was released, on September 7, 2018. The State CEQA Guidelines underwent a comprehensive update that became effective on December 28, 2018. The update addressed legislative changes to the CEQA statute, clarified certain portions of the State CEQA Guidelines, and updated the State CEQA Guidelines to be consistent with recent court decisions. The thresholds and analyses contained in this Draft Supplemental EIR reflect the latest State CEQA Guidelines.

1.4 SCOPE OF THIS DRAFT SUPPLEMENTAL EIR

CCR Sections 15162 and 15163 provide criteria for determining whether a subsequent or supplemental EIR should be prepared when there are modifications to a project. A supplement to an EIR may be prepared when “[o]nly minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation” (CCR Section 15163[a][2]). The City, as lead agency under CEQA, has prepared this Draft Supplemental EIR according to CEQA’s requirements.

In accordance with CCR Section 15163(a)(2), the supplement to the EIR need contain only the information necessary to make the previous EIR adequate for the project as revised. This Draft Supplemental EIR evaluates the following environmental resource areas, which are the only resource areas on which the project was determined to have the potential for new or substantially more severe significant direct, indirect, or cumulative effects.

- ▶ **Hydrology and water quality:** The project consists of placing an outfall pipeline and supporting infrastructure in the San Joaquin River and on the east bank. The potential for these project features to have hydrology and water quality effects was not analyzed in the RWCF Modifications Project EIR.
- ▶ **Terrestrial biological resources:** The project would involve the excavation of the San Joaquin River east bank levee, installation of the new outfall pipeline, and placement of material to restore the levee to its prior condition following outfall installation. The potential for these activities to affect terrestrial biological resources at the project site was not analyzed in the RWCF Modifications Project EIR.
- ▶ **Aquatic biological resources:** The project would involve construction activity in the San Joaquin River and discharge of RWCF effluent into the river from a new outfall location. The potential for these activities to affect aquatic biological resources at the new outfall location was not analyzed in the RWCF Modifications Project EIR.

The RWCF Modifications Project EIR also addressed impacts on air quality, greenhouse gas emissions and climate change, energy, cultural and tribal cultural resources, noise, environmental justice, and transportation and circulation. The project would not result in new or substantially more severe significant direct, indirect, and/or cumulative environmental effects to these resource categories, as discussed below in more detail:

- ▶ **Air quality:** The RWCF Modifications Project EIR determined that project construction and operations would have less-than-significant impacts related to (1) emissions of criteria air pollutants and precursors, (2) consistency with air quality plans, (3) exposure of sensitive receptors to toxic air contaminants, and (4) odor emissions. The construction equipment, hauling trips and worker vehicle trips needed to construct the project would be within the type and number needed to construct the features of the RWCF Modifications Project that would no longer be constructed as a result of the project. Consequently, there would be no net increase in emissions relative to that assessed in the previous EIR. Also, the project operations and maintenance activities would be as assumed for the previous EIR. Therefore, the project would not create any new sources of emissions beyond those assessed in the previous EIR. Thus, this Draft Supplemental EIR does not further evaluate effects of the project on air quality.
- ▶ **Greenhouse gas emissions and climate change:** The RWCF Modifications Project EIR determined that project construction and operations would have less-than-significant impacts related to (1) generation of greenhouse gas emissions and (2) increased risks from climate change. The construction equipment, hauling trips, and worker vehicle trips needed to construct the project would be within the type and number needed to construct the features of the RWCF Modifications Project that would no longer be constructed as a result of the project.

Consequently, there would be no net increase in emissions relative to that assessed in the previous EIR. Also, under the project, energy use would be less than described in the RWCF Modifications Project EIR because effluent would be discharged to the San Joaquin River by gravity flow, which does not involve energy use, more than 90 percent of the time rather than pumped to the west side of the river for discharge as originally proposed in the previous EIR. Therefore, the project would not create any new sources of emissions beyond those assessed in the previous EIR. Thus, this Draft Supplemental EIR does not further evaluate effects of the project on greenhouse gas emissions and climate change.

- ▶ **Energy:** The RWCF Modifications Project EIR determined that project construction and operations would have less-than-significant impact on (1) energy consumption and (2) available energy capacity. The construction equipment, hauling trips, and worker vehicle trips needed to construct the project would be within the type and number needed to construct the features of the RWCF Modifications Project that would no longer be constructed as a result of the project. Consequently, there would be no net increase in energy consumption during construction relative to that assessed in the previous EIR. Furthermore, the project would result in less energy consumption relative to that described in the RWCF Modifications Project EIR because RWCF effluent would be discharged to the San Joaquin River by gravity flow, which does not involve energy use, more than 90 percent of the time rather than pumped to the west side of the river for discharge as originally proposed in the previous EIR. Therefore, this Draft Supplemental EIR does not further evaluate effects of the project on energy resources.
- ▶ **Cultural and tribal cultural resources:** The RWCF Modifications Project EIR determined that project construction and operations would have a less-than-significant impact on significant cultural resources and a potentially significant impact on previously undiscovered archaeological resources, tribal cultural resources, human remains, and paleontological resources. These impacts have been mitigated to a less-than-significant level through implementation of a Cultural Resources Inadvertent/Unanticipated Discovery Plan. The proposed outfall is located in the area of potential effect evaluated in the previous EIR and the Cultural Resources Inadvertent/Unanticipated Discovery Plan would be applied during construction at the project site. Therefore, this Draft Supplemental EIR does not further evaluate effects of the project on cultural and tribal cultural resources.
- ▶ **Noise:** The RWCF Modifications Project EIR determined that project construction and operations would have less-than-significant impacts on (1) noise-sensitive receptors and (2) receptors sensitive to ground vibration. The hauling trips, and worker vehicle trips needed to construct the proposed outfall would be within the type and number needed to construct the features of the RWCF Modifications Project that would no longer be constructed as a result of the project. Equipment used to construct the new outfall would also be similar to that evaluated for construction of the RWCF Modifications Project, except that outfall construction would involve installation and removal of a cofferdam using a vibratory impact hammer. The proximity of the project construction activities to sensitive receptors would be the same as that assessed in the previous EIR. There are no historic structures within 0.25 miles of the project site. The nearest structure to the project is a warehouse located more than 1,370 feet away and the nearest residence is approximately 2,400 feet away. Ground vibration and vibration noise levels generated by use of a vibratory impact hammer at the project site would not exceed applicable thresholds at these receptors. Therefore, use of a vibratory impact hammer to install and remove the cofferdam during project construction activities would not result in the exposure of existing off-site sensitive receptors to excessive ground vibration or vibration noise levels. In addition, the proposed outfall would not create any permanent stationary sources of noise beyond those evaluated in the previous EIR. Therefore, this Draft Supplemental EIR does not further evaluate effects of the project on noise.
- ▶ **Environmental justice:** The RWCF Modifications Project EIR determined that project construction and operations would have a less-than-significant impact on minority and low-income populations. The project would not result in new infrastructure near these populations. Therefore, this Draft Supplemental EIR does not further evaluate effects of the project on environmental justice.
- ▶ **Transportation and circulation:** The RWCF Modifications Project EIR determined that project construction and operations would have a potentially significant impact on traffic congestion related to slow-moving construction vehicles and traffic increases on the roadway network. This impact has been mitigated to a less-than-significant level through implementation of a Construction Traffic Management Plan. The construction equipment and

vehicle trips needed to construct the proposed outfall would be within the type and number assumed for the analysis in the previous EIR and the Construction Traffic Management Plan would be implemented during construction at the project site. Therefore, this Draft Supplemental EIR does not further evaluate effects of the project on transportation and circulation.

The RWCF Modifications Project EIR determined that the project could not cause potentially significant impacts in the resource categories listed below. Accordingly, as required by CEQA, the EIR presented a brief explanation as to why impacts on each resource were not anticipated, and these resource categories were not addressed further. The project addressed by this Supplemental EIR also would not cause potentially significant impacts in these resource categories, for the reasons provided below.

- ▶ aesthetics
 - ▶ agriculture and forestry resources
 - ▶ geology and soils
 - ▶ hazards and hazardous materials
 - ▶ land use and planning
 - ▶ mineral resources
 - ▶ population and housing
 - ▶ public services
 - ▶ recreation
 - ▶ utilities and service systems
- ▶ **Aesthetics:** The proposed outfall would be located at a site within the San Joaquin River levee that currently has an outfall apron previously used as an outfall for the RWCF. Two trees would be removed as part of outfall construction, but the site would otherwise be restored to its existing character after the outfall was constructed. Therefore, no significant impacts on aesthetics would occur, and this issue is not discussed further.
 - ▶ **Agriculture and forestry resources:** The project site does not support any Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance, nor is the site under a Williamson Act contract. Also, the site is not zoned for forestland or timberlands and is not forested. Therefore, no significant impacts on agriculture or forestry resources would occur, and this issue is not discussed further.
 - ▶ **Geology and soils:** The project site is not located in an Alquist-Priolo Earthquake Fault Zone. The area where construction of the new outfall would occur contains very little habitat or vegetation of any kind. Ground cover in these areas consists primarily of riprap and compacted crushed rock. The site characteristics would be similar to existing conditions, with the outfall structure anchored and surrounding area protected with riprap. All areas temporarily impacted during construction would be reseeded with native plant mix to stabilize soils and prevent erosion. Therefore, no significant impacts related to geology and soils would occur, and this issue is not discussed further.
 - ▶ **Hazards and hazardous materials:** By complying with all existing hazardous material regulations and not interfering with local emergency operations plans, construction and operation of the RWCF Modifications Project would be protective of public health and the environment. On the project site there are no sites listed in the EnviroStor and Geotracker databases maintained pursuant to Government Code Section 65962.5. Furthermore, the project site is not in a location where it would result in a safety hazard for people residing or working near an airstrip or airport or expose people or structures to wildland fires. Therefore, no significant impacts related to hazards and hazardous materials would occur, and these issues are not discussed further.
 - ▶ **Land use and planning:** The proposed outfall does not involve changes to existing land use on the project site. Therefore, no significant land use and planning impacts would occur, and this issue is not discussed further.
 - ▶ **Mineral resources:** The project site does not contain any state-designated or locally designated important or valuable mineral resources. Therefore, no significant impacts on mineral resources would occur, and this issue is not discussed further.
 - ▶ **Population and housing:** Construction and operation of the proposed outfall would not increase RWCF treatment capacity and thus would not stimulate population growth or demand for housing, would not result in population growth through the provision of new homes or new businesses or any other manner, and would not displace existing housing or people. Therefore, no significant impacts on population and housing would occur, and this issue is not discussed further. The potential for growth-inducing impacts, however, is considered, as required by CEQA, in Section 7.1, "Growth-Inducing Impacts."

- ▶ **Public services:** Construction and operation of the proposed outfall would not increase the demand for public services (i.e., fire protection, police protection, schools, parks, other public facilities) or generate the need for new or physically altered governmental facilities. Therefore, no significant impacts on public services would occur, and this issue is not discussed further.
- ▶ **Recreation:** Construction and operation of the proposed outfall would not increase the capacity of the RWCF and therefore would have no effect on population growth and thus no effect on increased demand for recreation facilities or programs resulting from such growth in the RWCF service area. Furthermore, discharge of RWCF effluent to the San Joaquin River currently occurs in the reach of the river where the project site is located. Because the surrounding area offers numerous recreational opportunities that would be unaffected by the proposed outfall structure, no significant impact on regional recreation opportunities would occur, and this issue is not discussed further.
- ▶ **Utilities and service systems:** The project would allow for continued discharge of RWCF effluent to San Joaquin River at rates that occur under existing conditions. Water may be used during construction for dust control, equipment washing, and construction crew consumption; however, existing city supplies would be sufficient for this purpose. Solid waste generated during construction would be sent to Foothill Sanitary Landfill or North County Landfill, which have remaining capacity through 2082, and 2048, respectively (California Department of Resources Recycling and Recovery 2021). No utilities would be relocated. Therefore, no significant impacts on public utilities and service systems would occur, and this issue is not discussed further.

The 2018 update to the State CEQA Guidelines added the resource category of wildfire to the Appendix G Checklist. As described below, the proposed outfall addressed by this Draft Supplemental EIR also would not cause potentially significant impacts in this resource category:

- ▶ **Wildfire:** The proposed outfall site is not located within a high fire hazard severity zone. Therefore, no significant wildfire-related impacts would occur, and this issue is not discussed further.

1.5 AGENCY ROLES AND RESPONSIBILITIES

1.5.1 Lead Agency

The City of Stockton is the lead agency for the RWCF Modifications Project EIR under CEQA, as defined in CCR Section 15367. As such, the City has the principal responsibility for approving and carrying out the RWCF Modifications Project and for ensuring that the requirements of CEQA have been met. The City Council certified the RWCF Modifications Project EIR and approved the project on March 26, 2019. The City of Stockton also is serving as the lead agency responsible for preparing this Supplemental EIR. After the public review process for this Supplemental EIR is complete, the City will be responsible for certifying the Supplemental EIR and rendering a decision to approve or deny the proposed outfall change to the RWCF Modifications Project.

1.5.2 Trustee and Responsible Agencies

A trustee agency is a state agency that has jurisdiction by law over resources affected by a project that are held in trust for the people of the State of California (CCR Section 15386). The trustee agencies that have jurisdiction over resources potentially affected by the project are the California Department of Fish and Wildlife and California State Lands Commission.

A responsible agency is a public agency other than the lead agency that has legal responsibility for reviewing, carrying out, or approving elements of a project (CCR Section 15381). Responsible agencies should participate in the lead agency's CEQA process, review the lead agency's CEQA document, and use the document for decision making on project elements over which they have discretionary approval. The following agencies may have responsibility for, or jurisdiction over, issuing permits or approvals needed to construct the proposed outfall.

STATE AGENCIES

- ▶ Central Valley Flood Protection Board (CVFPB)
- ▶ California Department of Fish and Wildlife (CDFW)
- ▶ California State Lands Commission (CSLC)

REGIONAL AND LOCAL AGENCIES

- ▶ Central Valley Regional Water Quality Control Board (RWQCB)
- ▶ Reclamation District 404 (RD 404)
- ▶ San Joaquin Valley Air Pollution Control District (SJVAPCD)

FEDERAL AGENCIES WITH DISCRETIONARY-APPROVAL RESPONSIBILITY

In addition, the following federal agencies may use this Supplemental EIR for consideration of permits and approvals:

- ▶ National Marine Fisheries Service (NMFS)
- ▶ U.S. Army Corps of Engineers (USACE)
- ▶ U.S. Fish and Wildlife Service (USFWS)

1.5.3 Required Permits and Approvals

The following identifies permits and other approval actions likely to be required before implementation of individual elements of the proposed project.

FEDERAL ACTIONS/PERMITS

- ▶ **NMFS:** Endangered Species Act (ESA) Section 7 consultation for authorization of incidental take of a listed species; consultation in compliance with the Magnuson-Stevens Fisheries Conservation Management Act Section 305(b) for effects on essential fish habitat.
- ▶ **USACE:** Compliance with Section 404 of the CWA for discharge of fill to waters of the United States, and Rivers and Harbors Act Section 10 permit for construction in navigable waterways.
- ▶ **USFWS:** ESA Section 7 consultation for authorization of incidental take of a listed species

STATE ACTIONS/PERMITS

- ▶ **CVFPB:** Encroachment permit for work on the San Joaquin River channel, its levees, or within 10 feet of its levee toes.
- ▶ **CDFW:** California Endangered Species Act and Section 2081 of the Fish and Game Code if take of listed species is likely to occur, as well as compliance with Section 1600 of the Fish and Game Code.
- ▶ **CSLC.** Requires a lease be obtained for using or constructing any type of structure on lands under the Commission's jurisdiction.
- ▶ Permit) (Order No. 2009-009-DWQ, as amended by revised orders 2010-0014-DWQ and 2012-006-DWQ) for disturbance of more than 1 acre, CWA Section 401 water quality certification for any disturbance of waters of the United States.

REGIONAL AND LOCAL ACTIONS/PERMITS

- ▶ **Central Valley RWQCB:** NPDES permit for operation of the RWCF (Order No. R5-2020-0007, NPDES No. CA0079138), coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General)
- ▶ **RD 404:** District permit agreement for construction and maintenance of facilities affecting the levee system.
- ▶ **SJVAPCD:** Authority to construct (for devices that emit air pollutants) and permit to operate.

1.6 PUBLIC REVIEW PROCESS

This Draft Supplemental EIR is being circulated for public review and comment for a period of 45 days, from February 25, 2022, through April 11, 2022. During this period, comments from the general public, organizations, and agencies on the Draft Supplemental EIR may be submitted to the City. The notice of availability and the Draft Supplemental EIR are posted on the City's website (<http://www.stocktonca.gov/mudprojects>) and advertised in *The Record*. Copies of this Draft Supplemental EIR are also available for review at the following locations:

City of Stockton, City Clerk
425 N. El Dorado Street, 1st Floor
Stockton, CA 95202
Monday–Thursday

Cesar Chavez Central Library
605 N. El Dorado Street
Stockton, CA 95202
Monday–Friday

Written comments on the Draft Supplemental EIR must be submitted no later than April 11, 2022, at 5:00 p.m. to:

Deedee Antypas, Deputy Director of Wastewater Operations
City of Stockton Municipal Utilities Department
2500 Navy Drive
Stockton, CA 95206
Email: deedee.antypas@stocktonca.gov

Upon completion of the Draft Supplemental EIR public review and comment period, a Final Supplemental EIR will be prepared that will include comments on the Draft Supplemental EIR received during the public review period, responses to those comments, and any revisions to the Draft Supplemental EIR made in response to public comments. Together, the Draft Supplemental EIR and the Final Supplemental EIR will make up the Supplemental EIR for the City of Stockton RWCF Modifications Project.

Before approving the proposed revision (i.e., new outfall) to the RWCF Modifications Project, the City is required to certify that the Supplemental EIR has been completed in compliance with CEQA, that the decision-making body reviewed and considered the information in the Supplemental EIR, and that the Supplemental EIR reflects its independent judgment and analysis. When the City decides whether to approve the project revision, the decision-making body shall consider the previous RWCF Modifications Project EIR as revised by this Supplemental EIR (CCR Section 15163[e]).

1.7 DRAFT SUPPLEMENTAL EIR ORGANIZATION

This Draft Supplemental EIR is organized into the following chapters:

- ▶ **Chapter 1, "Introduction":** This chapter describes the purpose and intended uses of this Supplemental EIR, the scope of this Supplemental EIR, agency roles and responsibilities, the public review process, the organization of this Draft Supplemental EIR, and standard terminology.
- ▶ **Chapter 2, "Executive Summary":** This chapter summarizes the proposed outfall revision to the RWCF Modifications Project, alternatives, and areas of controversy. Finally, this chapter includes a summary table of the

significant environmental impacts and associated mitigation measures identified to reduce significant impacts to a less-than-significant level.

- ▶ **Chapter 3, "Project Description":** This chapter describes the proposed outfall location, background, purpose and objectives, existing outfall, proposed project revision elements, and anticipated construction schedule.
- ▶ **Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures":** The resource sections in this chapter evaluate the environmental effects anticipated from construction and use of the proposed outfall. Environmental impacts are identified and evaluated for each resource for which detailed analysis was performed. For each significant or potentially significant impact that would result from construction and use of the proposed outfall, mitigation measures are recommended, and the level of significance after mitigation is disclosed. Environmental impacts are numbered sequentially throughout the sections of Chapter 4 (e.g., Impact 4.2-1, Impact 4.2-2). Any required mitigation measures are numbered to correspond to the impact numbering; therefore, the mitigation measure for Impact 4.2-1 would be Mitigation Measure 4.2-1.
- ▶ **Chapter 5, "Cumulative Impacts":** This chapter assesses the potential cumulative impacts that would result from construction and use of the proposed outfall together with other past, present, and probable future projects, including all other aspects of the RWCF Modifications Project.
- ▶ **Chapter 6, "Alternatives Analysis":** This chapter provides a discussion of the purpose and intent of alternatives to the project, as well as how the alternatives apply to the proposed outfall revision to the RWCF Modifications Project.
- ▶ **Chapter 7, "Other CEQA-Mandated Sections":** This chapter identifies and assesses potential direct and indirect growth-inducing impacts from construction and use of the proposed outfall, significant and unavoidable impacts, and the significant and irreversible commitment of resources.
- ▶ **Chapter 8, "Report Preparation":** This chapter identifies the lead agency contacts, as well as the preparers of this Draft Supplemental EIR.
- ▶ **Chapter 9, "References":** This chapter identifies the organizations and persons consulted during preparation of this Draft Supplemental EIR and the documents used as sources for the analyses.

1.8 STANDARD TERMINOLOGY

This Draft Supplemental EIR uses the following standard terminology:

- ▶ **No impact** means no change from existing conditions (no mitigation is required).
- ▶ **Less-than-significant impact** means no substantial adverse change in the physical environment (no mitigation is required).
- ▶ **Potentially significant impact** or **significant impact** means an impact that might or would cause a substantial adverse change in the physical environment (mitigation is recommended where feasible).
- ▶ **Significant and unavoidable impact** means an impact that would cause a substantial adverse change in the physical environment and that cannot be avoided, even with the implementation of all feasible mitigation.
- ▶ **Significance criteria** means criteria used to define what level of impact would be considered significant. Significance criteria are defined by a lead agency based on examples found in CEQA or the State CEQA Guidelines, scientific and factual data, views of the public in affected areas, the policy/regulatory environment of affected jurisdictions, and other factors.

2 EXECUTIVE SUMMARY

2.1 INTRODUCTION

This summary is provided in accordance with CCR Section 15123. As stated in CCR Section 15123(a), “[a]n EIR shall contain a brief summary of the proposed actions and its consequences. The language of the summary should be as clear and simple as reasonably practical.” CCR Section 15123(b) states, “The summary shall identify: (1) Each significant effect with proposed mitigation measures and alternatives that would reduce or avoid that effect; (2) Areas of controversy known to the Lead Agency, including issues raised by agencies and the public; and (3) Issues to be resolved including the choice among alternatives and whether or how to mitigate the significant effects.” Accordingly, this chapter includes a brief synopsis of the project and other alternatives considered, environmental impacts and mitigation, areas of known controversy, and issues to be resolved during environmental review. Table 2-1 (at the end of this chapter) presents the summary of potential environmental impacts, their level of significance without mitigation measures, the recommended mitigation measures, and the level of significance following the implementation of mitigation measures.

2.2 SUMMARY DESCRIPTION OF THE PROJECT

2.2.1 Background

The City of Stockton is implementing modifications to its RWCF. Modifications to the RWCF are required to maintain compliance with the RWCF National Pollutant Discharge Elimination System (NPDES) permit, extend the useful life of existing facilities, improve working conditions for facility staff, and implement components of the City’s Capital Improvement and Energy Management Plan.

The RWCF currently consists of the main plant on the east side of the San Joaquin River and the tertiary plant on the west side of the river. RWCF effluent is discharged through an existing outfall to the San Joaquin River on the west bank using pipe siphons. The RWCF Modifications Project proposed to construct facilities to continue discharge of final effluent to the San Joaquin River using the existing outfall on the west bank. The City now proposes to discharge final effluent through a new outfall located on the east bank of the San Joaquin River, adjacent to the main plant and abandon the existing west bank outfall in place. The proposed outfall includes reinstatement of an abandoned 60-inch reinforced concrete pipe that served as the outfall for the City’s treated wastewater effluent before circa 1970.

2.2.2 Project Objectives

The purpose of the proposed project is to consolidate RWCF effluent disposal operations and maintenance activities at the main plant on the east side of the San Joaquin River. The specific objectives of the project are to:

- ▶ eliminate the need to construct approximately 2,000 feet of 54-inch pipeline along the western edge of the San Joaquin River,
- ▶ allow gravity discharge of effluent to the San Joaquin River to the maximum extent possible (more than 90 percent of the time), and
- ▶ comply with receiving water limitations specified in the RWCF NPDES permit.

2.2.3 Project Characteristics

The proposed project consists of the following three primary elements:

- ▶ reinstatement of an existing 60-inch reinforced concrete pipe running from the RWCF to an abandoned outfall apron on the east bank of the San Joaquin River,
- ▶ modification of the outfall apron structure on the east bank to create a new outfall outlet, and
- ▶ construction of a pipeline running from the Final Effluent Pump Station to the reinstated 60-inch reinforced concrete pipe.

Construction of the outfall would involve installation of a temporary cofferdam on the waterside of the San Joaquin River levee and removal of two trees at the site. Construction is expected to last up to 3 months, from July 15 through October 30.

Upon successful commissioning and reinstatement of the main plant outfall on the east side of the river, the existing outfall on the west side of the river would no longer be required and would be abandoned in place so that no discharge of RWCF effluent could occur through the existing outfall and all discharge would occur through the reinstated outfall on the east side of the river.

2.2.4 Lead Agency

The City of Stockton is the lead agency for this EIR under CEQA, as defined in CCR Section 15367. As such, the City has the principal responsibility for approving and carrying out the project and for ensuring that the requirements of CEQA have been met. After the EIR public review process is complete, the City is the party responsible for (1) certifying that the EIR adequately evaluates the environmental impacts of the project and (2) either approving or denying the project.

2.2.5 Required Permits and Approvals

The following sections identify permits and other approval actions likely to be required before implementation of individual elements of the proposed project.

FEDERAL ACTIONS/PERMITS

- ▶ **NMFS:** Endangered Species Act (ESA) Section 7 consultation for authorization of incidental take of a listed species; consultation in compliance with the Magnuson-Stevens Fisheries Conservation Management Act Section 305(b) for effects on essential fish habitat.
- ▶ **USACE:** Compliance with Section 404 of the Clean Water Act (CWA) for discharge of fill to waters of the United States, and Rivers and Harbors Act Section 10 permit for construction in navigable waterways.
- ▶ **USFWS:** ESA Section 7 consultation for authorization of incidental take of a listed species

STATE ACTIONS/PERMITS

- ▶ **CVFPB:** Encroachment permit for work on the San Joaquin River channel, its levees, or within 10 feet of its levee toes.
- ▶ **CDFW:** California Endangered Species Act and Section 2081 of the Fish and Game Code if take of listed species is likely to occur, as well as compliance with Section 1600 of the Fish and Game Code.
- ▶ **CSLC.** May require a lease be obtained for using or constructing any type of structure on lands under the Commission's jurisdiction.

REGIONAL AND LOCAL ACTIONS/PERMITS

- ▶ **Central Valley RWQCB:** NPDES permit for operation of the RWCF (Order No. R5-2020-0007, NPDES No. CA0079138), coverage under the General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit) (Order No. 2009-009-DWQ, as amended by revised orders 2010-0014-DWQ and 2012-006-DWQ) for disturbance of more than 1 acre, CWA Section 401 water quality certification for any disturbance of waters of the United States.
- ▶ **RD 404:** District permit agreement for construction and maintenance of facilities affecting the levee system.
- ▶ **SSJVAPCD:** Authority to construct (for devices that emit air pollutants) and permit to operate.

2.3 SUMMARY OF ENVIRONMENTAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

Table 2-1, at the end of this chapter, provides a summary of the environmental impacts of the project, the level of significance of the impact before mitigation, recommended mitigation measures, and the level of significance of the impact after the implementation of the mitigation measures. Implementation of the RWCF Modifications Project would not result in significant and unavoidable environmental impacts and would not be growth inducing because implementing the project would not increase the wastewater treatment capacity for the RWCF service area.

2.4 SUMMARY OF ALTERNATIVES ANALYSIS

This Draft Supplement EIR evaluates two alternatives to the project:

- ▶ **No-Project Alternative.** The City would not relocate the RWCF effluent outfall to the east side of the San Joaquin River adjacent to the main plant, and final RWCF effluent would continue to be discharged to the river through the existing outfall on the east side of the river.
- ▶ **Diffuser Outfall Alternative:** The alternative also would move the outfall to the same new location as the project, and would involve the same primary construction and installation elements described for the project, except that the discharge of treated effluent to the San Joaquin River would go through a multi-port bottom diffuser outfall instead of the side bank outfall as planned for the project.

The State CEQA Guidelines provide that an EIR should identify the "environmentally superior" alternative. As stated in CCR Section 15126.6(e)(2), "[i]f the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives."

As discussed in Chapter 6, "Alternatives Analysis," neither alternative would be environmentally superior to the project. Although the No-Project Alternative would avoid significant environmental impacts associated with construction of the project, this alternative would not improve temperature conditions in the river for aquatic life, as the project would do. The Diffuser Outfall Alternative would result in the same significant environmental impacts associated with construction of the project; however, this alternative would not improve temperature conditions in the river for aquatic life, as well as the project would do. Therefore, neither alternative would result in fewer significant environmental impacts relative to the proposed project. Moreover, neither alternative can fully achieve all three project objectives. For these reasons, the project is the environmentally superior alternative because all significant impacts would be mitigated to less-than-significant levels, and all project objectives would be met.

2.5 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

There are no known areas of controversy, and all potentially significant impacts of the proposed project would be reduced to less-than-significant levels with implementation of the recommended mitigation measures.

Table 2-1 Summary of Environmental Impacts and Mitigation Measures

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
4.1 Hydrology and Water Quality			
Impact 4.1-1: Potential for Project Construction to Affect Water Quality Project construction activities would have the potential to result in the temporary increase in San Joaquin River total suspended solids (TSS) and turbidity near the construction site and the release of construction-related contaminants into the river. Implementation of construction BMPs and various permit requirements, including SWRCB General Construction Permit requirements and CWA Section 401 Water Quality Certification requirements that will be required for project construction, would avoid and minimize potential adverse construction-related effects on surface water quality. This impact would be less than significant.	LTS	No mitigation is required for this impact.	LTS
Impact 4.1-2: Potential for Project Construction to Cause Increased Erosion or Affect Flood Flows The placement of the cofferdam for construction of the outfall structure would temporarily reduce San Joaquin River channel capacity. Because the cofferdam would be in place only during the summer period, when river flows are lowest, project construction would not cause increased erosion or siltation and would not impede or redirect flood flows or increase flood risks.	LTS	No mitigation is required for this impact.	LTS
Impact 4.1-3: Potential for Project Operations to Affect Water Quality Implementing the project would result in the discharge of RWCF effluent from the new outfall located on the east (main plant) side of the river, as well as cessation of discharge of effluent from the existing outfall on the west (tertiary plant) side of the river. Under project operations, effluent quality and volume discharged to the river would not change; rather, the only change would be that the effluent would be discharged at a new location on the east bank of the river, approximately 2,000 feet upstream of the existing outfall. Hence, river water quality after the effluent is fully mixed with river flows would not change. A similar effluent plume would exist near the outfall before complete effluent mixing but would be at the new (east bank) outfall location, and no effluent plume would occur with the project at the existing (west bank) outfall location.	LTS	No mitigation is required for this impact.	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
<p>Impact 4.1-4: Potential for the New Outfall to Cause Increased Erosion or Affect Flood Flows</p> <p>The new outfall would be installed within the existing profile of the San Joaquin River channel and would consist of concrete embedded into the levee and protected with erosion control material. The elevated walkway to provide access to the outfall pipeline would allow river flows to pass through the supporting structure. Thus, the project would not cause increased erosion or siltation and would not impede or redirect flood flows or increase flood risks within the San Joaquin River postconstruction.</p>	LTS	No mitigation is required for this impact.	LTS
<p>4.2. Terrestrial Biological Resources</p>			
<p>Impact 4.2-1: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Plant Species and Habitat</p> <p>Special-status plants with potential to occur on the project site include plants associated with marsh, riparian, or aquatic habitat. Habitat suitable for some of these species is present within the San Joaquin River and on its banks. Temporary dewatering and ground disturbance for construction of the outfall could result in removal of or damage to special-status plants if present.</p>	PS	<p>Mitigation Measure 4.2-1: Protect and Mitigate Impacts on Special-Status Plants</p> <p>Consistent with the avoidance and minimization measures in the SJMSCP, the City will implement the following measures to mitigate the potential impact on special-status plant species:</p> <ul style="list-style-type: none"> ▶ Before project implementation, habitat suitable for special-status plants on the project site shall be surveyed by a qualified botanist when the species' distinguishing characteristics are identifiable, such as during their typical blooming periods. This survey will be conducted no more than 1 year before the start of construction. ▶ If no special-status plants are observed on the project site, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required. ▶ All populations of slough thistle shall be avoided in accordance with the identified measures in Section 5.5.9(F) of the SJMSCP. The SJMSCP does not permit destruction of this species. If avoidance is not feasible, a compensation plan for slough thistle shall be developed in conjunction with CDFW. The plan shall determine the appropriate measures to minimize direct and indirect impacts that could occur as a result of project construction and shall describe measures to achieve no net loss of occupied habitat or individuals. Measures may include preserving and enhancing existing populations, creating off-site populations on project mitigation sites through seed collection or transplantation, restoring or creating suitable habitat in sufficient quantities, or paying an in-lieu fee to achieve no net loss of occupied habitat and/or individuals. 	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		<ul style="list-style-type: none"> ▪ If impacts on special-status plant species cannot be avoided, the City will implement compensation requirements provided in the SJMSCP, which may include species relocation to SJMSCP preserves, seed collection for propagation on SJMSCP preserves, or payment of SJMSCP fees such that no net loss of occupied habitat and/or individuals would occur. ▪ If watershed, which is not covered under the SJMSCP, is found and cannot be avoided during construction, the City will consult with CDFW to determine the appropriate measures to achieve no net loss of occupied habitat or individuals. Mitigation measures may include preserving and enhancing existing populations, creating off-site populations on mitigation sites through seed collection or transplantation, and/or restoring or creating suitable habitat in sufficient quantities to achieve no net loss of occupied habitat and/or individuals. A mitigation and monitoring plan shall be developed describing how unavoidable losses of special-status plants will be compensated. 	
<p>Impact 4.2-2: Potential for Project Construction to Result in Disturbance to or Loss of Western Pond Turtle</p> <p>Implementation of the project would include temporary dewatering of a portion of the San Joaquin River and construction within the river channel. These project components could result in disturbance to or direct loss of western pond turtle, if present, within aquatic and upland habitat.</p>	PS	<p>Mitigation Measure 4.2-2: Conduct Western Pond Turtle Preconstruction Surveys and Relocation</p> <p>The City will implement the following measures to avoid the potentially significant impact on western pond turtle, consistent with the avoidance and minimization measures in the SJMSCP. All mitigation listed below shall be limited to construction within 0.3 mile of potential aquatic habitat:</p> <ul style="list-style-type: none"> ▶ A preconstruction survey for western pond turtle shall be conducted by a qualified biologist before work in suitable aquatic habitat. ▶ If no western pond turtles are observed, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required. ▶ During the dewatering of the river, a qualified biologist shall be present to survey for western pond turtles. If western pond turtles are observed, a qualified biologist, with approval from CDFW, shall relocate the turtles to the nearest area with suitable aquatic habitat that will not be disturbed by project-related construction activities. ▶ If nesting areas for western pond turtles are identified on the project site, a buffer area of 300 feet shall be established between the nesting site (which may be immediately adjacent to wetlands or extend up to 400 feet away from 	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		wetland areas in uplands) and the wetland located near the nesting site. These buffers shall be indicated by temporary fencing if construction has or will begin before nesting periods are ended (the period from egg laying to emergence of hatchlings is normally April to November).	
<p>Impact 4.2-3: Potential for Project Construction to Result in Disturbance to or Loss of Burrowing Owl</p> <p>Implementation of the project would include ground disturbance that could result in disturbance to or direct loss of burrowing owls and their burrows, if present.</p>	PS	<p>Mitigation Measure 4.2-3: Protect Burrowing Owls</p> <p>The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on burrowing owl:</p> <ul style="list-style-type: none"> ▶ The City will retain a qualified biologist to conduct focused breeding and nonbreeding season surveys for burrowing owls in areas of suitable habitat on and within 150 meters of project activities. Surveys will be conducted before the start of construction activities. Surveys will be conducted before project activity in accordance with Appendix D of CDFW's <i>Staff Report on Burrowing Owl Mitigation</i> (CDFG 2012). ▶ If no occupied burrows are found, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required. ▶ If burrowing owls are discovered during preconstruction surveys and can be avoided during project activities, a protective buffer around the burrow shall be established in conjunction with the Joint Powers Authority and consistent with the SJMSCP. ▶ During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed. The development of a protective buffer shall be supported by a qualified biologist. The protective buffer will be informed by monitoring the burrowing owls' sensitivity and will be put in place to prevent burrow destruction and disturbance to nest sites (including nest abandonment and loss of eggs or young). The 2012 CDFW staff report identifies variables to consider for the buffer, such as habitual disturbances (visual and audible), existing vegetation, and type and extent of disturbance and impact. The staff report gives general guidelines for buffers during the breeding season. It recommends that, at minimum, the protective buffer during the breeding season be 200 meters; moving up to 500 meters for high levels of disturbance. These guidelines shall be followed. If activities are allowed closer than these recommended setback distances, then a broad-scale, long-term, scientifically rigorous monitoring program that ensures that the owls are not detrimentally 	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		affected by the alternative approach shall be conducted. The protective buffer shall remain until the end of the breeding season unless a qualified biologist approved by the permitting agencies verifies through noninvasive means that either (1) the birds have not begun egg-laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. After the fledglings are capable of independent survival, the burrow can be destroyed.	
<p>Impact 4.2-4: Potential for Project Construction to Result in Disturbance to or Loss of Swainson’s Hawk, White-Tailed Kite, and Other Nesting Raptors</p> <p>Implementation of the project would include tree and other vegetation removal, and construction noise, which could result in disturbance to or direct loss of nesting Swainson’s hawk, white-tailed kite, and other nesting raptors, potentially resulting in nest abandonment, failure, or mortality of chicks and eggs.</p>	PS	<p>Mitigation Measure 4.2-4: Protect Swainson’s Hawk, White-Tailed Kite, and Other Nesting Raptors</p> <p>The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on Swainson’s hawk, white-tailed kite, and other nesting raptors:</p> <ul style="list-style-type: none"> ▶ If removal of a known nest tree is required, it shall be removed between September 16 and February 14. ▶ If project activity would commence between February 15 and September 15, a qualified biologist shall be retained to conduct preconstruction surveys for active nests on and within 0.5 mile of the project site no more than 14 days and no less than 7 days before commencement. ▶ If no active nests are present in the survey area, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required. ▶ If an occupied nest is present, a buffer area will be established around the nest site. CDFW guidelines recommend implementation of a 0.25-mile buffer for Swainson’s hawk and a 500-foot buffer for other raptors, but the size of the buffer may be adjusted if a qualified biologist and CDFW determine that project activities would not be likely to adversely affect the nest with a smaller buffer. No project activity will commence within the buffer area until a qualified biologist confirms that the nest is no longer active or that the young have fully fledged. Monitoring of the nest by a qualified biologist will be required if the activity has potential to adversely affect the nest. 	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
<p>Impact 4.2-5: Potential for Project Construction to Result in Disturbance to or Loss of Song Sparrow ("Modesto" Population) and Other Nesting Birds</p> <p>Implementation of the project would involve tree and other vegetation removal, which could result in disturbance to or direct loss of nesting song sparrow ("Modesto" population) and other nesting birds, potentially resulting in nest abandonment, nest failure, or mortality of chicks and eggs.</p>	PS	<p>Mitigation Measure 4.2-5: Protect Song Sparrow ("Modesto" Population) and Other Nesting Birds</p> <p>The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on song sparrow ("Modesto" population) and other nesting birds:</p> <ul style="list-style-type: none"> ▶ A qualified biologist shall conduct a preconstruction survey for any project activity that would occur during the nesting bird season (March 1–August 31) and within 500 feet of suitable nesting habitat, including shrubs, riparian vegetation, and trees. The survey shall be conducted within 14 days before project activity begins. ▶ If no nesting birds are found, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required. ▶ If nests are found, the qualified biologist shall establish a no-disturbance buffer around the nest. A 10-foot buffer for songbirds is typically sufficient to protect the nest from disturbance, but the size of the buffer shall be determined by a qualified biologist. Buffer size may vary based on bird species, listing status of the species, and other factors, including distance from construction activity, type and duration of construction activity, and whether the nest is within the line-of-sight of construction activity. The size of the buffer may be adjusted if the qualified biologist and the City, in consultation with CDFW, determine that such an adjustment would not be likely to adversely affect the nest. 	LTS
<p>Impact 4.2-6: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Bats</p> <p>Implementation of the project would include construction near a bridge and other structures that could potentially provide roost habitat for common and special-status bats, particularly pallid bat. Construction noise could disturb active bat colonies, causing them to abandon their roosts or young or affect foraging behavior, affecting the survival of young or adult bats.</p>	PS	<p>Mitigation Measure 4.2-6: Protect Special-Status Bats</p> <p>The City will implement the following measures to avoid, minimize, and mitigate impacts on special-status bat species, consistent with the SJMSCP:</p> <ul style="list-style-type: none"> ▶ A qualified biologist shall be retained to conduct surveys for roosting bats before construction implementation near potential bat roosting structures, such as bridges. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano) and/or evening emergence surveys to note the presence or absence of bats, if determined necessary. If evidence of bat use is observed, the number and species of bats using the roost will be determined. 	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		<ul style="list-style-type: none"> ▶ If no evidence of bat roosts is found, a letter report documenting the survey methods and results shall be submitted to the City, and no further study shall be required. ▶ If roosts of pallid bat or other special-status bats are determined to be present, activities that could cause roost abandonment shall occur outside of the nursery and/or hibernation seasons and shall occur during dusk and/or evening hours after bats have left the roosting site. 	
<p>Impact 4.2-7: Potential for the Project to Result in Disturbance to or Loss of Waters of the United States and State</p> <p>Construction of the proposed new outfall within the San Joaquin River would result in temporary dewatering of approximately 0.04 acre of the San Joaquin River and permanent fill of approximately 0.02 acre of waters of the United States and state because of apron demolition and placement of a steel pipe and riprap to create the new outfall. Therefore, implementation of the project would result in a substantial adverse effect on state and federally protected waters.</p>	<p>S</p>	<p>Mitigation 4.2-7: Compensate for Loss of Waters of the United States and State</p> <p>The City will implement the following measures to compensate for the loss of waters of the United States and state:</p> <ul style="list-style-type: none"> ▶ The City will submit an aquatic resources delineation report to USACE and request a jurisdictional determination. Based on the jurisdictional determination, the City will determine the exact acreage of waters of the United States and waters of the state that would be filled because of project implementation. ▶ The City will replace on a “no net loss” basis (minimum 1:1 ratio) (in accordance with USACE and/or the regional water quality control board [RWQCB]) the acreage and function of all wetlands and other waters that would be removed, lost, or degraded as a result of project implementation. Wetland habitat will be replaced at an acreage and location agreeable to USACE and the Central Valley RWQCB and as determined during the Section 401 and Section 404 permitting processes. ▶ The City will obtain a USACE Section 404 permit and RWQCB Section 401 water quality certification before any groundbreaking activity within 50 feet of waters of the United States or state. The City will implement all permit conditions. 	<p>LTS</p>
<p>Impact 4.2-8: Potential for Project Construction to Result in Disturbance to or Loss of Riparian Habitat</p> <p>Construction of the proposed outfall along the San Joaquin River levee would result in direct removal of riparian vegetation.</p>	<p>S</p>	<p>Mitigation Measure 4.2-8: Minimize Loss of Riparian Habitat</p> <p>The City will implement the incidental take and avoidance measures in the SJMCSP for riparian habitat and the following measures:</p> <ul style="list-style-type: none"> ▶ The City will submit a notification of Lake and Streambed Alteration to CDFW for work within the San Joaquin River and its levee. The City will comply with all conditions of the Lake and Streambed Alteration Agreement issued by CDFW for the project. 	<p>LTS</p>

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
		<ul style="list-style-type: none"> ▶ The City will replace the 0.04 acre of valley foothill riparian woodland habitat to be removed from the project site with habitat comprising similar ecological conditions to those provided by the habitat removed from the project area, including similar species composition and diversity and functional organization. Riparian habitat replacement shall be at a minimum 1:1 mitigation ratio for a total of 0.04 acres. Habitat restoration, enhancement, and/or replacement shall be at a location and by methods agreeable to CDFW. This may include onsite restoration of riparian habitat; restoration or enhancement of riparian habitat elsewhere on the river in the project vicinity; purchase of mitigation credits at a CDFW-approved mitigation bank; or any combination thereof. ▶ The City will require restoration of preconstruction contours and herbaceous understory vegetation. 	
4.3. Aquatic Biological Resources			
<p>Impact 4.3-1: Potential for Project Construction-related Alterations in Aquatic and Riparian Habitat to Affect Aquatic Species</p> <p>Implementation of the project, including construction of the proposed outfall and placement of stabilization materials, would result in disturbance to or direct removal of a small amount of riparian vegetation and modifications to a small area of riverine aquatic habitat. Such modification of this area of the lower San Joaquin River would not have a substantial effect on the overall quantity and quality of available habitat for fish, BMI, or plankton communities within the river. The effects would not modify riverine habitat, including designated critical habitat for ESA-listed fishes, to levels that would cause a reduction in long-term abundance of special-status or resident fish species or their prey organisms.</p>	LTS	No mitigation is required for this impact.	LTS
<p>Impact 4.3-2: Potential for Project Construction-Related Underwater Noise and Vibration to Affect Fish and Their Prey Organisms</p> <p>Construction-related underwater noise, vibrations, and disturbance from constructing the new outfall has the potential to affect migrations and movements of fish near the outfall site or cause adverse effects on prey resources in the area. Most fish would move past the construction site in the portion of the river channel away from the area of disturbance and thus would not experience noise or vibrations at levels that would cause any chronic, adverse physical or behavioral effects on fish. Fish that move close enough to</p>	LTS	No mitigation is required for this impact.	LTS

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
<p style="text-align: center;"> B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable </p>			
<p>the pile driving to experience a startle response from the underwater noise levels would simply move away from the noise or drift with the currents past the site and away from the disturbance. In addition, all work would be limited to daylight hours during the week, leaving extensive periods of undisrupted passage for migrating fish and resident fish to move past the site daily in the evenings, in between periods of pile driving, and on weekends, when no construction would occur. Any small-magnitude, localized losses of resident larval fishes, BMI, and zooplankton from noise generated by pile-driving activities would be minimal and would not have population-level effects. Therefore, underwater noise and vibrations from construction-related activities would not lead to substantial adverse population-level effects on special-status fishes, resident fishes, or their prey resources and would not block or substantially delay the movement of any native resident or migratory fish species past the construction site.</p>			
<p>Impact 4.3-3: Potential for Project Construction to Cause Direct Fish Injury or Mortality, Resulting in Impacts on Fish Populations</p> <p>Construction of the cofferdam, subsequent dewatering of the area to provide a dry work area, and restoration of natural contours of the river postconstruction have the potential to cause direct mortality or injury to special-status fishes or other fish of the lower San Joaquin River. The potential for direct mortality or injury to special-status fishes would be minimized by limiting in-river construction activities to the July 1 to October 31 period and installing a cofferdam to hydraulically isolate the outfall installation from the river. The very limited injury or mortality that could potentially occur to non-special-status fish species would not occur at a level that would cause a reduction in their population. Nevertheless, it is possible that individual special-status fish could become stranded in the cofferdam footprint.</p>	<p>PS</p>	<p>Mitigation Measure 4.3-3: Conduct Fish Rescue and Relocation Operation</p> <p>The City will implement the following measures to avoid, minimize, and mitigate this potentially significant impact on San Joaquin River special-status fishes:</p> <ul style="list-style-type: none"> ▶ A fish rescue operation will be completed as water elevations within the cofferdam reach low levels. Fish rescue will be completed by qualified biologists using dip and seine nets to remove any fish remaining within the cofferdammed area. All fish rescued from inside the cofferdammed area will be placed into the San Joaquin River away from construction activities. ▶ After the dewatered area has been deemed free of any entrained fishes, the area will be completely dewatered using the submersible pumps. Depending on the amount of leakage between the sheet piles, the submersible pumps may have to be operated at regular intervals to keep the work area dry. 	<p>LTS</p>
<p>Impact 4.3-4: Potential for the RWCF's Thermal Plume in the San Joaquin River to Thermally Block or Substantially Delay the Migrations or Movements of Fishes Past the New Outfall</p> <p>The project would move the discharge location, and thus the warmest portion of the thermal plume, approximately 2,000 feet upstream from its existing location and to the opposite (east) bank of the river. Despite its new location, the geographic shape and size of the thermal plume, and the thermal gradients across the plume, would remain very similar to those of the existing outfall. The</p>	<p>LTS</p>	<p>No mitigation is required for this impact.</p>	<p>LTS</p>

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
<p>B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable</p>			
<p>temperature differentials within the plume, relative to river background temperatures, near the outfall from higher effluent temperatures being discharged would change minimally compared to those assessed for the RWCF Modifications Project. The reason for the minimal change is that both river and effluent flows and temperatures would remain the same as those assessed for the RWCF Modifications Project, and only the outfall pipe itself and its location within the channel would change with the project. Where plume temperatures differ the most from river background temperatures near the outfall in the zone of initial mixing, the plume would continue to cover a very small percentage of the overall cross-sectional area of the river (i.e., a few percent of the cross-sectional area). For this reason, adult and juvenile resident fishes moving upstream and downstream past the outfall and adult immigrating and juvenile emigrating anadromous fishes moving through this reach of the San Joaquin River would continue to have ample zones of passage within the river channel that would be unaffected by the plume. Fishes moving through the warmest portion of the thermal plume either would pass through the plume quickly (i.e., seconds to minutes) because of its size within the channel or would move laterally or vertically in the water column to move around the plume if the temperatures experienced when initially encountering the plume are above preferred temperatures. For this reason, the internal temperature gradients for the thermal plume in the near-field zone of initial mixing (i.e., area near the outfall before full mixing of effluent with river flows) under the project would not block or substantially delay the movement of any native resident or migratory fish species, including any special-status species, past the new (east bank) outfall.</p>			
<p>Impact 4.3-5: Potential for the RWCF Effluent Discharge to Cause Mortality or Chronic Adverse Sublethal Effects on Fish, Phytoplankton, Zooplankton, or Macroinvertebrates Moving through the Thermal Plume</p> <p>Most fish moving through the river reach where the new (east bank) outfall would be located would never encounter the thermal plume because of its small size within the channel. Adult and juvenile migrating fishes, and resident fishes moving locally, that move near the outfall would be able to choose either to move through the thermal plume in seconds to minutes or to move around the plume. Phytoplankton, zooplankton, and invertebrates that drift through the plume would not experience thermal conditions within the plume that exceed their upper thermal tolerances. For these reasons, the plume would not cause</p>	<p>LTS</p>	<p>No mitigation is required for this impact.</p>	<p>LTS</p>

Impact	Significance before Mitigation	Mitigation Measure	Significance after Mitigation
B = Beneficial NI = No impact LTS = Less than significant PS = Potentially significant S = Significant SU = Significant and unavoidable			
lethality to or population reductions for these organisms. For larval fishes drifting through this river reach, most would not encounter the plume. For those that do, they would move through the plume in seconds to minutes under conditions that do not exceed their thermal tolerances; thus, the plume would not cause lethality or any chronic, adverse sublethal effects.			
<p>Impact 4.3-7: Potential for the New East Bank Outfall Structure and Thermal Plume to Cause Increased Predation on Special-Status Fishes</p> <p>The new (east bank) outfall would provide a small area within the channel for striped bass and other predatory fishes to hold behind. Studies of larger thermal plumes downstream from wastewater discharges in the Delta have not found the existence of the thermal plume itself to attract predatory fishes and increase predation substantially at the site. The geographic size and thermal gradients across the plume of the new outfall would be similar to those that currently exist for the (west bank) outfall. Hence, the thermal plume associated with the new outfall would not cause a predation "hot spot" in the river and would not be expected to increase predation rates on emigrating juvenile ESA-listed and other special status fishes above those that currently occur at the existing west bank thermal plume.</p>	LTS	No mitigation is required for this impact.	LTS

3 PROJECT DESCRIPTION

The City of Stockton proposes to construct a new outfall on the east bank of the San Joaquin River to discharge final, tertiary-treated effluent from its RWCF. Construction and operation of this new outfall is part of the City's RWCF Modifications Project, which is being completed to maintain compliance with its National Pollutant Discharge Elimination System (NPDES) permit, extend the useful life of existing facilities, improve working conditions for facility staff, and implement components of the City's Capital Improvement and Energy Management Plan. The relocation of the RWCF outfall to the east bank of the San Joaquin River is the "project" addressed in this Draft Supplemental EIR.

3.1 PROJECT LOCATION

The project site is located at the City's RWCF, along the east bank of the San Joaquin River, south of the Santa Fe Railroad bridge in Stockton, California, as shown in Figures 3-1 and 3-2. The proposed outfall location is at an abandoned 60-inch reinforced concrete pipe that served as the outfall for the City's treated wastewater effluent before circa 1970.

3.2 PROJECT BACKGROUND

The RWCF consists of the main plant on the east side of the San Joaquin River and the tertiary plant on the west side of the river. RWCF effluent is currently discharged to the river using pipe siphons in the west bank (Figure 3-2). This outfall is located adjacent to the chlorine contact channel and is submerged approximately 10 feet beneath the San Joaquin River water surface.

The City initiated the RWCF Modifications Project to (1) increase the reliability of the liquid and solids treatment processes, (2) improve reliability in treating existing and projected flows, (3) reduce energy costs and provide reliable renewable energy alternatives, and (4) reduce nitrate plus nitrite concentrations in the final effluent to comply with the RWCF NPDES permit. Implementing the RWCF Modifications Project would result in all wastewater treatment facilities being located at the "main plant" on the east side of the San Joaquin River.

As originally proposed, the RWCF Modifications Project involved constructing facilities so that the discharge of final effluent to the San Joaquin River would occur using the existing outfall on the west bank (see Figure 3-2). Facilities needed to continue discharge through the existing outfall included a new Final Effluent Pump Station (FEPS) at the main plant and approximately 2,000 linear feet of new pipelines.

3.3 PROJECT PURPOSE AND OBJECTIVES

The purpose of the project is to consolidate RWCF effluent disposal operations and maintenance activities at the main plant. The specific objectives of the project are to:

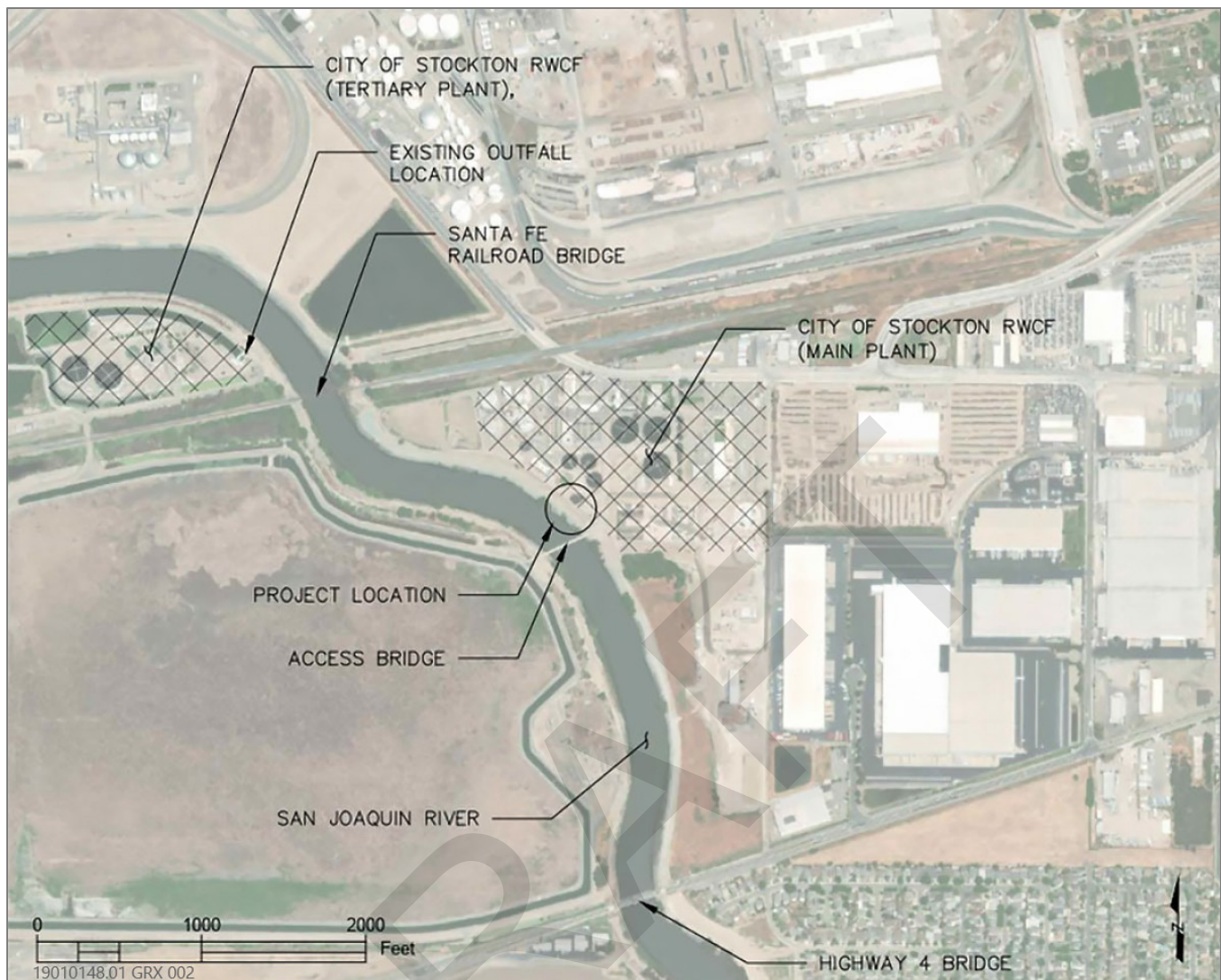
- ▶ further consolidate treatment facilities, thereby eliminating the need to construct approximately 2,000 feet of 72-inch pipeline along the western edge of the San Joaquin River,
- ▶ allow gravity discharge of effluent to the San Joaquin River to the maximum extent possible (more than 90 percent of the time) thereby reducing overall disposal cost, and
- ▶ comply with receiving water limitations specified in the RWCF NPDES permit.



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Source: Data provided by AECOM in 2021, adapted by Robertson-Bryan, Inc. in 2021

Figure 3-1 Project Location



Source: Data provided by AECOM in 2021, adapted by Robertson-Bryan, Inc. in 2021

Figure 3-2 Key Features in Project Vicinity

3.4 PROJECT SITE DESCRIPTION

The project site is located on the east bank of the San Joaquin River, adjacent to the main plant. A 60-inch reinforced concrete pipe runs from the RWCF westward, under the existing levee, and daylights on the waterside of the levee at an existing apron structure on the east side of the river (Figure 3-3). Under the river channel in the vicinity of the project are two other pipes owned by the City that currently convey wastewater from the main plant on the east side of the river to the tertiary plant on the west side of the river. The 60-inch pipe that daylights on the waterside of the levee on the east bank is not currently in use, and the closest upstream butterfly valve is welded shut. This existing pipe was inspected to determine its condition and viability to be reinstated as an effluent discharge pipe through rehabilitation with cured-in-place pipe (CIPP) methods (described further in Section 3.5.1, "Reinstatement of 60-Inch Pipe"). Inspection was performed by dewatering the pipe to a dry condition and inspecting it with closed-circuit television (CCTV). The inspection showed no major offsets, alignment changes, or major deterioration of the host pipe, thus indicating that the pipe is suitable for cured-in-place pipe rehabilitation.

Some existing features shown in Figure 3-3 on the project site, including the stairs, control panel, and apron structure, would be removed as part of the project, as described further in Section 3.5, "Project Components."

3.5 PROJECT COMPONENTS

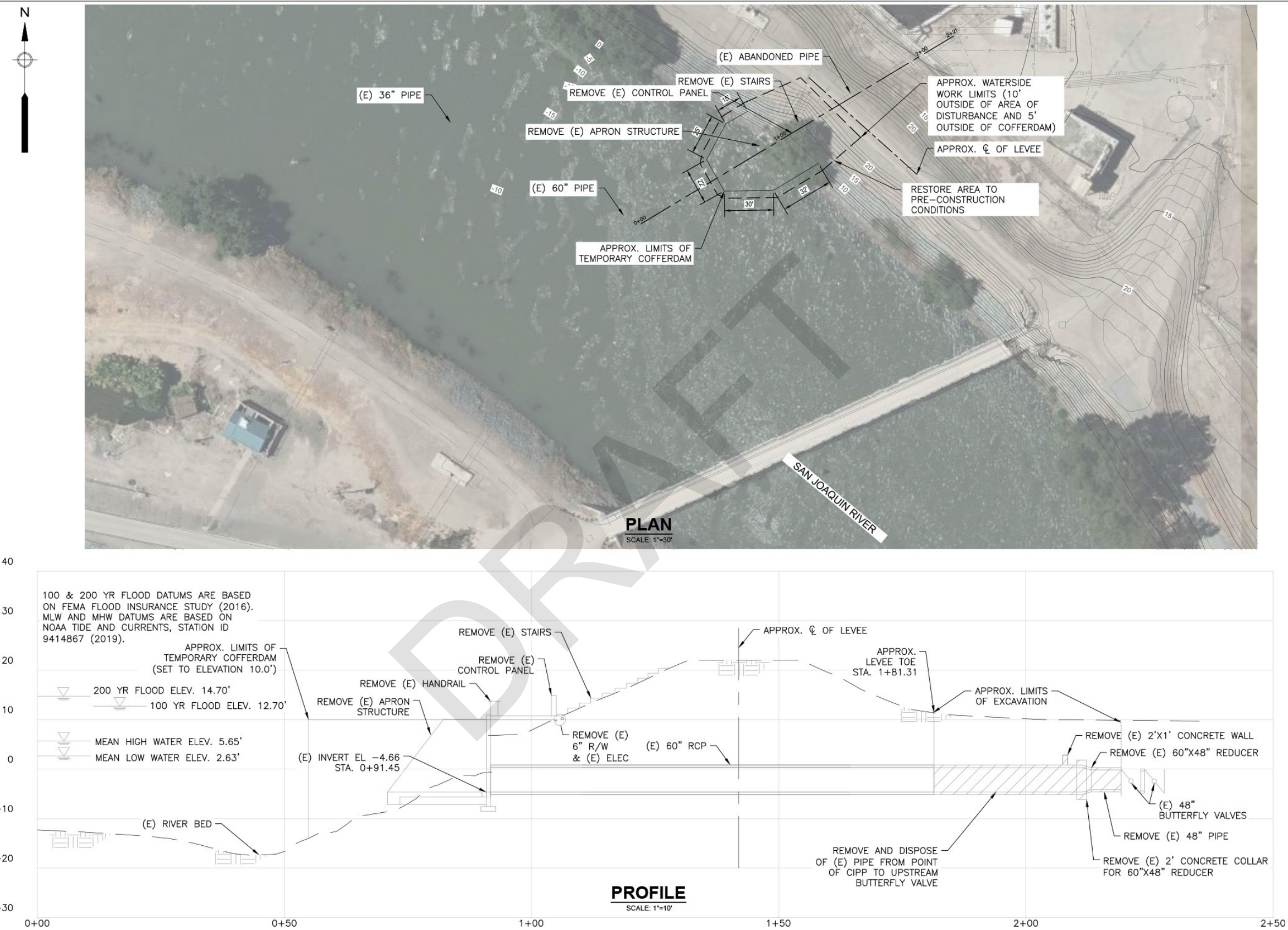
The proposed project consists of the following three primary elements (Figure 3-4):

- ▶ reinstatement of the existing 60-inch reinforced concrete pipe running from the RWCF to the abandoned outfall apron on the east bank of the San Joaquin River,
- ▶ modification of the outfall apron structure to create a new outfall outlet, and
- ▶ construction of a pipeline running from the FEPS to the reinstated 60-inch reinforced concrete pipe.

Each of these elements is described further in the following sections.

With the RWCF effluent outfall relocated to the east side of the San Joaquin River adjacent to the main plant, the following components of the RWCF Modifications Project would no longer be constructed:

- ▶ 1,600 feet of 72-inch final effluent pipeline (Option 1 or 2) to the existing tertiary plant,
- ▶ connection of new 72-inch final effluent pipeline to the existing 72-inch reinforced concrete pipe at the control weir drainage box, and
- ▶ 400 feet of 36-inch pipeline under the utility bridge and the associated discharge to the pond return channel.
- ▶ In addition, the existing 60-inch pipeline to the pond return channel would remain in service with no modifications. The locations of these components are identified in Figure 3-5.
- ▶ Upon successful commissioning and reinstatement of the main plant east discharge outfall, the existing outfall on the west side of the river would no longer be required and would be abandoned in place so that no discharge of RWCF effluent could occur through the existing outfall. The abandonment of the existing outfall would be performed in conjunction with the demolition of the tertiary plant. The existing outfall abandonment would be accomplished by removing the process equipment, including air vacuum pumps and associated equipment that is currently required for operation. When this equipment is removed, the system would be deemed nonoperational and outfall abandoned in place.



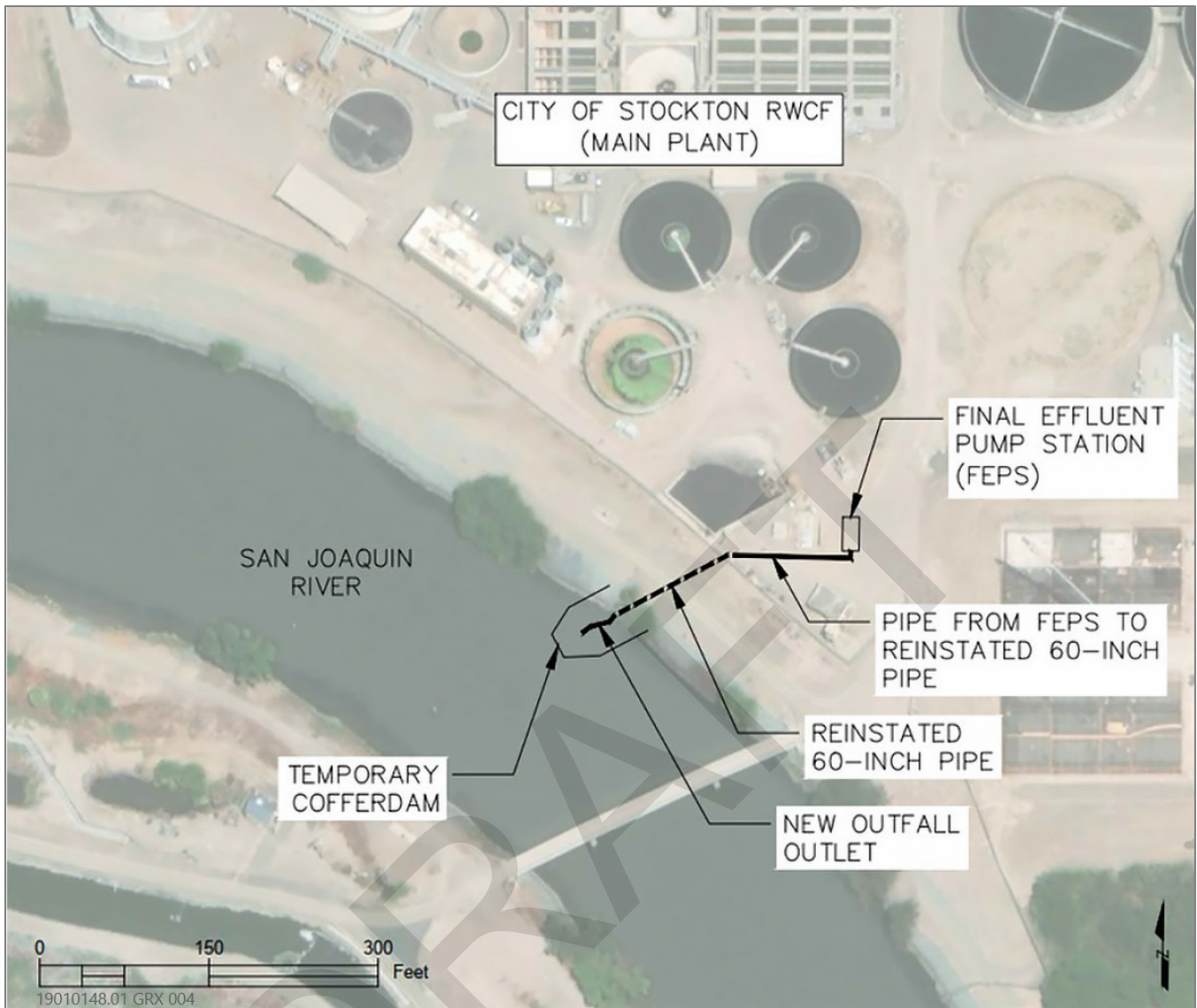
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Source: AECOM 2022

Figure 3-3 Existing Site Conditions

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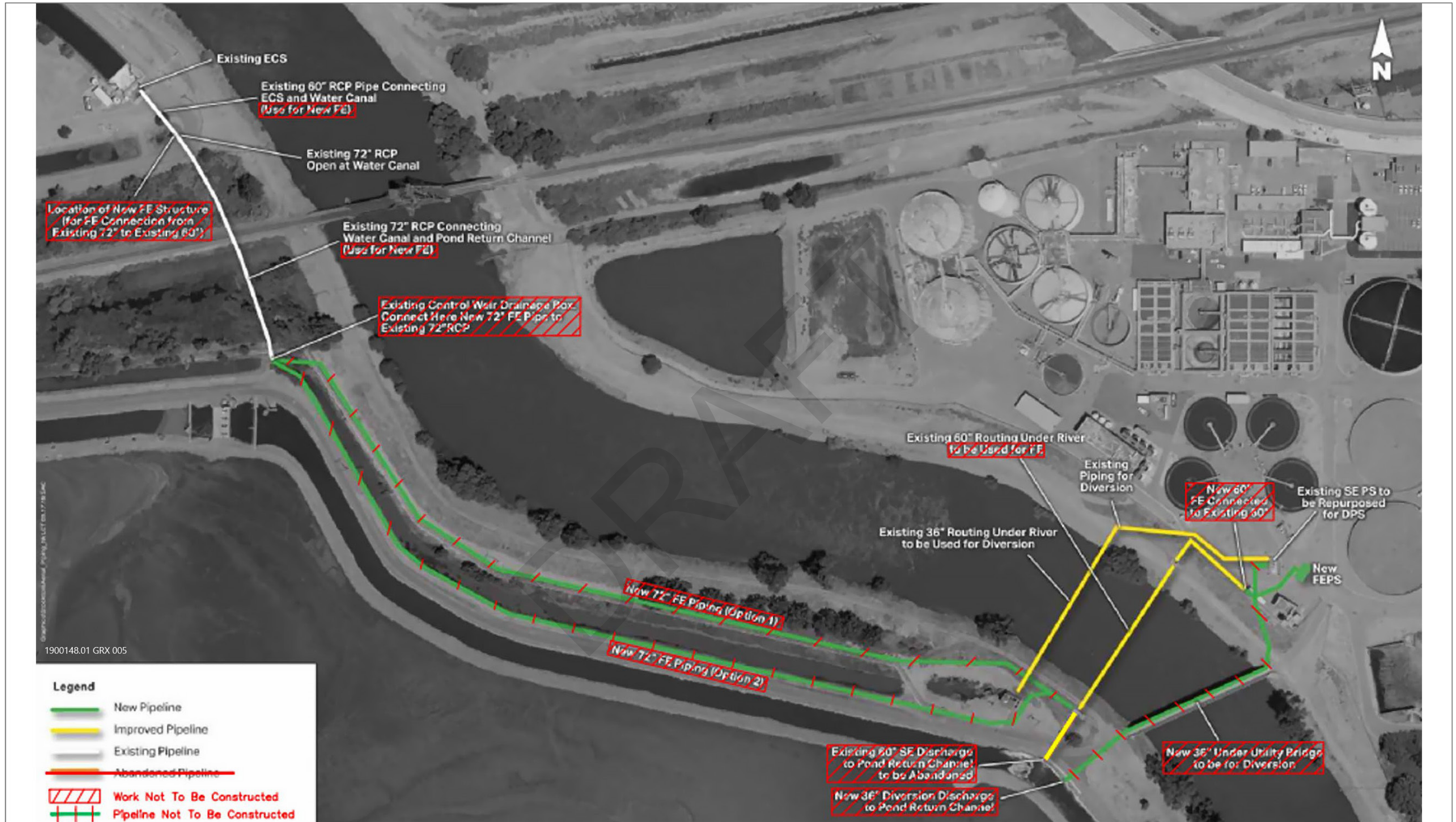


Source: Data provided by AECOM in 2021, adapted by Robertson-Bryan, Inc. in 2021

Figure 3-4 Project Features

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Source: Data provided by AECOM in 2021, adapted by Robertson-Bryan, Inc. in 2022

Figure 3-5 RWCF Modifications Project Facilities Not Being Constructed as a Result of Proposed Outfall Relocation

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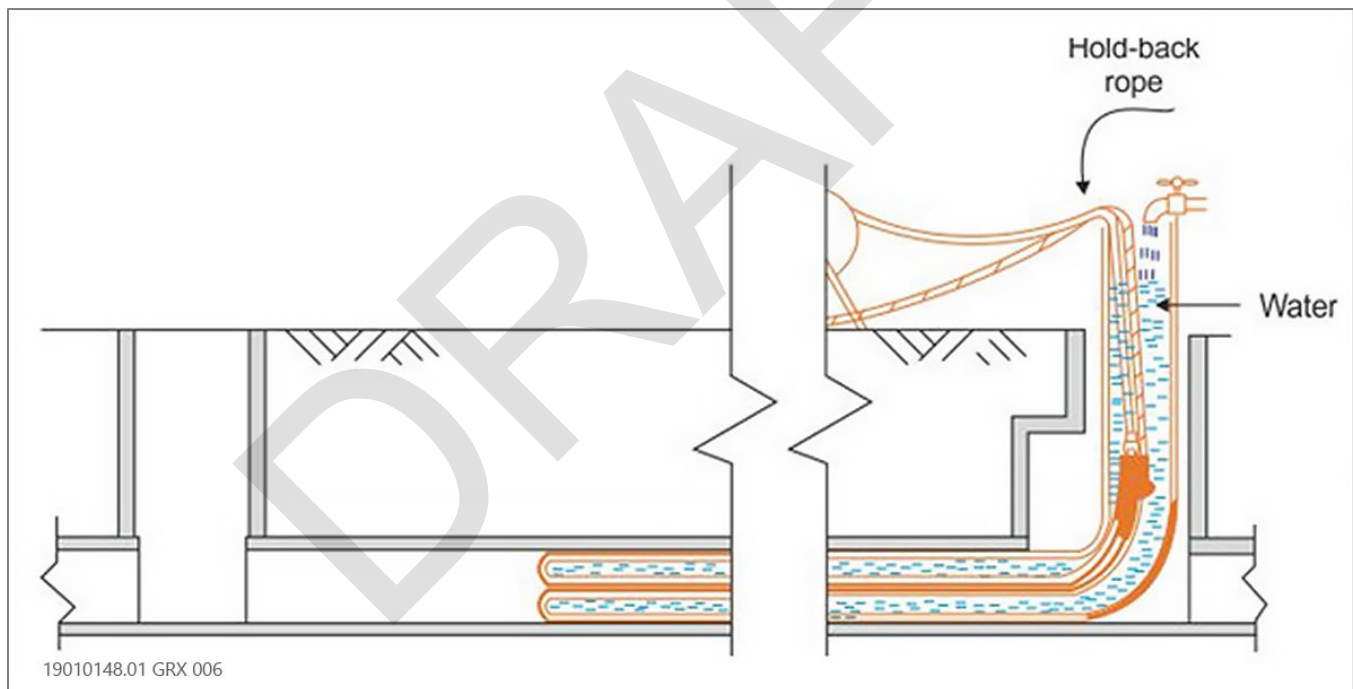
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3.5.1 Reinstatement of 60-Inch Pipe

The existing 60-inch reinforced concrete pipe outfall would be reinstated by lining the interior with CIPP. CIPP liners are constructed by inverting and curing a resin-impregnated felt liner within the existing pipe to form a new close-fit pipe within the existing host pipe. Although the CIPP liner is a close fit to the host pipe, there is no bond between the liner and the host pipe. CIPP liners are designed to independently support both external hydrostatic pressure and overburden loads ignoring the host pipe. A typical install of a CIPP is shown in Figure 3-6.

The CIPP lining effort would begin with excavation to the top of the existing 60-inch reinforced concrete pipe near the landside levee toe. The section of the existing pipe within the excavated trench would be removed. The trench would be backfilled using the excavated material in 8-inch loose lifts and compacted to 97 percent of the maximum dry density in accordance with ASTM International standard D 698. The trench would be approximately 50 feet long and approximately 100 cubic yards of soil would be excavated for the trench, covering approximately 100 square feet. This same volume of soil would be backfilled into the trench.

The existing 60-inch pipe would be dewatered, inspected using CCTV, and cleaned before the CIPP is installed. Dewatering water and water used for cleaning would be conveyed by means of pumping to the RWCF headworks using the nearby catch basin. Following installation, the CIPP liner would undergo hydrostatic testing and inspection using CCTV. The hydrostatic test water would be conveyed to the RWCF headworks for treatment in the same manner as dewatering water.



Source: AECOM 2021

Figure 3-6 Typical Cured-in-Place Pipe Install

3.5.2 Modification of Outfall Apron Structure to Create New Outfall Outlet

Modification of the existing outfall outlet is necessary to lower the outlet to an invert elevation of -12.37 feet North American Vertical Datum of 1988 (NAVD 88) to ensure compliance with NPDES permit limitations. The new outfall outlet would be created by demolishing the existing apron structure and installing a new 60-inch cement-lined and -

coated steel pipe connected to the reinstated 60-inch pipe (Figures 3-7 and 3-8). The new steel pipe would be approximately 30 feet in length and installed with premanufactured bends. The new steel pipe would be connected to a new gatewell structure, which would be connected to the reinstated 60-inch pipe by installing a concrete collar, ensuring that the joint is watertight. Except for the final 7 feet extending into the river, the new outfall pipe would be covered with riprap. The new outfall pipe would be encased in concrete and anchored to prevent uplift. The gatewell would be installed at the connection of the reinstated 60-inch pipe and would house two gates, a slide gate on the waterside for positive closure and a flap gate designed to accommodate the hydrostatic pressure of a 200-year design flood elevation. The gatewell would be installed at the location of the existing apron structure. The slide gate stem would be accessed using an elevated walkway that would be designed and constructed to allow river water to flow underneath, unimpeded. Additionally, an inspection access manhole would be placed away from the landside toe of the levee, within the RWCF property. This manhole would provide access for future pipe maintenance and inspection activities.

Approximately 45 cubic yards of excavation within a 300-square-foot area of the waterside levee slope and toe would be required to facilitate installation of the 60-inch steel pipe down the slope to the final outlet elevation. Excavated material would be loaded onto off-haul dump trucks and stockpiled on RWCF property within the staging area established for the RWCF Modifications Project (refer to City of Stockton 2018, Chapter 3, "Project Description," Exhibit 3-9).

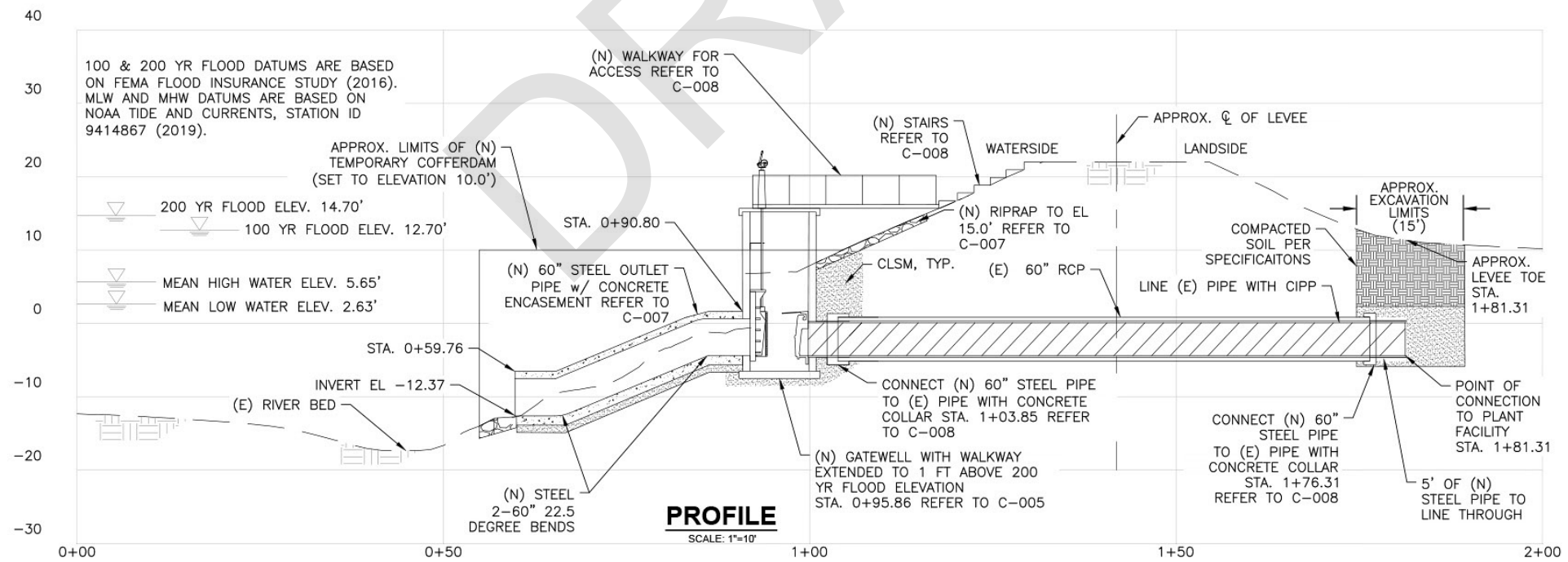
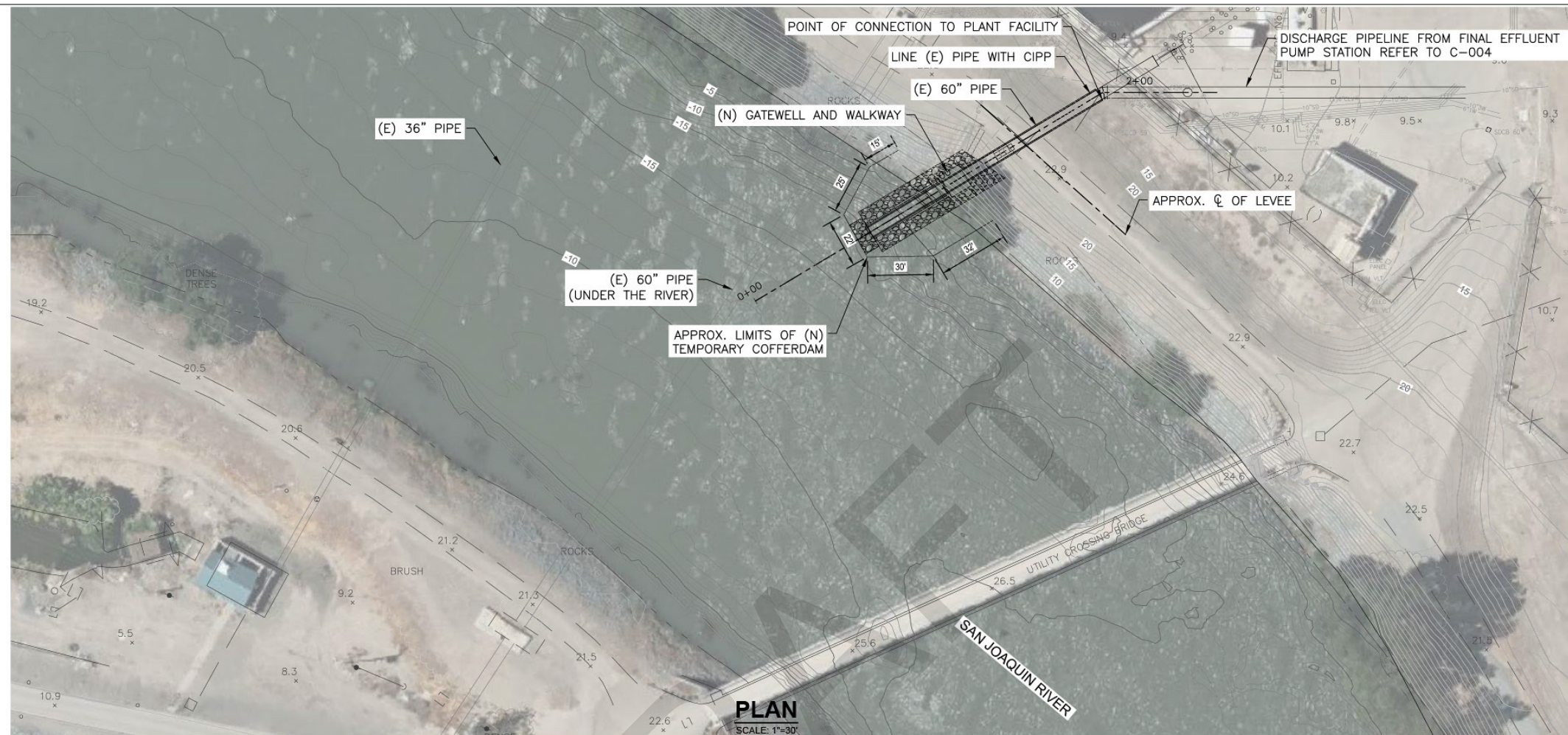
Any alterations to the levee that occur during the outfall outlet installation would be repaired, and the levee would be reconstructed to match the existing grade and condition of the bank adjacent to the work limits in accordance with Central Valley Flood Protection Board Title 23 requirements and applicable U.S. Army Corps of Engineers engineering standards. This includes placement of select levee fill, rock armoring of the waterside slope, and aggregate base resurfacing of the levee crown. Approximately 15 cubic yards of select levee fill would be placed on prepared excavated surfaces in horizontal layers not to exceed 6 inches loose thickness and then compacted. Fill material would be required to be free from organics, construction debris, and other deleterious substances. Rock armor would be placed on both sides of the new 60-inch pipe starting at the outlet end and worked up the slope in a manner that would not damage or displace the new outfall pipe. The rock would be transitioned smoothly into the existing rock armor on either side of the new outfall pipe and into the existing rock above. A small rock apron would also be placed below the end of the new outlet pipe. All rock would be placed and worked in a manner that would produce a stable fill that contains no large unfilled spaces caused by bridging of the larger fraction. Approximately 75 cubic yards of rock armoring in total would be placed, covering an estimated 1,000 square feet. Aggregate base resurfacing of the levee crown would be performed as necessary, where damages or wear are incurred.

All the excavation, preparation of excavated surfaces, installation of the new outfall outlet, levee reconstruction, and placement of rock armor would occur from the land side (i.e., levee crown). No activities would occur from a barge. Excavated materials would be stockpiled within the staging area established for the RWCF Modifications Project (refer to City of Stockton 2018, Chapter 3, "Project Description," Exhibit 3-9).

Disturbed levee areas would be reseeded with a native plant mix for erosion control.

3.5.3 Construction of Pipeline from Final Effluent Pump Station to Reinstated 60-Inch Pipe

The pipe connecting the FEPS to the reinstated 60-inch pipe (lined with CIPP) would be approximately 180 feet in length and constructed using open-cut excavation methods within the confines of the treatment plant site (i.e., on the land side of the existing levee). This pipe would consist of an epoxy-coated and cement-lined 60-inch steel pipe. The pipe from the FEPS would be connected to the reinstated 60-inch pipe on the land side of the levee toe by inserting a new bend or fittings or both as necessary where the CIPP liner terminates.



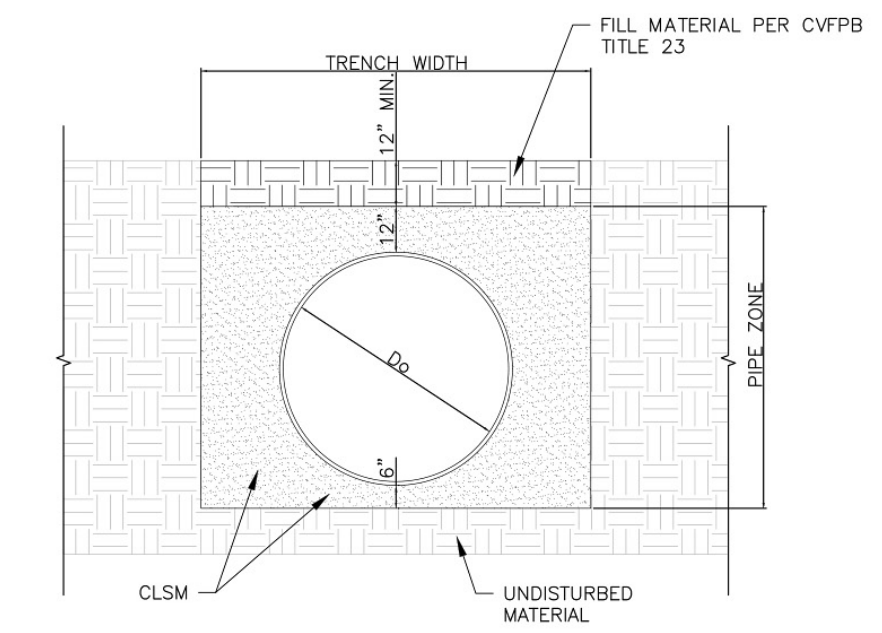
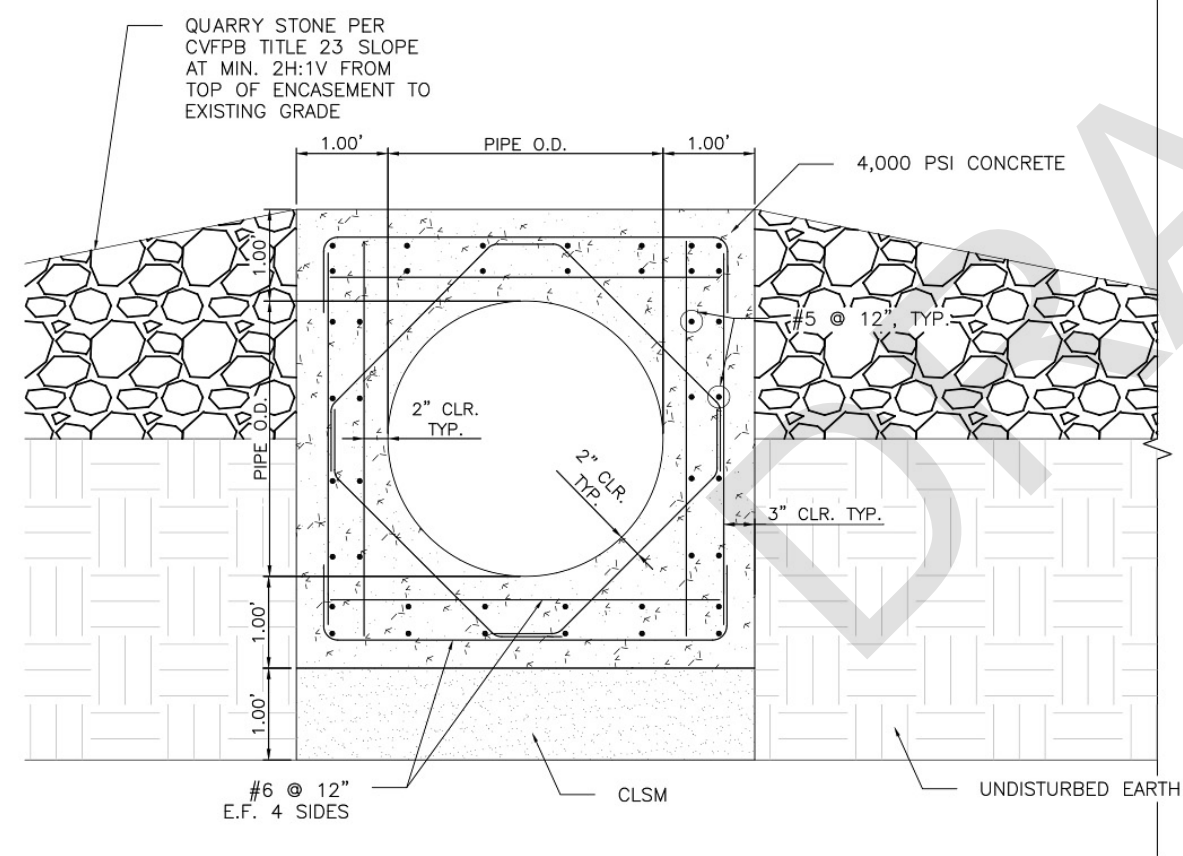
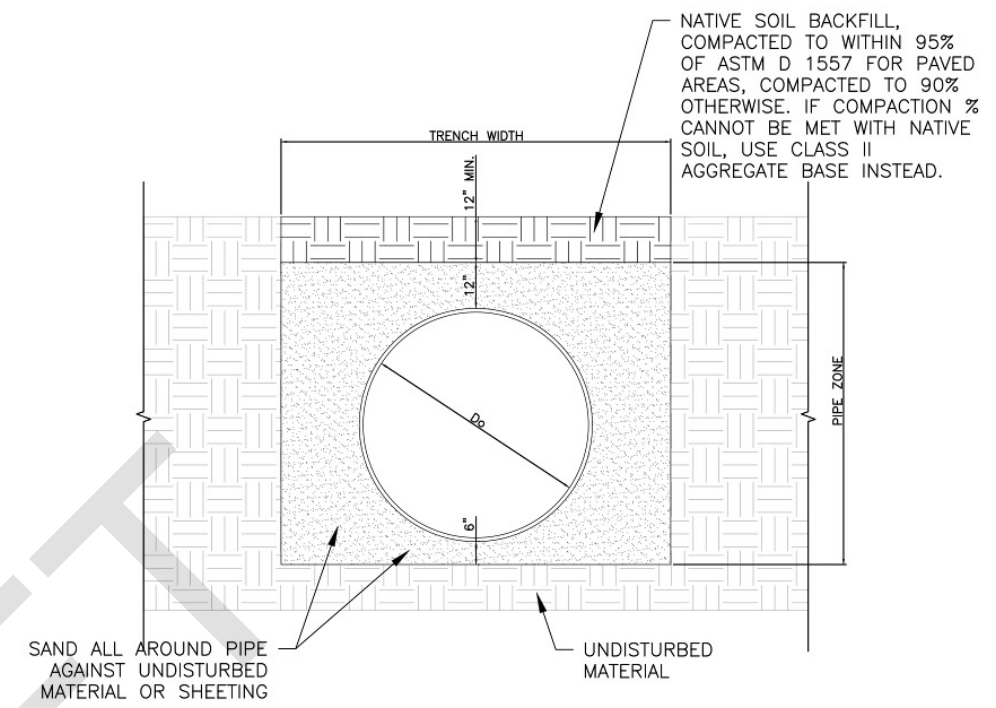
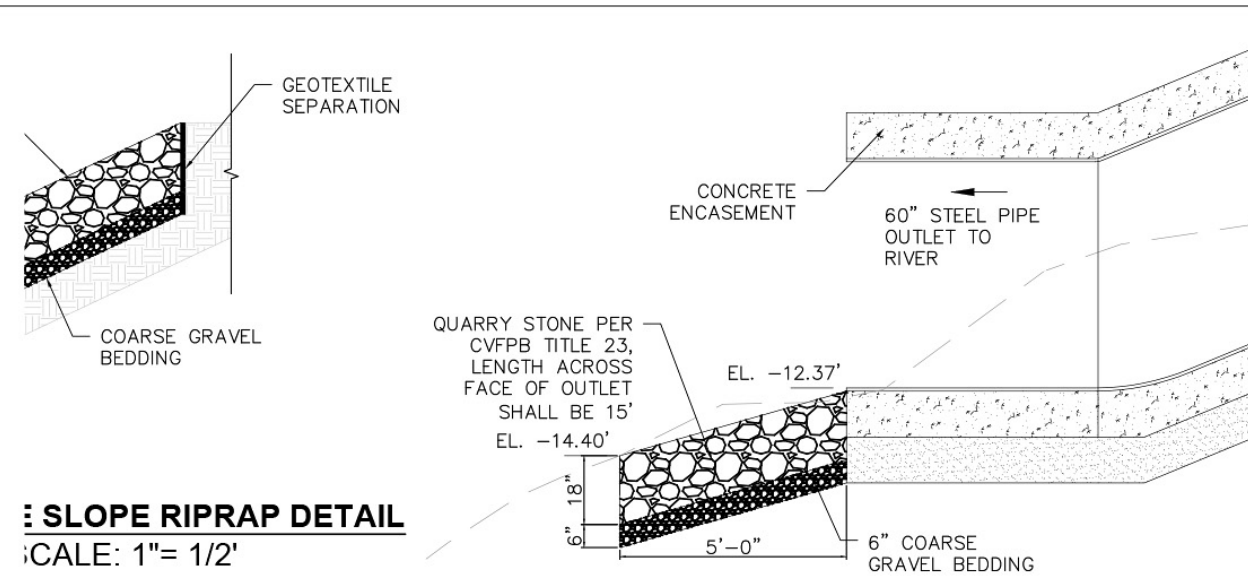
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Source: AECOM 2022

Figure 3-7 Proposed Project Site Plan and Profile

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Source: AECOM 2022

Figure 3-8 Proposed Outfall Detail

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Source: Data provided by City of Stockton in 2022, compiled by Ascent Environmental, Inc. in 2022

Figure 3-9 Sediment Settling Tank and Staging Area Locations

3.6 PROJECT CONSTRUCTION

3.6.1 Construction Staging

The construction staging area being used for the RWCF Modifications Project, which is located on the RWCF property, south of the main plant, would be used for the outfall project (refer to City of Stockton 2018, Chapter 3, "Project Description," Exhibit 3-9). This location has ample room for temporary office space, parking for construction crew members, and receiving and storage of construction equipment and materials. This location allows for optimal construction access with limited impact on the balance of the RWCF. Also located on this property are existing buildings, canopies, and (potentially) utilities that could further support construction operations. In addition, an approximately 15,000-square-foot staging area would be set up on the land side of the levee and adjacent to the outfall project work area (Figure 3-9).

3.6.2 Temporary Cofferdam

A temporary cofferdam would be installed on the waterside of the San Joaquin River levee to facilitate construction activities for reinstating the 60-inch pipe with CIPP, demolishing the existing outfall apron, installing the new outfall outlet pipe, and installing riprap. The cofferdam dam would be constructed with interlocking steel sheet piles (approximately 40 feet tall and 55 inches wide) installed using a vibratory pile driver. The total length of the cofferdam would be approximately 125 feet, and it is anticipated to be driven 15–17 feet into the riverbed, extending above the riverbed to an elevation of 10.00 feet (NAVD 88), as shown in Figure 3-7. The cofferdam would be in place for the entire permitted in-water work window, from approximately July 15 to October 30.

Before dewatering, an existing baseline turbidity level for the San Joaquin River would be established. Monitoring for turbidity would be conducted every hour during dewatering of the cofferdam to ensure that compliance is maintained. Dewatering would commence and the water would be discharged into the San Joaquin River as long as the discharge can achieve compliance with state water quality objectives. If necessary to achieve turbidity objectives before discharge, dewatering water would be routed into a nearby sediment settling tank (refer to Figure 3-9) and then to an existing RWCF manhole that conveys the water into the RWCF recirculation channel, which conveys water to the tertiary plant, where it would be treated before discharge to the San Joaquin River.

3.6.3 Tree Removal

Two sycamore trees (*Alnus rhombifolia*) are located adjacent to the proposed outfall location (Figure 3-10). One tree has two main trunks, one with a 10-inch diameter at breast height (dbh) and the other with a 12-inch dbh. The second tree has multiple trunks, the largest with an 8-inch dbh. These trees would be removed as part of constructing the outfall pipeline and elevated walkway.



Source: Data provided by City of Stockton in 2021, compiled by Robertson-Bryan, Inc. in 2021

Figure 3-10 Trees to Be Removed for Outfall Construction

3.6.4 Construction Sequencing

Construction would consist of four phases: preconstruction, construction, site restoration, and cleanup and demobilization. The specific activities within these four phases are listed below.

PRECONSTRUCTION

- ▶ Install temporary security fencing delineating work limits.
- ▶ Install vegetation/tree protection measures and other environmental commitments resulting from the environmental review and permitting processes, as well as NPDES stormwater management measures.
- ▶ Identify and demarcate existing utilities within work limits.
- ▶ Remove trees and trim existing vegetation within work limits, where necessary.
- ▶ Implement the traffic control plan for ingress/egress of project site during construction.
- ▶ Conduct Worker Environmental Awareness Training, as applicable.

CONSTRUCTION

- ▶ Install the temporary steel sheet pile cofferdam in San Joaquin River and dewater the work area.
- ▶ Dewater and clean the 60-inch pipe to be reinstated using CIPP.
- ▶ Excavate the land side to expose and cut the 60-inch pipe.
- ▶ Demolish the existing apron structure, platform, and associated equipment.
- ▶ Deliver the CIPP liner to the site.
- ▶ Install the CIPP from the land side through the 60-inch pipe.
- ▶ Construct gatewell within the dewatered area behind the cofferdam.
- ▶ Install and connect the new outfall outlet pipe to the gatewell.
- ▶ Conduct hydrostatic testing of the liner and new outfall pipe and inspect them using CCTV.
- ▶ Remove a portion of the existing 60-inch reinforced concrete pipe from the cut to the existing welded-shut butterfly valve, as applicable.
- ▶ Install the new pipe and access manhole between the FEPS and the reinstated 60-inch pipe.
- ▶ Connect the new pipe extending from the FEPS to the reinstated 60-inch pipe.
- ▶ At existing outfall, remove air vacuum pumps and associated equipment that is currently required for operation.

SITE RESTORATION

- ▶ Backfill and resurface the landside area that was excavated.
- ▶ Repair/reconstruct the levee.
- ▶ Replace the riprap on the water side to match preconstruction conditions.
- ▶ Reseed with a native plant mix for erosion control where applicable.

CLEANUP AND DEMOBILIZATION

- ▶ Remove the cofferdam.
- ▶ Demobilize the construction equipment.
- ▶ Remove the temporary security fencing and erosion controls.

3.6.5 Construction Equipment and Staging

The project would be constructed using various equipment and trucks, including tractors, excavators, haul dump trucks, a crane, and semi-trucks for delivery of materials described below. Table 3-1 identifies the equipment that would be used for each project element. Some of this equipment is already on-site for the ongoing RWCF Modifications Project construction; other equipment is unique to the proposed outfall relocation project. Equipment already on-site includes the following:

- ▶ Low-boy tractor trailer (one): for mobilization and demobilization of large equipment
- ▶ Medium-sized tracked excavator (one): to accommodate all site excavation activities
- ▶ Larger long-reach excavator (one): to accommodate all site excavation activities
- ▶ Off-haul dump truck (four): 10-wheel dump trucks cycled between the site and the waste disposal location or used to deliver fill and other construction materials

- ▶ Small skid-steer loader (one): for moving small pieces of equipment around the site
- ▶ Medium-sized front-end loader (one): 2- to 3-cubic-yard capacity for loading waste materials from excavation into off-haul dump trucks
- ▶ Hydraulic crane (one): reach of approximately 80 feet for hoisting materials and equipment, as well as installing and removing the cofferdam
- ▶ Medium-sized compaction roller (one): for compaction of all placed materials
- ▶ Small gas-powered compactor (one): "Jumping Jack" compactor for adequately compacting small areas and corners
- ▶ Water truck (one): 2,000-gallon capacity for dust control during construction

Additional equipment required for outfall relocation is listed below.

- ▶ Ready-mix concrete truck and concrete pump (one): to supply concrete
- ▶ CCTV box truck (one): for CCTV of the existing 60-inch pipe
- ▶ Dewatering pump (one): for cleaning the existing 60-inch pipe
- ▶ Semi-truck (one): to deliver CIPP to the site
- ▶ Steam truck (one): to produce steam to cure the CIPP
- ▶ Trailered water tank (one): 500-gallon capacity to CIPP installation
- ▶ Contractor pickup/utility trucks (three): for crew movement and for operating and maintaining equipment

The construction headquarters and staging for the proposed outfall project would be the same as that described in the RWCF Modifications Project EIR.

Table 3-1 Construction Equipment Required for Each Project Element

Description	Quantity	Reinstatement of 60-Inch Pipe	Modification of Outfall Apron Structure to Create New Outfall Outlet	Construction of Pipeline from FEPS to Reinstated 60-Inch Pipe
Low-boy tractor trailer	1	✓	✓	✓
Medium-sized tracked excavator	1	✓	✓	✓
Larger long-reach excavator	1	✓	✓	✓
Off-haul dump trucks	4	✓	✓	✓
Small skid-steer loader	1	✓	✓	✓
Medium-sized front-end loader	1	✓	✓	✓
Hydraulic crane	1	✓	✓	✓
Ready-mix concrete truck and concrete pump	1		✓	✓
Medium-sized compaction roller	1	✓	✓	✓
Small gas-powered compactor	1	✓	✓	✓
Water truck	1	✓	✓	✓
CCTV box truck	1	✓		
Dewatering pump	1	✓		
Semi-truck	1	✓		
Steam truck	1	✓		
Trailered water tank	1			✓
Contractor pickup/utility trucks	3	✓	✓	✓

Note: FEPS = final effluent pump station.

As described above in Section 3.5, "Project Components," certain components of the RWCF Modifications Project would no longer be needed with the new outfall project. Elimination of these components would result in reduced construction equipment use relative to that which would occur with construction of the originally proposed RWCF Modifications Project. While the new outfall project has the addition of five days of sheet pile installation and removal of these sheet piles over several days, the project also would involve substantially less excavation (i.e., 1,600 feet less pipe and associated trenching) and fewer truck trips for delivery of pipe. Because of similarities in construction methods and facilities, construction equipment needed for the new outfall project would be comparable to that needed for the RWCF Modifications Project components that would no longer be constructed or used. For example, both the new outfall project and the eliminated components involve pipeline connections to supporting facilities (e.g., pump station, weir boxes). Overall, there would be no increase in the construction equipment use or hauling trips with the new outfall project compared to that assessed in the RWCF Modifications Project EIR.

3.6.6 Timing and Workforce

Construction is expected to last up to 3 months and occur between July 1 and October 31. Construction activities would take place primarily between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, with the possibility of work between 7:00 a.m. and 7:00 p.m. on Saturdays; no work is projected to occur on Sundays or national holidays, which are the same work hours defined in the RWCF Modifications Project EIR. Workforce and truck traffic would access the site from Interstate 5 to Navy Drive and Brooks Road to the main plant, which is the same access route defined in the RWCF Modifications Project EIR. Daily truck trips for deliveries of materials for the proposed outfall project would fall within the estimated four to 16 truck trips assumed for the RWCF Modifications Project EIR.

A workforce of 10–20 people is anticipated specifically for construction of the outfall project. The workforce anticipated for the RWCF Modifications Project in the EIR was 80–90 workers per month during times when construction of multiple project elements overlap. For project elements that involve less construction, the number of required workers was estimated to be 40–50 per month. The period of construction for the outfall project would be such that the number of workers for all construction activities for the RWCF Modifications Project, including those for the proposed outfall project, would not exceed 90 workers per month assessed in the RWCF Modifications Project EIR.

3.7 PROJECT OPERATION AND MAINTENANCE

The existing RWCF operates 24 hours per day. Currently, 65 full-time equivalent employees operate, maintain, and administer the RWCF. After implementation of the project, the operating hours and work shifts at the RWCF are not expected to change. Routine maintenance would continue as needed for the RWCF and outfall. Staffing levels and the number of truck trips would not change.

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4 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

APPROACH TO THE ENVIRONMENTAL ANALYSIS

In accordance with CEQA (PRC Section 21083) and the State CEQA Guidelines (CCR Title 14 Section 15163[a][2]), this Supplemental EIR contains only the information necessary to make the RWCF Modifications Project EIR (City of Stockton 2018) adequate for the project, as revised. For this reason, this Supplemental EIR evaluates only the following resource areas, which are those on which the project was determined to have the potential for new or substantially more severe direct, indirect, or cumulative effects: hydrology and water quality, terrestrial biological resources, and aquatic biological resources. Section 1.5, "Scope of This Draft Supplemental EIR," describes the resource areas for which the project would not result in new or substantially more severe significant direct, indirect, or cumulative effects.

Sections 4.1 through 4.3 of this Draft Supplemental EIR each include the following components:

- ▶ **Regulatory Background:** This subsection presents information on the laws, regulations, plans, and policies from the federal, state, and local level that relate to the issue area being discussed. Where the regulatory background provided in the RWCF Modifications Project EIR remains applicable to the analysis of the project, it is incorporated by reference. Where regulatory changes subsequent to the adoption of the RWCF Modifications Project EIR are relevant to understanding the project's potential impacts, additional background information is provided.
- ▶ **Existing Environmental Setting:** This subsection presents the existing environmental conditions on the project site and in the surrounding area as appropriate, in accordance with State CEQA Guidelines Section 15125. The discussions of the environmental setting focus on information relevant to the issue under evaluation. The extent of the environmental setting area evaluated differs among resources, depending on the locations where impacts would be expected. For example, the study area for the evaluation of terrestrial biological resources is the San Joaquin River watershed in the project vicinity, whereas the study area for evaluation of aquatic biological resources is the San Joaquin River in the project vicinity. As noted above for the regulatory background, the existing setting information provided in the RWCF Modifications Project EIR is incorporated by reference where this information remains applicable to the analysis of the project. Where changes to the existing conditions subsequent to the adoption of the RWCF Modifications Project EIR are relevant to understanding the project's potential impacts, additional background information is provided.
- ▶ **Environmental Impacts and Recommended Mitigation Measures:** This subsection discloses the impacts from the project and presents a discussion of mitigation measures. The significance criteria used to determine the level of significance of the environmental impacts for each resource topic are provided, in accordance with State CEQA Guidelines Sections 15126, 15126.2, and 15143. These significance criteria are based on the checklist presented in Appendix G of the State CEQA Guidelines; best available data; and the applicable regulatory standards of the City of Stockton and county, state, and federal agencies. Significance criteria are dismissed from further evaluation if the project would have no new significant effect related to the significance criteria or if the project would not have a more severe impact than identified in the RWCF Modifications Project EIR.

The project's impacts are numbered sequentially in each subsection (Impact 4.2-1, Impact 4.2-2, Impact 4.2-3, etc.). A summary impact statement precedes a more detailed discussion of each environmental impact. The discussion includes the analysis, rationale, and substantial evidence upon which conclusions are drawn. The determination of the level of significance of the impact is defined in bold text. An impact is identified as "less than significant" if it would not involve a substantial adverse change in the physical environment. An impact that is "potentially significant" or "significant" could or would involve a substantial adverse change in the physical environment; both are treated the same under CEQA in terms of procedural requirements and the need to

identify feasible mitigation. In accordance with CEQA Section 21061.1, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, considering economic, environmental, legal, social, and technological factors. Where mitigation measures are identified, a discussion of impact significance with the implementation of these measures follows.

All mitigation measures pertinent to each individual impact are described immediately following the impact statement and are organized numerically to correspond to the impact they address. For example, Impact 4.3-1 would be mitigated with Mitigation Measure 4.3-1. The degree to which the identified mitigation measure(s) would reduce the impact is also described. Mitigation measures are identified, as feasible, to avoid, minimize, rectify, reduce, or compensate for significant or potentially significant impacts, in accordance with State CEQA Guidelines Section 15126.4. Unless otherwise noted, the mitigation measures presented are recommended in the Supplemental EIR for consideration by the City of Stockton to adopt as conditions of approval.

Where an existing law, regulation, or permit specifies mandatory and prescriptive actions about how to fulfill the regulatory requirement as part of the project definition, leaving little discretion in its implementation, and would avoid an impact or maintain it at a less-than-significant level, the environmental protection afforded by the regulation is considered before the impact significance is determined. Where existing laws or regulations specify a mandatory permit process, performance standards without prescriptive actions to accomplish them, or other requirements that allow substantial discretion in how they are accomplished, or have a substantial compensatory component, the level of significance is determined before the influence of the regulatory requirements is applied. In this circumstance, the impact would be potentially significant or significant, and the regulatory requirements would be included as a mitigation measure.

4.1 HYDROLOGY AND WATER QUALITY

This section addresses the potential hydrology and water quality impacts on the affected environment of the San Joaquin River and downstream Sacramento–San Joaquin Delta (Delta) waters that would result from implementing the project. It includes a description of relevant laws and regulations, existing environmental conditions, the methods used for assessment, and the impacts associated with constructing and implementing the project.

4.1.1 Regulatory Background

Regulatory background relevant to the project is provided in the RWCF Modifications Project EIR, Chapter 4, “Environmental Setting, Impacts, and Mitigation Measures,” Section 4.5, “Hydrology and Water Quality” (City of Stockton 2018). The following sections provide additional regulatory background relevant to the project addressed by this Draft Supplemental EIR.

FEDERAL

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act requires authorization from the U.S. Army Corps of Engineers (USACE) before any work in, under, or over navigable waters of the United States and work that would affect the course, location, condition, or capacity of such waters. Navigable waters of the United States are defined as waters that have been used in the past, are now used, or are susceptible to use as a means to transport interstate or foreign commerce up to the head of navigation. Activities requiring a permit include dredging and excavation, bank stabilization, and the installation of outfall pipes.

Clean Water Act

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants to surface waters in the United States. The law authorizes the U.S. Environmental Protection Agency (EPA) to set point-source effluent limits for industry and publicly owned treatment works and requires states (or EPA in the event of default by states) to set water quality standards for contaminants in surface waters. The CWA authorizes EPA to delegate many permitting, administrative, and enforcement aspects of the law to state governments. In such cases, however, EPA still retains oversight responsibilities. Such responsibility has been delegated to the State of California, which administers the CWA through the State Water Resources Control Board (SWRCB) and the nine regional water quality control boards (RWQCBs). Three particularly relevant programs resulting from passage of the CWA are the National Pollutant Discharge Elimination System (NPDES) Permit program, industrial waste pretreatment program, and the program to develop total maximum daily loads (TMDLs) for impaired water bodies.

Section 401

Section 401 of the CWA requires applicants for a federal permit or license to conduct any activity, including the construction or operation of facilities, that may result in discharge into the navigable waters to provide the licensing or permitting agency a certification from the state in which the discharge originates or will originate that the discharge will comply with all applicable water quality standards, limitations, and restrictions. No license or permit may be issued by a federal agency until after Section 401 certification has been granted by the applicable state agency, and no license or permit may be issued if certification has been denied. Examples of permits or licenses that are subject to Section 401 of the CWA include permits issued under Section 404 of the CWA and permits issued under Sections 9 and 10 of the Rivers and Harbors Act. Most projects are regulated by the RWQCB for the region in which the project occurs, which for this project would be the Central Valley RWQCB. Construction of the outfall in the San Joaquin River for this project requires CWA Section 404 and Rivers and Harbors Act Section 10 permits issued by USACE. For these reasons, the Central Valley RWQCB would issue the CWA Section 401 water quality certification for this federally authorized outfall construction action.

Section 402

Section 402 of the CWA established the NPDES Permit Program, which regulates point and nonpoint source discharges to waters of the United States. The RWCF treats wastewater and discharges treated effluent to the San Joaquin River under the requirements of an NPDES permit issued by the Central Valley RWQCB in February 2020 (Order No. R5-2020-0007, NPDES No. CA0079138). As discussed in the RWCF Modifications Project EIR (City of Stockton 2018), Section 4.5, "Hydrology and Water Quality," the NPDES stormwater program requires permits for discharges from construction activities that disturb 1 or more acres. SWRCB adopted a general NPDES permit for stormwater discharges associated with construction activity (Construction General Permit) in Order No. 2009-0009-DWQ, which became effective on July 1, 2010 (as amended by revised orders 2010-0014-DWQ and 2012-006-DWQ). Authorization for coverage under the Construction General Permit would be acquired for the project.

Section 404

Section 404 of the CWA established a program to regulate the discharge of dredged or fill material into waters of the United States. USACE administers the program and reviews and issues permits. Activities in waters of the United States that are regulated under this program include placement of dredged or fill material for development projects, water resource projects (e.g., dams and levees), infrastructure projects (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. The basic premise of the program is that no discharge of dredged or fill material may be permitted if (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. In other words, when applying for a permit, the applicant must demonstrate that steps have been taken to avoid impacts on wetlands, streams, and other aquatic resources; that potential impacts have been minimized; and that compensation would be provided for all remaining unavoidable impacts.

STATE

State regulatory background relevant to the project is provided in the RWCF Modifications Project EIR, Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures," Section 4.5, "Hydrology and Water Quality" (City of Stockton 2018).

LOCAL

Local regulatory background relevant to the project is provided in the RWCF Modifications Project EIR, Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures," Section 4.5, "Hydrology and Water Quality" (City of Stockton 2018).

4.1.2 Environmental Setting

The existing environmental setting for the project is the same as that described in the RWCF Modifications Project EIR, Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures," Section 4.5, "Hydrology and Water Quality" (City of Stockton 2018).

4.1.3 Environmental Impacts and Recommended Mitigation Measures

This section describes the effects on hydrology and water quality in the project area that would result from construction and implementation of the project. Aspects of the project with the potential to affect hydrology and water quality include constructing the new RWCF effluent outfall in the San Joaquin River, ceasing discharge of RWCF effluent through the existing outfall, abandoning the existing outfall, and discharging RWCF effluent through the new outfall.

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact related to hydrology and water quality if it would:

- ▶ violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality, defined as:
 - causing exceedance of applicable state or federal numeric or narrative water quality objectives/criteria, or other relevant water quality effects thresholds by frequency, magnitude, and geographic extent that would result in adverse effects to one or more beneficial uses within affected water bodies; or
 - degrading water quality by a sufficient magnitude, duration, and geographic extent that would cause a substantial risk of adverse effects to one or more beneficial uses;
- ▶ substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- ▶ substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
 - result in substantial erosion or siltation on- or off-site;
 - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
 - create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
 - impede or redirect flood flows or increase flood risks;
- ▶ in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation; or
- ▶ conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

METHODS AND ASSUMPTIONS

Hydrology

The hydrology assessment addresses the effects of the project on surface water hydrology and flood risks as follows:

- ▶ effects of constructing and using the new outfall structure on the course of the San Joaquin River, bank erosion and associated siltation, and the channel's ability to convey flood flows; and
- ▶ effects of abandoning the existing outfall structure on the course of the San Joaquin River, bank erosion and associated siltation, and the channel's ability to convey flood flows.

Water Quality

The water quality assessment focuses on changes in receiving water pollutant concentrations. The water quality assessment evaluates both short-term effects related to construction and long-term effects related to operation of the project.

Construction-Related Water Quality Effects

The potential construction-related water quality effects were assessed by considering the work that would be involved and potential environmental exposure to contaminants. The types of materials and contaminants that may be handled, stored, and used or produced and released to the environment and the related fate and transport and potential for discharge to adjacent water bodies were considered. Also considered was the plan for implementing erosion control and stormwater pollution prevention best management practices (BMPs) during and following completion of construction activities.

Operations-Related Water Quality Effects

The analysis of potential operations-related water quality effects addresses the long-term effects on the water quality of the San Joaquin River and downstream Delta waters from discharge of RWCF effluent through the new outfall and cessation of effluent discharge through the existing outfall. The assessment relied on effluent quality characteristics described in the RWCF Modifications Project EIR (City of Stockton 2018), which would be unchanged by the proposed outfall assessed in this Draft Supplemental EIR.

ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

Groundwater Supplies and Recharge

Implementing the project would involve changing the location of the discharge of RWCF effluent from the west bank of the San Joaquin River to the east bank of the river approximately 2,000 feet upstream of the existing location. The change in outfall location would have no effect on the wastewater treatment processes and thus no effect on the quantity of the RWCF effluent discharged to the river relative to that assessed in the RWCF Modifications Project EIR. The project would not involve actions that would increase reliance on groundwater or otherwise contribute to groundwater depletion. Therefore, the issue of whether the project would substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin is not discussed further in this Supplemental EIR.

Drainage Patterns and Runoff

The portion of the outfall project on the main plant side of the San Joaquin River levee would require installation of pipelines underground, but there would be no changes in the site drainage patterns or other changes that could create additional impervious surfaces that would increase the runoff amount. The remaining portion of the outfall project would be a pipe within the river channel and associated infrastructure to secure and maintain the outfall; thus, no additional runoff would occur. By design, the outfall would be permanently inundated and constructed with materials to withstand deterioration. Therefore, the project would not substantially increase the rate or amount of surface runoff in a manner that would result in substantial erosion or siltation on- or off-site or flooding on- or off-site, and it would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. Therefore, these issues are not assessed further in this Supplemental EIR.

Release of Pollutants Related to Project Inundation

By design, the outfall structure would be within the San Joaquin River, submerged approximately 15 feet below the mean low water level. Erosion protection material would be placed to protect the outfall structure to prevent scour. There would be no sources of pollutants from the outfall structure other than the discharge of the RWCF effluent, which would be regulated by an NPDES permit to control the discharge of pollutants. Therefore, the project would not release pollutants as a result of project inundation. This issue is not discussed further in this Supplemental EIR.

Water Quality Control and Groundwater Management Plans

The project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. The applicable water quality control plans are:

- ▶ *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins* (Basin Plan), adopted by the Central Valley RWQCB;
- ▶ *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, adopted by SWRCB;
- ▶ *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California*, adopted by SWRCB; and
- ▶ *Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted by SWRCB.

NPDES permits issued by the Central Valley RWQCB to regulate surface water discharges implement the requirements of, and must be consistent with, these plans. Thus, there would be no potential for the project to conflict with or obstruct implementation of a water quality control plan. The project also would not conflict with or obstruct implementation of a sustainable groundwater management plan, because the project would not involve actions that would increase reliance on groundwater or otherwise contribute to groundwater depletion. Therefore, the issue of whether the project would conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan is not discussed further in this EIR.

IMPACT ANALYSIS AND MITIGATION MEASURES

Impact 4.1-1: Potential for Project Construction to Affect Water Quality

Project construction activities would have the potential to result in the temporary increase in San Joaquin River total suspended solids (TSS) and turbidity near the construction site and the release of construction-related contaminants into the river. Implementation of construction BMPs and various permit requirements, including SWRCB General Construction Permit requirements and CWA Section 401 Water Quality Certification requirements that will be required for project construction, would avoid and minimize potential adverse construction-related effects on surface water quality. This impact would be **less than significant**.

Construction activities related to the outfall project that would occur on the landside of the levee on the main plant side (east side) of the San Joaquin River would primarily include excavation and installation of pipelines. Similarly, activities related to abandoning the existing outfall would occur on the landside of the levee on the tertiary plant side (west side) of the San Joaquin River. Impacts on water quality from the types of activities associated with other aspects of the RWCF Modifications Project are addressed in the RWCF Modifications Project EIR, Section 4.5, "Hydrology and Water Quality," Impact 4.5-4: Stormwater Quality Impacts (City of Stockton 2018). The pipeline work on the main plant site associated with the new outfall would not cause any new or more severe construction-related impacts on water quality relative to those addressed in the RWCF Modifications Project EIR (City of Stockton 2018). The remainder of this impact discussion addresses the project construction activities that would occur on the waterside of the levee and within the river channel, which are not addressed in the RWCF Modifications Project EIR.

Construction-related activities with the potential to affect San Joaquin River water quality include installation of the new outfall pipeline, installation and removal of the cofferdam (behind which the outfall would be constructed), and discharge of dewatering water from inside the cofferdam. These activities have the potential to result in temporary increases in TSS and turbidity, as well as discharge of construction-related contaminants, such as petroleum products, concrete, and trash, into the river. Because construction activities would occur over a single season during the dry months, the potential for exposure of construction activities and disturbed soil areas to direct rainfall and stormwater runoff events, and related risk of increased erosion, sedimentation, and off-site runoff of other contaminants, would be low.

Effects on Water Quality: Increased Suspended Sediment and Turbidity

Installation and removal of the cofferdam would temporarily disturb river sediments, resulting in temporary elevated TSS and turbidity levels in the river. Also, after the cofferdam is in place and rescue fish seining has been completed and before construction begins, the cofferdammed area would be dewatered. San Joaquin River water remaining inside the cofferdam would be discharged to the river as long as the discharge meets water quality objectives for turbidity. If necessary to achieve turbidity objectives before discharge, dewatering water would be routed into a nearby sediment settling tank and then to an existing RWCF manhole that conveys the water into the RWCF recirculation channel, which conveys water to the tertiary plant, where it would be treated before discharge to the San Joaquin River. Approximately 10 sheet piles can be placed per day, for a total of approximately 5 days to complete construction of the temporary cofferdam. Its removal is expected to occur over 1 to several days. Installation and removal would be limited to daytime hours. Thus, TSS and turbidity increases associated with cofferdam placement and removal would be of a short duration.

Aquatic life beneficial uses would be most sensitive to elevated TSS and turbidity levels in the river. Chronic increased concentrations of suspended solids and resulting increased turbidity are of concern to fish because at sufficiently high levels, they can cause species to avoid turbid waters. At high and sustained levels, TSS/turbidity can reduce feeding and growth; displace juveniles; cause physiological stress, respiratory impairment, and gill damage; reduce tolerance to disease and toxicants; reduce survival; and cause direct mortality (Sigler et al. 1984; Stern 1988; Newcombe and Jensen 1996; Bash et al. 2001; Madej et al. 2004). However, Bash et al. (2001) reported that the primary effect of increased turbidity on juvenile salmonids was irritation of the gills and that direct lethality was unlikely.

Installation and removal of the cofferdam sheet piles would be expected to create the greatest TSS/turbidity increases in the water column at the site where the sheet piles are driven into the riverbed. A small TSS/turbidity plume would originate at the site and move downstream or upstream with the tidal flow. TSS and turbidity levels within the plume would rapidly diminish with increasing distance from the site because the larger suspended sediment particles would resettle to the river bottom and finer suspended material would become rapidly diluted with increasing distance downstream as the plume mixes with river flows. This would result in the highest TSS and turbidity levels occurring closest to the sheet piles, at the outfall construction site, along the east bank. The river channel is approximately 225 feet wide at the site, and river velocities over a tidal cycle reach approximately 1.5 feet per second. Thus, the central and western portions of the river channel immediately adjacent to the outfall construction site would not experience a measurable elevation of turbidity. During the brief periods of slack tide, the TSS/turbidity plume would temporarily extend out from the construction site in a circular pattern, and disturbed sediment would resettle most rapidly at slack tide. After upstream or downstream tidal flow resumes, the small, localized elevated TSS/turbidity plume would move in the direction of river flow, along the east bank of the river, with concentrations falling rapidly with increasing distance downstream because of both settling and dilution with unaffected river flows.

Salmonids may alter their migratory behavior by moving laterally or downstream to avoid turbid areas (Sigler et al. 1984). Larger fish tend to be more tolerant of high concentrations of suspended sediment than smaller fish, although migrating adult salmonids may avoid areas with high silt loads (Bjornn and Reiser 1991). Any juvenile salmonids occurring in the area would have the ability to swim to an unaffected or minimally affected portion of the river in response to elevated suspended sediment and turbidity and thus would not be affected by temporary daytime increases in suspended sediment and turbidity. If fish did remain in the construction zone, a sufficient portion of the channel (e.g., along the center of the channel, opposite bank, and just upstream) would remain unaffected and would provide suitable migration pathways through the area and rearing habitat within the area.

Little information is available that directly addresses turbidity effects on sturgeon, although the information that is available suggests that elevated turbidity may alter the behavior of adults, subadults, and juveniles. In a dredging field study, juvenile and adult Atlantic sturgeon avoided water in the vicinity of a dredged material disposal site (Hatin et al. 2007). However, the TSS/turbidity levels at a dredged material disposal site would be higher than those expected to occur at the outfall construction site. Green sturgeon present in the vicinity of the in-water construction work area may choose to avoid areas of high turbidity. Like salmonids, sturgeon would be expected to swim to an unaffected portion of the river in response to elevated suspended sediment and turbidity and thus would not be adversely affected by temporary daytime increases in suspended sediment and turbidity.

Like salmonids and sturgeon, other fish that could be residing in or moving through the construction area either would not encounter TSS/turbidity levels sufficiently high to affect their movements or may seek to move away from working construction equipment because of underwater noise and elevated turbidity levels.

TSS/turbidity levels in the San Joaquin River at and downstream of the outfall construction site would not reach levels high enough across the entire channel, or last long enough, to cause adverse feeding or growth effects; permanently displace juvenile fishes from the area; cause chronic physiological stress, respiratory impairment, or gill damage; reduce fish health and thus tolerance to disease and toxicants; reduce survival; or cause direct mortality. This conclusion is reached because, as described above, elevated TSS/turbidity levels would (1) occur primarily on the east side of the river channel, (2) be limited to the cofferdam installation and removal days, and (3) return to background levels every night (i.e., half of every 24-hour period), when no work is occurring. Finally, the outfall construction activities would occur between July 1 and October 31, when no salmonid juvenile emigration would be occurring in the river.

Additional potential indirect effects of temporarily elevated TSS and turbidity levels in the river include localized displacement of benthic macroinvertebrates resulting from sediment disturbance from sheet pile installation and removal and from sediment redeposition. These effects would be expected to be short-lived because of the rapid recolonization rates typically observed for benthic macroinvertebrate communities following temporary riverbed disturbances (Barbour et al. 1999). Moreover, the relative proportion of the San Joaquin River benthic macroinvertebrate community affected within the project site would be negligible; thus, the river's macroinvertebrate community overall and the prey base for fishes and other wildlife using the river would not be adversely affected.

Effects on Water Quality: Contaminants

Potential sources of contaminant discharges would be the discharge of dewatering water from inside the cofferdam and the use of motorized equipment on and around the levee to install the new outfall.

San Joaquin River water remaining inside the cofferdam would be the same as that which is flowing in the river channel; thus, it would have water quality characteristics and constituent concentrations similar to those of the water within the river channel. However, when sediments are resuspended into the water column, trace metals and other contaminants that were adsorbed to the sediment can sometimes be released back into the water column, particularly if pH changes occur. Because pH changes are not expected to occur in the water removed from the cofferdammed area, minimal, if any, contaminant release from the disturbed sediments is expected to occur. Also, as described above, if necessary to achieve turbidity objectives before discharge, dewatering water would be routed into a nearby sediment settling tank and then to an existing RWCF manhole that conveys the water into the RWCF recirculation channel, which conveys water to the tertiary plant, where it would be treated before discharge to the San Joaquin River. Therefore, the risk of discharge of contaminants to the river that may enter the dewatering water column from disturbed sediments is low.

The use of motorized equipment and the storage and handling of fuels and equipment lubricants and fluids may result in petroleum product discharges that could degrade water quality if these contaminants directly enter the river or the water within the cofferdammed area to be dewatered, or they are spilled on the ground where they may be mobilized and transported in stormwater runoff into surface waters following construction. Other potential construction-related contaminants associated with the equipment used, contained in products used to construct project facilities, or inadvertently discharged by construction workers include concrete, trash, cleaners, solvents, and human sanitary wastes. The potential for indirect discharges of these contaminants from dewatered and upland areas during the construction period, or via stormwater runoff following construction, is considered low because construction activities would be conducted during the seasonally dry months of July through October, when runoff is low or nonexistent.

The beneficial uses of aquatic life would be most sensitive to the discharge of contaminants to the San Joaquin River. For example, petroleum products can cause oily films to form on the water surface that can reduce dissolved oxygen levels available to aquatic organisms. The magnitude of effects on aquatic life resulting from accidental or unintentional contaminant spills would depend on several factors related to the spill, including the proximity to the water body; the type, amount, concentration, and solubility of the contaminant; and the timing and duration of the discharge. The severity of the effect also depends on species and life stage sensitivity, duration of exposure, condition or health of individuals (e.g., nutritional status), and physical or chemical properties of the water (e.g., temperature, dissolved oxygen). Potential effects can range from no effects to mortality of aquatic organisms.

The project would require CWA Section 404 and Rivers and Harbors Act Section 10 permits from USACE, a CWA Section 401 Water Quality Certification from the Central Valley RWQCB, and a California Fish and Game Code Section 1600 Streambed Alteration Agreement with the California Department of Fish and Wildlife before construction of the outfall on the waterside of the levee could occur. The construction work also would be subject to authorization under the SWRCB NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES Permit No. CAS000002, as amended by 2010-0014-DWQ and 2012-0006-DWQ). Therefore, the City and/or its construction contractor would be required to develop a stormwater pollution prevention plan (SWPPP) and implement appropriate construction BMPs for all activities that may result in the discharge of construction-related contaminants from disturbed construction areas. Implementation of

appropriate erosion control and pollution prevention BMPs would avoid and minimize construction-related erosion and contaminant discharges. In addition to the BMPs, the SWPPP would include BMP inspection and monitoring activities and would identify responsibilities of all parties, contingency measures, agency contacts, and training requirements and documentation for those personnel responsible for installation, inspection, maintenance, and repair of BMPs. The CWA Section 401 Water Quality Certification also would require implementation of measures to prevent, minimize, and contain spills and to minimize the amount of soil, sediment, and trash that enters surface waters.

As described above, the risk of direct and indirect discharge of construction-related contaminants to surface waters would be low. The construction activities occurring on the land and levee above the water line and in the dewatered portion of the channel would further avoid and minimize potential adverse construction-related effects because they would be consistent with requirements of the BMPs and permits described above. The project would not cause constituent discharges of sufficient frequency and magnitude to result in a substantial increase in exceedances of water quality objectives/criteria relative to existing conditions, nor would it substantially degrade water quality with respect to constituents of concern by a sufficient magnitude, duration, or geographic extent to cause a substantial risk of adverse effects on one or more beneficial uses in the San Joaquin River or downstream Delta waters. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 4.1-2: Potential for Project Construction to Cause Increased Erosion or Affect Flood Flows

The placement of the cofferdam for construction of the outfall structure would temporarily reduce San Joaquin River channel capacity. Because the cofferdam would be in place only during the summer period, when river flows are lowest, project construction would not cause increased erosion or siltation and would not impede or redirect flood flows or increase flood risks. This impact would be **less than significant**.

A temporary cofferdam would be erected within the San Joaquin River channel before any construction on the waterside of the levee would occur. The cofferdam would extend from the ordinary high-water mark into the channel approximately 60 feet, temporarily reducing the channel capacity to convey river flows. The channel width at this location is approximately 225 feet and the cross-sectional area is approximately 2,800 square feet at the mean lower low water elevation.

Construction of the levee crossing and outfall would occur between July 1 and October 31, which is the period of lowest river flows. Average river flow rates during this period are less than 2,000 cubic feet per second (cfs) (City of Stockton 2018:Table 4.5-2). By comparison, average river flow rates during winter and spring months are greater than 11,000 cfs, and peak flow rates are approximately 15,000 cfs (City of Stockton 2018:Table 4.5-2). Thus, the channel would have capacity with the temporary cofferdam in place sufficient to convey the lower river flows during the construction period, and placement of a temporary cofferdam would not impede or redirect river flows at the time of construction or impede or redirect flood flows.

The temporary cofferdam would have minor effects on flow patterns within the channel at the outfall construction site, resulting in slightly higher flow velocity through the open, flowing part of the channel. Because the cofferdam placement would occur during the period of lowest river flows, and because approximately 80 percent of the cross-sectional area of the entire channel at this location would remain unaffected, the change in velocities and scour in the flowing part of the channel would be minimal, relative to existing conditions.

Abandonment of the existing outfall would not require work within the river channel; all associated activities would occur on the landside of the levee. Thus, abandonment of the existing outfall would have no impact on existing drainage patterns of the San Joaquin River.

For these reasons, project construction would not alter the existing drainage pattern of the San Joaquin River in a manner that would result in substantial erosion or siltation or impede or redirect flood flows or increase flood risks. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 4.1-3: Potential for Project Operations to Affect Water Quality

Implementing the project would result in the discharge of RWCF effluent from the new outfall located on the east (main plant) side of the river, as well as cessation of discharge of effluent from the existing outfall on the west (tertiary plant) side of the river. Under project operations, effluent quality and volume discharged to the river would not change; rather, the only change would be that the effluent would be discharged at a new location on the east bank of the river, approximately 2,000 feet upstream of the existing outfall. Hence, river water quality after the effluent is fully mixed with river flows would not change. A similar effluent plume would exist near the outfall before complete effluent mixing but would be at the new (east bank) outfall location, and no effluent plume would occur with the project at the existing (west bank) outfall location. This impact would be **less than significant**.

Implementing the project would result in the discharge of RWCF effluent from the new outfall located on the east (main plant) side of the river, as well as cessation of discharge of effluent from the existing outfall on the west (tertiary plant) side of the river. Moving the discharge of effluent from the existing outfall to the new outfall would result in a new RWCF effluent plume on the east side of the river, where one currently does not exist, and would eliminate the existing discharge approximately 2,000 feet downstream on the west side of the river.

The quality of effluent discharged through the new outfall and the discharge rate would be as described in the RWCF Modifications Project EIR (City of Stockton 2018). Hence, with the new outfall, effluent quality and volume discharged to the river would not change relative to those described in the RWCF Modifications Project EIR. For this reason, river water quality after the discharged effluent fully mixes with river flows would not change. The effluent plume resulting on the east side of the river at the new outfall location would not cause increased exceedances of applicable state or federal numeric or narrative water quality objectives/criteria or other relevant water quality effects thresholds by a frequency, magnitude, and geographic extent sufficient to result in adverse effects on one or more beneficial uses within the San Joaquin River or downstream waters.

Because the effluent quality would not change relative to that described in the RWCF Modifications Project EIR, implementing the project would not degrade the water quality of the fully mixed condition. The constituent concentrations within the plume near the new outfall would be similar to those that occur within the river near the existing west bank outfall under project conditions because the effluent discharge rate would be the same and the river characteristics that affect effluent dilution (i.e., width, cross-sectional area, flow velocities) at the two locations are similar. In addition, implementing the proposed new outfall is expected to improve the ability of the RWCF to comply with the temperature limitations in the NPDES permit under project conditions. This is a beneficial effect of the new outfall. Overall, neither far-field fully mixed nor near-field plume river water quality would change by a magnitude, duration, and geographic extent sufficient to cause a substantial risk of adverse effects on one or more beneficial uses of the San Joaquin River. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 4.1-4: Potential for the New Outfall to Cause Increased Erosion or Affect Flood Flows

The new outfall would be installed within the existing profile of the San Joaquin River channel and would consist of concrete embedded into the levee and protected with erosion control material. The elevated walkway to provide access to the outfall pipeline would allow river flows to pass through the supporting structure. Thus, the project would not cause increased erosion or siltation and would not impede or redirect flood flows or increase flood risks within the San Joaquin River postconstruction. This impact would be **less than significant**.

The outfall components within the San Joaquin River channel would be buried within the channel's existing profile, and the natural contours of the riverbed would be restored to pre-project conditions at the end of construction. The outfall pipe would be covered with riprap except for the final 7 feet extending into the river, which would be anchored to prevent uplift. Rock armoring would be placed on the waterside slope to prevent scour. Because the outfall structure would be located within the existing profile of the river channel and the outfall would be protected with erosion control material, the outfall would not reduce the capacity of the river channel or alter the existing drainage pattern of the San Joaquin River in a manner that would result in substantial erosion or siltation or impede or redirect flood flows or increase flood risks.

An elevated walkway would extend from the levee into the river channel to provide access to the gatewell. The walkway would be positioned at the 200-year flood elevation and would be designed and constructed to allow river water to flow underneath it unimpeded. A portion of the gatewell would be inundated at the 100-year and 200-year flood elevations (see Figure 3-7 in Chapter 3, "Project Description"). The river channel width at the 100-year and 200-year flood elevations is approximately 255 feet and the cross-sectional area is approximately 5,400 square feet. The gatewell would be 8 feet wide and the inundated cross-sectional area would be approximately 70 square feet, or approximately 1 percent of the river cross-sectional area, over a distance of 8 feet (i.e., the length of the gatewell). Thus, these new project features would not alter the existing drainage pattern of the San Joaquin River in a manner that would result in substantial erosion or siltation or impede or redirect flood flows or increase flood risks.

The RWCF effluent discharge rate through the new outfall would be unchanged from that described and assessed in the RWCF Modifications Project EIR (City of Stockton 2018). Consequently, the effluent discharge would not affect the existing drainage pattern of the San Joaquin River in a manner that would result in substantial erosion or siltation, impede or redirect flood flows, or increase flood risks.

The existing west bank outfall structure would be abandoned in place. Therefore, this activity would have no impact on the existing drainage pattern of the San Joaquin River and would not cause substantial erosion or siltation, impede or redirect flood flows, or increase flood risks.

This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

4.2 TERRESTRIAL BIOLOGICAL RESOURCES

This section addresses common and sensitive biological resources that could be affected by implementation of the project. The analysis includes a description of relevant laws and regulations, existing environmental conditions, and the impacts associated with constructing and implementing the project. This evaluation is based on review of the terrestrial biological resources information provided in the 2018 RWCF Modifications Project Public Draft EIR; data collected during a reconnaissance-level survey of the project site conducted on January 11, 2022; a review of color aerial imagery of the project area on Google Earth; and updated information obtained from the following biological data sources:

- ▶ California Natural Diversity Database (CNDDDB) record search of the Stockton West, Stockton East, Terminus, Lodi South, Waterloo, Holt, Union Island, Lathrop, and Manteca U.S. Geological Survey (USGS) 7.5-minute quadrangles (CNDDDB 2022);
- ▶ California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California record search of the Stockton West, Stockton East, Terminus, Lodi South, Waterloo, Holt, Union Island, Lathrop, and Manteca USGS 7.5-minute quadrangles (CNPS 2022);
- ▶ U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation online tool for identifying federally listed species and resources that may be affected by a project in a given location (USFWS 2022);
- ▶ eBird online database of bird observations (eBird 2022); and
- ▶ U.S. Natural Resources Conservation Service's soil survey of San Joaquin County (NRCS 2017).

4.2.1 Regulatory Background

Regulatory background relevant to the project is provided in the RWCF Modifications Project EIR, Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures," Section 4.6, "Terrestrial Biological Resources" (City of Stockton 2018). The following sections provide additional regulatory background relevant to the project addressed by this Draft Supplemental EIR.

FEDERAL

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S Code Sections 703–712), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA provides that it is unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird or any part, nest, or egg of any such bird. Under the MBTA, "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations, Section 10.13. The list includes nearly all birds native to the United States.

LOCAL

City of Stockton Envision Stockton 2040 General Plan

The City of Stockton Envision Stockton 2040 General Plan was adopted on December 4, 2018. The following natural resource policy, which is listed under "3. Land Use," is relevant to the project:

- ▶ **Policy LU-5.2:** Protect natural resource areas, fish and wildlife habitat, scenic areas, open space areas, agricultural lands, parks, and other cultural/historic resources from encroachment or destruction by incompatible development.

4.2.2 Environmental Setting

The RWCF Modifications Project EIR provides an overview of the regional setting, local setting (i.e., hydrology, soils, climate), vegetation and wildlife, special-status species, and sensitive habitats (i.e., waters of the United States, wetlands, and riparian habitats). The project site historically supported riparian forest, freshwater marsh, and grassland habitats but was cleared and developed with wastewater treatment facilities in 1922 and incrementally expanded in the years following. The outfall relocation project site occupies approximately 1 acre on the east bank levee of the San Joaquin River near River Mile 41 (i.e., approximately 41 miles upstream from its confluence with the Sacramento River near Antioch) and approximately 0.03 acre on the west bank of the river where existing outfall structures (i.e., air vacuum pumps and associated equipment) would be abandoned and removed. Habitat on the project site currently consists of open water within the San Joaquin River channel, valley foothill riparian along the levee embankment and within the ordinary high-water mark of the San Joaquin River, ruderal vegetation growing in riprap substrate on the waterside slope of the levee, and developed land on the remainder of the project site. Vegetation and wildlife associated with habitats on the project site are consistent with those describe in the RWCF Modifications Project EIR, except for open water in the San Joaquin River.

OPEN WATER

The project site includes approximately 0.26 acre of the San Joaquin River channel that is inundated with water at some point each year. This portion of the San Joaquin River is mostly unvegetated, although there is some floating aquatic vegetation composed of Brazilian waterweed (*Egeria densa*) and common water hyacinth (*Eichhornia crassipes*). The water level within the river channel fluctuates daily based on tidal influences and throughout the year depending on the timing and amount of precipitation, Sierra Nevada snowpack, water use, and regulated flows upstream. Riprap has been placed below the waterline and extends to approximately the middle of the levee slope to stabilize the east bank of the river. Wildlife species that may be found in the open water portion of the river include green-winged teal (*Anas crecca*), mallard (*Anas platyrhynchos*), common merganser (*Mergus merganser*), American coot (*Fulica americana*), great blue heron (*Ardea herodias*), and muskrat (*Ondatra zibethicus*).

RIPARIAN

Riparian vegetation grows at the edge of the ordinary high-water mark of the San Joaquin River and occupies approximately 0.07 acre on the project site. The riparian vegetation, which is sparse because of the riprap substrate and regular vegetation management, consists of two sycamore trees (*Platanus racemosa*); some California blackberry (*Rubus ursinus*); and an herb layer composed of California mugwort (*Artemisia douglasiana*), common rush (*Juncus effusus*), curly dock (*Rumex crispus*), Dallis grass (*Paspalum dilatatum*), and dwarf nettle (*Urtica urens*). Typical wildlife species that use riparian habitat include wood duck (*Aix sponsa*), California quail (*Callipepla californica*), belted kingfisher (*Megaceryle alcyon*), and Bewick's wren (*Thryomanes bewickii*).

RUDERAL

Approximately 0.03 acre of ruderal habitat is present along the levee slope on the project site. Vegetation in this habitat includes annual grasses, such as wild oat (*Avena fatua*) and riggut brome (*Bromus rigidus*), and nonnative forbs, such as black mustard (*Brassica nigra*), cheeseweed (*Malva parviflora*), old-man-in-the-spring (*Senecio vulgaris*), and bull thistle (*Cirsium vulgare*). Ruderal habitat typically supports common wildlife species adapted to disturbed habitats, such as western fence lizard (*Sceloporus occidentalis*), black-tailed jackrabbit (*Lepus californicus*), and California ground squirrel (*Otospermophilus beecheyi*).

DEVELOPED

Developed areas on the project site include the levee, wastewater facilities and infrastructure, roads, and parking lots. The developed areas were under construction at the time of the 2022 survey and were mostly devoid of vegetation

except for a few weedy plant species. Wildlife species that may occur in the developed areas include common species adapted to disturbed habitats, such as European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), mourning dove (*Zenaida macroura*), northern mockingbird (*Mimus polyglottos*), and California gull (*Larus californicus*).

SPECIAL-STATUS SPECIES

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by federal, state, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- ▶ officially listed by California or the federal government as endangered, threatened, or rare;
- ▶ a candidate for state or federal listing as endangered, threatened, or rare;
- ▶ taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in California Code of Regulations Section 15380 of the State CEQA Guidelines;
- ▶ species identified by the California Department of Fish and Wildlife (CDFW) as species of special concern;
- ▶ species listed as Fully Protected under the California Fish and Game Code;
- ▶ species afforded protection under local planning documents, such as the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP); and
- ▶ plant taxa considered by CDFW to be “rare, threatened, or endangered in California” and assigned a California Rare Plant Rank.

The term “California species of special concern” is applied by CDFW to animals not listed under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA) but that are declining at a rate that could result in listing or that historically occurred in low numbers and known threats to their persistence currently exist. CDFW’s fully protected status was California’s first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually listed as threatened or endangered under CESA; however, some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time, and take permits cannot be issued for these species except for scientific research purposes or for relocation to protect livestock.

Tables 4.2-1 and 4.2-2 provide a list of the special-status plant and wildlife species, respectively, that have been documented within the CNDDDB and CNPS USGS nine-quadrangle search area, or that are otherwise known to occur in the area, and describes their regulatory status, habitat, and potential for occurrence on the project site. As indicated in these tables, a total of five special-status plant species and six special-status wildlife species, not including fish, which are addressed in Section 4.3, “Aquatic Biological Resources,” of this Supplemental EIR, have potential to occur on the project site.

Table 4.2-1 Special-Status Plant Species Known to Occur in the Project Region and Their Potential for Occurrence in the Project Site

Species	Listing Status ¹			Habitat	Potential for Occurrence
	Federal	State	CRPR		
Large-flowered fiddleneck <i>Amsinckia grandiflora</i>	FE	SE	1B.1	Annual grassland in various soils. 902 to 1,804 feet in elevation. Blooms March-May.	Not expected to occur. The project site does not contain grassland habitat suitable for this species.
alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	—	—	1B.2	Low ground, alkali flats, and flooded lands; in annual grassland or in playas or vernal pools. 0 to 551 feet in elevation. Blooms March-June.	Not expected to occur. The project site does not contain alkali playa or vernal pool habitat suitable for this species.
heartscale <i>Atriplex cordulata</i> var. <i>cordulata</i>	—	—	1B.2	Alkaline flats and scalds in the Central Valley on sandy alkaline soils. 10 to 902 feet in elevation. Blooms April-October.	Not expected to occur. The project site does not contain alkali habitat suitable for this species.
big tarplant <i>Blepharizonia plumosa</i>	—	—	1B.1	Dry hills and plains in annual grassland. Clay to clay-loam soils; usually on slopes and often in burned areas. 98 to 1,657 feet in elevation. Blooms July-October.	Not expected to occur. The project site does not contain grassland habitat and clay soils suitable for this species.
watershield <i>Brasenia schreberi</i>	—	—	2B.3	Freshwater marshes and swamps. Aquatic from water bodies both natural and artificial. 98 to 7,218 feet in elevation. Blooms June-September.	May occur. The project site contains aquatic habitat potentially suitable for this species in the San Joaquin River.
bristly sedge <i>Carex comosa</i>	—	—	2B.1	Lake margins, wet places; site below sea level is on a Delta island. 16 to 5,315 feet in elevation. Blooms May-September.	May occur. The project site contains habitat potentially suitable for this species in the San Joaquin River.
palmate-bracted salty bird's-beak <i>Chloropyron palmatum</i>	FE	SE	1B.1	Chenopod scrub, valley and foothill grassland, meadow and seep, wetland. Usually on Pescadero silty clay, which is alkaline, with <i>Distichlis</i> , <i>Frankenia</i> , etc. 16 to 509 feet in elevation. Blooms May-October.	Not expected to occur. The project site does not contain alkaline soils or wetland habitat suitable for this species. Additionally, the project site does not contain Pescadero silty clay soil.
slough thistle <i>Cirsium crassicaule</i>	—	—	1B.1	Chenopod scrub, marshes and swamps, riparian scrub. Sloughs, riverbanks, and marshy areas. 10 to 328 feet in elevation. Blooms May-August.	May occur. The project site contains potentially suitable riverbank habitat along the San Joaquin River.
recurved larkspur <i>Delphinium recurvatum</i>	—	—	1B.2	Poorly drained alkaline soils; often in valley saltbush or valley chenopod scrub. 10 to 2,592 feet in elevation. Blooms March-June.	Not expected to occur. The project site does not contain scrub, grassland, or woodland habitat suitable for this species.
Delta button-celery <i>Eryngium racemosum</i>	—	SE	1B.1	Seasonally inundated floodplain depressions on clay substrate. 10 to 100 feet in elevation. Blooms June-October.	Not expected to occur. The project site does not contain suitable floodplain riparian habitat clay soils.
San Joaquin spearscale <i>Extriplex joaquinana</i>	—	—	1B.2	In seasonal alkali wetlands or alkali sink scrub with <i>Distichlis spicata</i> , <i>Frankenia</i> , etc. 3 to 2,740 feet in elevation. Blooms April-October.	Not expected to occur. The project site does not contain alkali habitat suitable for this species.
woolly rose-mallow <i>Hibiscus lasiocarpus</i> var. <i>occidentalis</i>	—	—	1B.2	Moist, freshwater-soaked riverbanks and low peat islands in sloughs; can also occur on riprap and levees. In California, known from the delta watershed. 0 to 509 feet in elevation. Blooms June-September.	May occur. The project site contains potentially suitable riverbank, riprap, and levee habitat along the San Joaquin River.
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	—	—	1B.2	Freshwater and brackish marshes. Often found with <i>Typha</i> , <i>Aster lentus</i> , <i>Rosa californica</i> , <i>Juncus</i> sp., <i>Scirpus</i> , etc. Usually on marsh and slough edges. 0 to 16 feet in elevation. Blooms May-September.	Not expected to occur. Although the fluctuation zone of the San Joaquin River supports some marsh vegetation, this habitat is not characteristic of the marsh habitats where this species is typically found.

Species	Listing Status ¹			Habitat	Potential for Occurrence
	Federal	State	CRPR		
Mason's lilaepsis <i>Lilaeopsis masonii</i>	—	—	1B.1	Freshwater and brackish marshes and riparian scrub. Tidal zones, in muddy or silty soil formed through river deposition or riverbank erosion. 0 to 33 feet in elevation. Blooms April-November.	Not expected to occur. The riverbanks within the project site are riprapped and do not provide habitat conditions suitable for this species.
Delta mudwort <i>Limosella australis</i>	—	—	2B.1	Riparian scrub, marshes, and swamps. Usually on mud banks of the Delta in marshy or scrubby riparian associations on intertidal flats; often with <i>Lilaeopsis masonii</i> . 0 to 16 feet in elevation. Blooms May-August.	Not expected to occur. The riverbanks on the project site are riprapped and do not provide habitat conditions suitable for this species.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	—	—	1B.2	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0 to 2,133 feet in elevation. Blooms May- November.	Not expected to occur. This species is not associated with deep river channels.
side-flowering skullcap <i>Scutellaria lateriflora</i>	—	—	2B.2	Wet meadows and marshes in the Delta; often found on logs. 0 to 1,640 feet in elevation. Blooms July-September.	Not expected to occur. The project site is not within the Sacramento-San Joaquin River Delta.
Suisun Marsh aster <i>Symphotrichum lentum</i>	—	—	1B.2	Marshes and swamps (brackish and freshwater). Most often seen along sloughs with <i>Phragmites</i> , <i>Scirpus</i> , blackberry, Typha, and other emergent marsh plants. 0 to 98 feet in elevation. Blooms April-November.	May occur. The project site contains habitat potentially suitable for this species within the San Joaquin River.
Wright's trichocoronis <i>Trichocoronis wrightii</i> var. <i>wrightii</i>	—	—	2B.1	Mud flats of vernal lakes, drying riverbeds, alkali meadows. 16 to 1,427 feet in elevation. Blooms May-September.	Not expected to occur. The project site does not contain vernal pool, drying riverbed, or alkali meadow habitat suitable for this species.
saline clover <i>Trifolium hydrophilum</i>	—	—	1B.2	Marshes and swamps, valley and foothill grassland, vernal pools. Mesic, alkaline sites. 0 to 984 feet in elevation. Blooms April-June.	Not expected to occur. The project site does not contain grassland or vernal pool habitat suitable for this species.

Note: CRPR = California Rare Plant Rank

¹ Legal Status Definitions

Federal:

FE Endangered (legally protected by ESA)

State:

SE Endangered (legally protected by CESA)

California Rare Plant Ranks:

1B Plant species considered rare or endangered in California and elsewhere (protected under CEQA, but not legally protected under ESA or CESA)

2B Plant species considered rare or endangered in California but more common elsewhere (protected under CEQA, but not legally protected under ESA or CESA)

Threat Ranks

0.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

0.2 Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Sources: CNDDDB 2022; CNPS 2022

Table 4.2-2 Special-Status Animal Species Known to Occur in the Project Region and Their Potential for Occurrence in the Project Site

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Federal	State		
Amphibians and Reptiles				
California red-legged frog <i>Rana draytonii</i>	FT	SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby, or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Not expected to occur. This species is considered to be extirpated from the eastern Sacramento-San Joaquin River Delta and the Central Valley.
California tiger salamander <i>Ambystoma californiense</i>	FT	ST	Needs underground refuges, especially ground squirrel burrows, and vernal pools or other seasonal water sources for breeding.	Not expected to occur. The project site and surrounding areas do not contain vernal pools or seasonal ponds suitable for breeding for this species.
giant garter snake <i>Thamnophis gigas</i>	FT	ST	Marsh and swamp, riparian scrub, and wetland. Prefers freshwater marsh and low-gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	Not expected to occur. The San Joaquin River is too wide, deep, and fast to support giant garter snakes, and emergent vegetation on the project site is sparse and restricted to a narrow fringe at the water's edge. Therefore, there is no habitat suitable for this species on the project site.
western pond turtle <i>Actinemys marmorata</i>	—	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to approximately 0.3 mile from water for egg-laying.	May occur. Potentially suitable aquatic habitat is present within the San Joaquin River.
Birds				
burrowing owl <i>Athene cucularia</i>	—	SSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	May occur. The project site contains potentially suitable breeding habitat along levees adjacent to the San Joaquin River. Additionally, the project site contains a population of California ground squirrels (<i>Otospermophilus beecheyi</i>) and large burrows.
least Bell's vireo <i>Vireo bellii pusillus</i>	FE	SE	Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2,000 feet. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, <i>Baccharis</i> , or mesquite.	Not expected to occur. The project site is within the historic range of this species, but the species has been extirpated throughout much of its historic range, and there are no recent occurrences within approximately 5 miles of the project site (eBird 2022; CNDDB 2022).
northern harrier <i>Circus cyaneus</i>	—	SSC	Coastal salt and freshwater marsh. Nests and forages in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	Not expected to occur. Northern harrier is known to forage in the area, and there have been many recent observations of the species in the project vicinity (eBird 2022); however, there is no nesting habitat suitable for this species near the project site.

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Federal	State		
song sparrow ("Modesto" population) <i>Melospiza melodia</i>	—	SSC	Nests and forages primarily in emergent marsh, riparian scrub, and early successional riparian forest habitats in the north-central portion of the Central Valley; infrequently in mature riparian forest and sparsely vegetated ditches and levees.	May occur. Habitat potentially suitable for this species is present near the project site.
Swainson's hawk <i>Buteo swainsoni</i>	—	ST	Nests in riparian and isolated trees. Requires adjacent suitable foraging areas, such as grasslands, or alfalfa or grain fields supporting rodent populations.	May occur. The project site contains suitable nesting habitat within large walnut (<i>Juglans</i> sp.), blue gum (<i>Eucalyptus globulus</i>), Fremont cottonwood (<i>Populus fremontii</i>), and other trees in the project vicinity. The site is surrounded by suitable agricultural foraging habitat.
tricolored blackbird <i>Agelaius tricolor</i>	—	ST SSC	Forages in agricultural lands and grasslands; nests in marshes, riparian scrub, and other areas that support cattails or dense thickets of shrubs or herbs. Requires open water, protected nesting substrate, and foraging area with insect prey within a few miles of the nest colony.	Not expected to occur. There is no suitable nesting habitat for tricolored blackbird near the project site.
white-tailed kite <i>Elanus leucurus</i>	—	FP	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	May occur. The project site contains potentially suitable nesting habitat for white-tailed kite within large trees along the San Joaquin River or within riparian habitat.
Invertebrates				
valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT	—	Occurs only in the Central Valley of California, in association with blue elderberry (<i>Sambucus nigra</i> ssp. <i>caerulea</i>). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	Not expected to occur. There are no elderberry shrubs on the project site.
vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT	—	Valley and foothill grassland, vernal pool, and wetland. Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabits small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Not expected to occur. The project site does not contain vernal pool habitat.
vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE	—	Valley and foothill grassland, vernal pool, and wetland. Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass-bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	Not expected to occur. The project site does not contain vernal pool habitat.
Mammals				
pallid bat <i>Antrozous pallidus</i>	—	SSC	Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites. Roosts are most commonly rock crevices, but buildings, bridges, live trees, and snags are also used	May occur. Potentially suitable roosting habitat for pallid bat is present within large trees (e.g., walnut, cottonwood) and bridges near the project site.

Species	Listing Status ¹		Habitat	Potential for Occurrence ²
	Federal	State		
riparian brush rabbit <i>Sylvilagus bachmani riparius</i>	FE	SE	Riparian areas on the San Joaquin River in northern Stanislaus County. Dense thickets of wild rose, willows, and blackberries.	Not expected to occur. Riparian brush rabbit has been extirpated from most of its historic range because of development. Although the project site is within the historic range of the species, the species is now limited to a relatively small area of intact riparian habitat in Stanislaus County.

Note: CNDDDB = California Natural Diversity Database

¹ Legal Status Definitions

Federal:

FE Endangered (legally protected)

FT Threatened (legally protected)

State:

FP Fully protected (legally protected)

SSC Species of special concern (no formal protection other than CEQA consideration)

SE Endangered (legally protected)

ST Threatened (legally protected)

Sources: CNDDDB 2022; USFWS 2022; eBird 2022

SENSITIVE HABITATS

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through CEQA or other federal or state laws. Sensitive habitats may be of special concern to regulatory agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. Many of these communities are tracked in CDFW's CNDDDB.

Sensitive habitats include sensitive natural communities designated by CDFW. These are vegetation assemblages that are of limited distribution statewide or within a county or region and that often are vulnerable to environmental effects of projects. These communities may or may not contain special-status species or their habitat. CDFW designates sensitive natural communities based on their state rarity and threat ranking using NatureServe's Heritage Methodology. Natural communities with rarity ranks of S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable, are considered sensitive natural communities to be addressed in the environmental review processes of CEQA and its equivalents (CDFW 2018). There are no sensitive natural communities within or adjacent to the project site.

The project site contains riparian habitat, which is a sensitive habitat type protected by Section 1602 of the California Fish and Game Code. A formal wetland delineation of the project survey area was conducted on January 11, 2022 (Ascent Environmental 2022). The San Joaquin River channel is a traditional navigable water of the United States subject to regulation under Sections 404 and 401 of the Clean Water Act. The San Joaquin River is also a water of the state subject to regulation under the Porter-Cologne Water Quality Control Act.

4.2.3 Environmental Impacts and Recommended Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact related to terrestrial biological resources if it would:

- ▶ have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- ▶ have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS;
- ▶ have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- ▶ interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- ▶ conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- ▶ conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

Wildlife Movement Corridors

The project site is located within the Pacific Flyway, which is a major north-south route for migratory birds along western North America. Large numbers of waterfowl, shorebirds, and cranes move through the area seasonally and congregate in wetlands, grasslands, and agricultural fields for winter or use them as resting grounds during longer migrations from the Arctic to Central or South America. The project would not create a barrier to movement of migratory species, and project implementation would not significantly alter the character of existing habitat available to migrating birds in the region. Additionally, areas that would be affected by construction or modification on the project site are not known to contain native wildlife nursery sites, such as colonial bird rookeries. Therefore, this issue is not discussed further in this EIR.

Consistency with Local Policies

The Envision Stockton 2040 General Plan outlines policies to protect natural resources. These include protecting natural resource areas, fish and wildlife habitat, scenic areas, open space areas, agricultural lands, parks, and other cultural/historic resources from encroachment or destruction by incompatible development. As described throughout the impact discussion below and in Section 4.3, "Aquatic Biological Resources," the project would be implemented consistent with these natural resource policies. The project is also consistent with the City's Heritage Oak Tree Ordinance because heritage oak trees would not be removed. Because the project would be consistent with the City's natural resource policies, this issue is not discussed further in this EIR.

IMPACT ANALYSIS AND MITIGATION MEASURES

Impact 4.2-1: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Plant Species and Habitat

Special-status plants with potential to occur on the project site include plants associated with marsh, riparian, or aquatic habitat. Habitat suitable for some of these species is present within the San Joaquin River and on its banks. Temporary dewatering and ground disturbance for construction of the outfall could result in removal of or damage to special-status plants if present. This would be a **potentially significant** impact.

Five special-status plant species have potential to occur on the project site. All these species are covered under the SJMSCP except for watershield. Construction activities could result in direct removal of special-status plant species or result in damage that leads to their eventual death as a result of trampling, breaking, or hydrological alteration. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 4.2-1: Protect and Mitigate Impacts on Special-Status Plants

Consistent with the avoidance and minimization measures in the SJMSCP, the City will implement the following measures to mitigate the potential impact on special-status plant species:

- ▶ Before project implementation, habitat suitable for special-status plants on the project site shall be surveyed by a qualified botanist when the species' distinguishing characteristics are identifiable, such as during their typical blooming periods. This survey will be conducted no more than 1 year before the start of construction.
- ▶ If no special-status plants are observed on the project site, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required.
- ▶ All populations of slough thistle shall be avoided in accordance with the identified measures in Section 5.5.9(F) of the SJMSCP. The SJMSCP does not permit destruction of this species. If avoidance is not feasible, a compensation plan for slough thistle shall be developed in conjunction with CDFW. The plan shall determine the appropriate measures to minimize direct and indirect impacts that could occur as a result of project construction and shall describe measures to achieve no net loss of occupied habitat or individuals. Measures may include preserving and enhancing existing populations, creating off-site populations on project mitigation sites through seed collection or transplantation, restoring or creating suitable habitat in sufficient quantities, or paying an in-lieu fee to achieve no net loss of occupied habitat and/or individuals.
- ▶ If impacts on special-status plant species cannot be avoided, the City will implement compensation requirements provided in the SJMSCP, which may include species relocation to SJMSCP preserves, seed collection for propagation on SJMSCP preserves, or payment of SJMSCP fees such that no net loss of occupied habitat and/or individuals would occur.
- ▶ If watershield, which is not covered under the SJMSCP, is found and cannot be avoided during construction, the City will consult with CDFW to determine the appropriate measures to achieve no net loss of occupied habitat or individuals. Mitigation measures may include preserving and enhancing existing populations, creating off-site populations on mitigation sites through seed collection or transplantation, and/or restoring or creating suitable habitat in sufficient quantities to achieve no net loss of occupied habitat and/or individuals. A mitigation and monitoring plan shall be developed describing how unavoidable losses of special-status plants will be compensated.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-1 would reduce the potentially significant impact on special-status plant species to a **less-than-significant** level because it would require that the project not result in unapproved take of these species and that any species losses would be compensated for.

Impact 4.2-2: Potential for Project Construction to Result in Disturbance to or Loss of Western Pond Turtle

Implementation of the project would include temporary dewatering of a portion of the San Joaquin River and construction within the river channel. These project components could result in disturbance to or direct loss of western pond turtle, if present, within aquatic and upland habitat. This would be a **potentially significant** impact.

Project implementation would include dewatering a portion of the San Joaquin River and construction within the river channel, which provides potentially suitable aquatic habitat for western pond turtle. Additionally, western pond turtle can use upland habitat for egg-laying within approximately 0.3 mile of aquatic habitat. If western pond turtles are present at the time of construction, they could be crushed, buried, or otherwise injured, resulting in death. If nests are present, eggs or young could be killed by construction equipment. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 4.2-2: Conduct Western Pond Turtle Preconstruction Surveys and Relocation

The City will implement the following measures to avoid the potentially significant impact on western pond turtle, consistent with the avoidance and minimization measures in the SJMSCP. All mitigation listed below shall be limited to construction within 0.3 mile of potential aquatic habitat:

- ▶ A preconstruction survey for western pond turtle shall be conducted by a qualified biologist before work in suitable aquatic habitat.
- ▶ If no western pond turtles are observed, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required.
- ▶ During the dewatering of the river, a qualified biologist shall be present to survey for western pond turtles. If western pond turtles are observed, a qualified biologist, with approval from CDFW, shall relocate the turtles to the nearest area with suitable aquatic habitat that will not be disturbed by project-related construction activities.
- ▶ If nesting areas for western pond turtles are identified on the project site, a buffer area of 300 feet shall be established between the nesting site (which may be immediately adjacent to wetlands or extend up to 400 feet away from wetland areas in uplands) and the wetland located near the nesting site. These buffers shall be indicated by temporary fencing if construction has or will begin before nesting periods are ended (the period from egg laying to emergence of hatchlings is normally April to November).

Significance after Mitigation

Implementation of Mitigation Measure 4.2-2 would reduce the potentially significant impact on western pond turtle to a **less-than-significant** level because it would ensure that western pond turtles are removed from the site and that nest sites are protected so that project construction would not result in mortality of individuals.

Impact 4.2-3: Potential for Project Construction to Result in Disturbance to or Loss of Burrowing Owl

Implementation of the project would include ground disturbance that could result in disturbance to or direct loss of burrowing owls and their burrows, if present. This would be a **potentially significant** impact.

Burrowing owl is a California species of special concern. The project site contains potentially suitable breeding habitat within large burrows (possibly attributed to coyotes and California ground squirrels) along levees adjacent to the San Joaquin River. The nearest known occurrence of this species is approximately 1 mile east of the project site (CNDDDB 2022).

Implementation of the project would include ground disturbance, which could result in direct loss to or destruction of active burrows, killing owls inside, or disturbance of burrowing owls causing them to abandon their nests, eggs, or young. Displacing individuals from their burrows can result in indirect impacts, such as predation, increased energetic

costs, increased stress, and risks associated with having to find and compete for burrows, all of which can lead to take or reduced reproduction. This would be a **potentially significant** impact.

Mitigation Measure 4.2-3: Protect Burrowing Owls

The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on burrowing owl:

- ▶ The City will retain a qualified biologist to conduct focused breeding and nonbreeding season surveys for burrowing owls in areas of suitable habitat on and within 150 meters of project activities. Surveys will be conducted before the start of construction activities. Surveys will be conducted before project activity in accordance with Appendix D of CDFW's *Staff Report on Burrowing Owl Mitigation* (CDFG 2012).
- ▶ If no occupied burrows are found, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required.
- ▶ If burrowing owls are discovered during preconstruction surveys and can be avoided during project activities, a protective buffer around the burrow shall be established in conjunction with the Joint Powers Authority and consistent with the SJMSCP.
- ▶ During the breeding season (February 1 through August 31), occupied burrows shall not be disturbed. The development of a protective buffer shall be supported by a qualified biologist. The protective buffer will be informed by monitoring the burrowing owls' sensitivity and will be put in place to prevent burrow destruction and disturbance to nest sites (including nest abandonment and loss of eggs or young). The 2012 CDFW staff report identifies variables to consider for the buffer, such as habitual disturbances (visual and audible), existing vegetation, and type and extent of disturbance and impact. The staff report gives general guidelines for buffers during the breeding season. It recommends that, at minimum, the protective buffer during the breeding season be 200 meters; moving up to 500 meters for high levels of disturbance. These guidelines shall be followed. If activities are allowed closer than these recommended setback distances, then a broad-scale, long-term, scientifically rigorous monitoring program that ensures that the owls are not detrimentally affected by the alternative approach shall be conducted. The protective buffer shall remain until the end of the breeding season unless a qualified biologist approved by the permitting agencies verifies through noninvasive means that either (1) the birds have not begun egg-laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. After the fledglings are capable of independent survival, the burrow can be destroyed.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-3 would reduce impacts on burrowing owl to **less than significant**, because it would require that burrowing owls be avoided and protected from construction activity or that the City compensate for the loss of suitable occupied habitat because of construction activity.

Impact 4.2-4: Potential for Project Construction to Result in Disturbance to or Loss of Swainson's Hawk, White-Tailed Kite, and Other Nesting Raptors

Implementation of the project would include tree and other vegetation removal, and construction noise, which could result in disturbance to or direct loss of nesting Swainson's hawk, white-tailed kite, and other nesting raptors, potentially resulting in nest abandonment, failure, or mortality of chicks and eggs. This would be a **potentially significant** impact.

The project site and surrounding areas contain nesting habitat suitable for raptors, including large trees (e.g., walnut, sycamore, cottonwood) for Swainson's hawk, white-tailed kite, and other nesting raptors (e.g., red-tailed hawk [*Buteo jamaicensis*], red-shouldered hawk [*Buteo lineatus*]).

Implementation of the project would involve removal of trees and construction noise and activities, including demolition, trenching, and grading, and the presence of construction equipment and personnel, which could result in

direct loss of active nests or disturbance of nesting adults, potentially resulting in nest abandonment, nest failure, or mortality of eggs or chicks. This would be a **potentially significant** impact.

Mitigation Measure 4.2-4: Protect Swainson's Hawk, White-Tailed Kite, and Other Nesting Raptors

The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on Swainson's hawk, white-tailed kite, and other nesting raptors:

- ▶ If removal of a known nest tree is required, it shall be removed between September 16 and February 14.
- ▶ If project activity would commence between February 15 and September 15, a qualified biologist shall be retained to conduct preconstruction surveys for active nests on and within 0.5 mile of the project site no more than 14 days and no less than 7 days before commencement.
- ▶ If no active nests are present in the survey area, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required.
- ▶ If an occupied nest is present, a buffer area will be established around the nest site. CDFW guidelines recommend implementation of a 0.25-mile buffer for Swainson's hawk and a 500-foot buffer for other raptors, but the size of the buffer may be adjusted if a qualified biologist and CDFW determine that project activities would not be likely to adversely affect the nest with a smaller buffer. No project activity will commence within the buffer area until a qualified biologist confirms that the nest is no longer active or that the young have fully fledged. Monitoring of the nest by a qualified biologist will be required if the activity has potential to adversely affect the nest.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-4 would reduce the potentially significant impact on Swainson's hawk, white-tailed kite, and other nesting raptors to a **less-than-significant** level because it would require that project activities would not involve removing an active nest tree or disturbing nest sites.

Impact 4.2-5: Potential for Project Construction to Result in Disturbance to or Loss of Song Sparrow ("Modesto" Population) and Other Nesting Birds

Implementation of the project would involve tree and other vegetation removal, which could result in disturbance to or direct loss of nesting song sparrow ("Modesto" population) and other nesting birds, potentially resulting in nest abandonment, nest failure, or mortality of chicks and eggs. This would be a **potentially significant** impact.

Potential nesting habitat for song sparrow ("Modesto" population), including riparian habitat, is present near the project site. Other, nonlisted native bird species could nest within trees and shrubs in and near the project site.

Implementation of the project would involve tree and other vegetation removal, which could result in direct loss of active nests, nest abandonment, nest failure, or mortality of eggs or chicks. Additionally, construction activities, including demolition, trenching, and grading, and the presence of construction equipment and personnel, could result in disturbance to active nests if they are present in the vicinity of these activities. This would be a **potentially significant** impact.

Mitigation Measure 4.2-5: Protect Song Sparrow ("Modesto" Population) and Other Nesting Birds

The City will implement the following measures consistent with the SJMSCP to avoid, minimize, and mitigate impacts on song sparrow ("Modesto" population) and other nesting birds:

- ▶ A qualified biologist shall conduct a preconstruction survey for any project activity that would occur during the nesting bird season (March 1–August 31) and within 500 feet of suitable nesting habitat, including shrubs, riparian vegetation, and trees. The survey shall be conducted within 14 days before project activity begins.
- ▶ If no nesting birds are found, a letter report documenting the survey methods and results shall be submitted to the City, and no further mitigation is required.

- ▶ If nests are found, the qualified biologist shall establish a no-disturbance buffer around the nest. A 10-foot buffer for songbirds is typically sufficient to protect the nest from disturbance, but the size of the buffer shall be determined by a qualified biologist. Buffer size may vary based on bird species, listing status of the species, and other factors, including distance from construction activity, type and duration of construction activity, and whether the nest is within the line-of-sight of construction activity. The size of the buffer may be adjusted if the qualified biologist and the City, in consultation with CDFW, determine that such an adjustment would not be likely to adversely affect the nest.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-5 would reduce the potentially significant impact on song sparrow ("Modesto" population), and other nesting birds to a **less-than-significant** level because it would require that project activities not remove an active nest or disturb nest sites.

Impact 4.2-6: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Bats

Implementation of the project would include construction near a bridge and other structures that could potentially provide roost habitat for common and special-status bats, particularly pallid bat. Construction noise could disturb active bat colonies, causing them to abandon their roosts or young or affect foraging behavior, affecting the survival of young or adult bats. This would be a **potentially significant** impact.

The RWCF buildings and structures could support pallid bat, a species known to roost in abandoned or minimally used buildings and bridges if they provide suitable thermal and structural conditions. Day roosts are used throughout spring and summer, and maternity colony roosts can be active from early April until mid-October. Hibernation roosts may be used from November to early March. If the bridge or other buildings or structures in the project area are used as day roosts, hibernation roosts, or maternity colony roosts, demolition could result in mass displacement, injury, and mortality of bats. Effects could occur from direct physical harm to individuals or from untimely roost abandonment (e.g., death of young that cannot care for themselves because of abandonment of a maternity roost or death of individuals forced from winter hibernacula when food is unavailable or when weather conditions are too harsh for survival).

Demolition or construction activities could result in the displacement, injury, and mortality of pallid bats and would be a **potentially significant** impact on special-status bat species.

Mitigation Measure 4.2-6: Protect Special-Status Bats

The City will implement the following measures to avoid, minimize, and mitigate impacts on special-status bat species, consistent with the SJMSCP:

- ▶ A qualified biologist shall be retained to conduct surveys for roosting bats before construction implementation near potential bat roosting structures, such as bridges. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano) and/or evening emergence surveys to note the presence or absence of bats, if determined necessary. If evidence of bat use is observed, the number and species of bats using the roost will be determined.
- ▶ If no evidence of bat roosts is found, a letter report documenting the survey methods and results shall be submitted to the City, and no further study shall be required.
- ▶ If roosts of pallid bat or other special-status bats are determined to be present, activities that could cause roost abandonment shall occur outside of the nursery and/or hibernation seasons and shall occur during dusk and/or evening hours after bats have left the roosting site.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-6 would reduce the potentially significant impact on pallid, or other special-status, bat to a **less-than-significant** level because it would require surveys to confirm that bats are absent from potential roost sites or avoid disturbance during sensitive periods for bats.

Impact 4.2-7: Potential for the Project to Result in Disturbance to or Loss of Waters of the United States and State

Construction of the proposed new outfall within the San Joaquin River would result in temporary dewatering of approximately 0.04 acre of the San Joaquin River and permanent fill of approximately 0.02 acre of waters of the United States and state because of apron demolition and placement of a steel pipe and riprap to create the new outfall. Therefore, implementation of the project would result in a substantial adverse effect on state and federally protected waters. Loss of wetlands and other waters of the United States and state would be a **significant** impact.

Construction of the outfall would result in the temporary disturbance of approximately 0.04 acre of waters and direct fill of approximately 0.02 acre of wetlands and other waters. These acreages are based on an aquatic resources delineation conducted by Ascent Environmental on January 11, 2022, and preliminary design information. The delineation has not yet been verified by the U.S. Army Corps of Engineers (USACE). The area of waters of the United States and state was delineated based on the ordinary high-water mark of the San Joaquin River. Under the project, cofferdams would be used to surround the proposed outfall location to drain the work area and reach the desired depth for the proposed outfall. This activity would result in the temporary disturbance of the San Joaquin River. Following demolition of the existing apron structure, installation of the new steel pipe and placement of riprap against the levee to create the new outfall would result in the permanent fill of a portion of the San Joaquin River. Project implementation would result in the temporary disturbance and permanent loss of waters of the United States and state. This would be a **significant** impact.

Mitigation Measures

Mitigation 4.2-7: Compensate for Loss of Waters of the United States and State

The City will implement the following measures to compensate for the loss of waters of the United States and state:

- ▶ The City will submit an aquatic resources delineation report to USACE and request a jurisdictional determination. Based on the jurisdictional determination, the City will determine the exact acreage of waters of the United States and waters of the state that would be filled because of project implementation.
- ▶ The City will replace on a “no net loss” basis (minimum 1:1 ratio) (in accordance with USACE and/or the regional water quality control board [RWQCB]) the acreage and function of all wetlands and other waters that would be removed, lost, or degraded as a result of project implementation. Wetland habitat will be replaced at an acreage and location agreeable to USACE and the Central Valley RWQCB and as determined during the Section 401 and Section 404 permitting processes.
- ▶ The City will obtain a USACE Section 404 permit and RWQCB Section 401 water quality certification before any groundbreaking activity within 50 feet of waters of the United States or state. The City will implement all permit conditions.

Significance after Mitigation

Implementation of Mitigation Measure 4.2-7 would reduce the significant impact on waters of the United States and waters of the state to a **less-than-significant** level because it would ensure no net loss of functions and acreage of waters of the United States and waters of the state.

Impact 4.2-8: Potential for Project Construction to Result in Disturbance to or Loss of Riparian Habitat

Construction of the proposed outfall along the San Joaquin River levee would result in direct removal of riparian vegetation. This would be a **significant** impact.

Implementation of the project would result in the removal of two California sycamore trees and sparse cover of understory herbaceous riparian associates (e.g., California mugwort, common rush [*Juncus effusus*], Dallis grass, and dwarf nettle. Overall, the acreage that would be affected is approximately 0.05 acre of valley foothill riparian

woodland habitat (approximately 0.01 acre of temporary disturbance and approximately 0.04 acre of permanent impacts). All portions of the river and associated riparian habitat are protected under Section 1602 of the California Fish and Game Code. The disturbance or removal of riparian habitat would be a **significant** impact.

Mitigation Measures

Mitigation Measure 4.2-8: Minimize Loss of Riparian Habitat

The City will implement the incidental take and avoidance measures in the SJMCSP for riparian habitat and the following measures:

- ▶ The City will submit a notification of Lake and Streambed Alteration to CDFW for work within the San Joaquin River and its levee. The City will comply with all conditions of the Lake and Streambed Alteration Agreement issued by CDFW for the project.
- ▶ The City will replace the 0.04 acre of valley foothill riparian woodland habitat to be removed from the project site with habitat comprising similar ecological conditions to those provided by the habitat removed from the project area, including similar species composition and diversity and functional organization. Riparian habitat replacement shall be at a minimum 1:1 mitigation ratio for a total of 0.04 acres. Habitat restoration, enhancement, and/or replacement shall be at a location and by methods agreeable to CDFW. This may include onsite restoration of riparian habitat; restoration or enhancement of riparian habitat elsewhere on the river in the project vicinity; purchase of mitigation credits at a CDFW-approved mitigation bank; or any combination thereof.
- ▶ The City will require restoration of preconstruction contours and herbaceous understory vegetation.

Significance after Mitigation

The implementation of Mitigation Measure 4.2-8 would minimize the loss of riparian habitat. The impact would be minimized with replacement planting of riparian trees and restoration of understory vegetation and channel contours at the site. Therefore, the implementation of this mitigation measure would reduce the impact on riparian habitat to **less than significant**.

4.3 AQUATIC BIOLOGICAL RESOURCES

This section addresses the potential impacts on aquatic biological resources in the affected environment of the San Joaquin River and downstream Sacramento–San Joaquin Delta (Delta) waters that would result from implementing the project. The analysis includes a description of existing environmental conditions, the methods used for the impact assessments, the impacts associated with constructing and implementing the project, and mitigation measures for significant impacts.

4.3.1 Regulatory Background

Regulatory background relevant to the project is provided in the RWCF Modifications Project EIR, Chapter 4, “Environmental Setting, Impacts, and Mitigation Measures,” Section 4.7, “Aquatic Biological Resources” (City of Stockton 2018).

4.3.2 Environmental Setting

Evaluating potential impacts on fish and other aquatic biological resources requires an understanding of fish and other species’ life histories and life stage–specific environmental requirements. Existing environmental setting for native and special-status fish species, phytoplankton, zooplankton, benthic macroinvertebrates (BMI), and critical habitat and essential fish habitat in the affected environment is provided in the RWCF Modifications Project EIR, Chapter 4, “Environmental Setting, Impacts, and Mitigation Measures,” Section 4.7, “Aquatic Biological Resources” (City of Stockton 2018). Additional setting information is provided below to support the project impact analysis herein.

TEMPORAL OCCURRENCES

The temporal occurrence of the fish using the project reach of the San Joaquin River—in particular, fishes listed under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA)—is key to the impact assessments provided for fish in Section 4.3.3, “Environmental Impacts and Recommended Mitigation Measures.” Table 4.3-1 presents the temporal occurrences of adult and juvenile fall-run Chinook salmon (thermally sensitive, but not ESA- or CESA-listed), spring-run Chinook salmon (ESA- and CESA-listed as threatened), and steelhead (ESA-listed as threatened), as well as that of the ESA-listed threatened green sturgeon and the ESA-listed threatened and CESA-listed endangered delta smelt.

THERMAL TOLERANCES

The RWCF Modifications Project EIR, Chapter 4, “Environmental Setting, Impacts, and Mitigation Measures,” Section 4.7, “Aquatic Biological Resources” (City of Stockton 2018) provides information regarding the thermal tolerances of Chinook salmon, steelhead, and delta smelt. Additional data regarding thermal tolerances for these fish, as well as green sturgeon, are presented in Tables 4.3-2, 4.3-3, 4.3-4, and 4.3-5. In addition, thermal tolerances for native and resident fish species occurring in the San Joaquin River, originally provided in the RWCF Modifications Project EIR, are provided below in Table 4.3-6 to support the impact analysis discussions in Section 4.3.3.

Table 4.3-1 Principal Occurrences of Chinook Salmon, Steelhead, Delta Smelt and Green Sturgeon in the Lower Reach of the San Joaquin River

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ADULT												
Chinook salmon fall-run										■	■	
Chinook salmon spring-run			■	■	■							
Steelhead											■	■
Delta smelt												
Green sturgeon												
JUVENILE												
Chinook salmon fall-run		■	■	■	■							
Chinook salmon spring-run			■	■	■							
Steelhead				■	■	■						
Delta smelt												
Green sturgeon												

Notes: Peak abundance: ■ Present: □

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018.

Table 4.3-2 Delta Smelt Thermal Tolerance Studies

Author	Type of Study	Acclimation Temperature (F)	Endpoint Temperature (F)	Time to Endpoint	Endpoint Reported	Life Stage	
Swanson and Cech 1995	CTM ^a	53.6	69.8	90 min	LOE	Subadult and adult	
		62.6	77.0	80 min		Juvenile, subadult, and adult	
		69.8	82.4	70 min		Juvenile and subadult	
Swanson et al. 2000	CTM ^a	62.6	77.0	80 min	LOE	40–70 mm subadults and adults	
Komoroske et al. 2014	CTM ^b	53.4 ± 0.2	80.8	50.7 min	LOE	Juvenile (140–164 dph)	
		53.6 ± 0.4	80.8	50.3 min		Adult (200–250 dph)	
		54.3 ± 0.2	75.4	39.0 min		Postspawn adults (>300 dph)	
		61.5 ± 0.5	85.8	45.0 min		Larvae (30–32 dph)	
		61.5 ± 0.5	84.4	42.3 min		Late-larvae (60–64 dph)	
		60.3 ± 0.2	82.8	41.7 min		Juvenile (140–164 dph)	
	CLT _{max} ^c	61.9 ± 0.2	83.1	39.3 min	LOE	Adult (200–250 dph)	
		59.5 ± 0.2	79.3	36.7 min		Postspawn adults (>300 dph)	
		67.5 ± 0.4	84.0	30.7 min		Juvenile (140–164 dph)	
		65.7 ± 0.4	82.9	32.0 min		Adult (200–250 dph)	
CLT _{max} ^c	65.7	65.7	80.8	28.0 min	LOE	Postspawn adults (>300 dph)	
			81.3	8.7 days		CLT ₅₀ ^d	Juvenile (140–164 dph)
			79.7	7.8 days			Adult (200–250 dph)
			77.2	6.4 days		CLT ₉₅ ^e	Postspawn adults (>300 dph)
82.6	9.4 days	Juvenile (140–164 dph)					
Jeffries et al. 2016	CTM ^c	57.2	81.7	~ 45.0 min	LOE	Adult (200–250 dph)	
			81.3	8.7 days		Juvenile (140–164 dph)	
			79.9	7.9 days		Postspawn adults (>300 dph)	
Davis et al. 2019	CTM ^c	60.8	85.5 ± 0.36 ^f	~ 45.0 min	LOE	Juvenile (145 dph)	

Notes: CLT_{max} = chronic lethal thermal maximum; CTM = critical thermal maximum; dph = days post-hatch; LOE = loss of equilibrium; min = minutes; mm = millimeters; °C = degrees Celsius; °F = degrees Fahrenheit.

^a Temperatures were increased by 6°C (10.8°F) per hour until LOE was observed.

^b Temperatures were increased by 0.3°C (0.54°F) per minute until LOE was observed.

^c Temperatures were increased by 1°C (1.8°F) per day until lethality occurred.

^d CLT₅₀: temperature at which 50% lethality was observed.

^e CLT₉₅: temperature at which 95% lethality was observed.

^f Acclimated to waters with 2.4 parts per thousand salinity.

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018

Table 4.3-3 Steelhead Thermal Tolerance Studies

Species	Locality	Author	Type of Study	Acclimation Temperature (°F)	Endpoint Temperature (°F)	Time to Endpoint	Endpoint Reported	Life Stage
Steelhead	Various	Washington State Department of Ecology 2002	Preference	N/A	69.8–75.2	N/A	Avoidance behavior and migration blockage	Adult
Steelhead	American River, CA	Myrick and Cech 2005	CTM	51.8 59 66.2	81.5 83.1 85.3	55 min 45 min 35 min	LOE	Age-0
Steelhead	Feather River, CA	Myrick and Cech 2000a	CTM	60.8	84.9	45 min	LOE	Juveniles – hatchery fish
				60.8	87.8	50 min	LOE	Juveniles – wild fish
Steelhead ^a	Tuolumne River, CA	Verhille et al. 2016	Thermal tolerance	54.5	76.3	~ 6 hr	Maintained 95% of their peak aerobic scope	Juveniles
Rainbow trout	Eagle Lake, CA	Myrick and Cech 2000b	CTM	50 57.2 66.2 71.6 77	81.7 83.5 86.2 87.8 89.6	59 min 49 min 37 min 29 min 22 min	LOE	Age-0
Rainbow trout	Mt. Shasta, CA	Myrick and Cech 2000b	CTM	50 57.2 66.2 71.6 77	81.9 83.1 85.3 87.3 88.7	59 min 48 min 35 min 29 min 22 min	LOE	Age-0
Rainbow trout	Columbia River, WA	Coutant and Dean 1972, cited in Coutant 1972a	UILT	59	86.9	15.5 min	LT50	Juveniles
Rainbow trout	Columbia River, WA	Coutant 1972b	Exposure	59	78.8	32 min	Vulnerability to predation	Juveniles

Notes: CTM = critical thermal maximum; hr = hours; LOE = loss of equilibrium; LT50 = median lethal temperature; min = minutes; N/A = not applicable; UILT = upper incipient lethal temperature; °F = degrees Fahrenheit.

^a Wild juvenile *Oncorhynchus mykiss* with no distinction made between resident and anadromous life history forms, but for permitting purposes the fish were considered Central Valley evolutionarily significant unit steelhead.

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018

Table 4.3-4 Chinook Salmon Thermal Tolerance Studies

Run	Locality	Author	Type of Study	Acclimation Temperature (°F)	Endpoint Temperature (°F)	Time to Endpoint	Endpoint Reported	Life Stage
Fall-run chinook	Klamath River, CA	Boles 1988	Preference	N/A	76	N/A	No effect on migration	Adult
Fall-run chinook	Deer Creek, CA	Cramer and Hammack 1952	Preference	N/A	80	N/A	Rested in pools	Adult
					81–82	N/A	Lethality	Adult
Spring-run chinook	Columbia River, OR	McCullough 1999	Preference	N/A	77	N/A	Tolerated short-term exposure	Adult
Spring-run chinook	Sacramento and San Joaquin Rivers, CA	Moyle 2002	Preference	N/A	69.8–77	N/A	Oversummered	Adults
Fall-run chinook	Mokelumne River, CA Hatchery fish in laboratory	Poletto et al. 2017	Physiological performance	59 and 66.2	73.4 ^a	40 min	Absolute aerobic scope	Juveniles
Fall-run chinook	Sacramento River, CA	Orsi 1971, cited in Boles 1988	UILT	73	87	6 min	LT100	Juveniles
				73	87	2 min	LT30	
				70	88	4–6 min	LT100	
				70	84	4–6 min	LT10	
				65	83	4–6 min	LT50	
				60	70	48 hr	LT50	
				70	76.8	48 hr	LT50	
Fall-run chinook	Snake River, ID	Geist et al. 2010	Modified CTM	50	80.2	11.2 hr ^b	LOE	Juveniles
				53.6	80.6	10 hr		
				57.2	81.1	8.9 hr		
				50	81.5	11.7 hr	LT50	Juveniles
				53.6	81.3	10.3 hr		
				57.2	82.2	9.3 hr		
Fall-run chinook	Columbia River, WA	Snyder and Blahm 1971	Modified CTM UILT	50	65	1 hr	No mortality No mortality	Juveniles
				50	70	1 hr		
				50	80	4 min	LT50 LT50	Juveniles
				50	90	6 sec		
Fall-run chinook	Big Qualicum River, British Columbia	Muñoz et al. 2014	CTM	50	79.7 ± 1.8	~ 35 min ^b	Lost equilibrium and a righting response ^c	Juveniles

Run	Locality	Author	Type of Study	Acclimation Temperature (°F)	Endpoint Temperature (°F)	Time to Endpoint	Endpoint Reported	Life Stage
Fall-run chinook	Columbia River, WA	Mesa et al. 2002	CTM	53.6	78.8	2–2.5 hr ^d	LT25	Juveniles
				53.6	80.6	2–2.5 hr	LT35	
Fall-run chinook	Mokelumne River, CA	Hanson 1997	UILT	53.6	78.8	10–120 min	Vulnerability to predation – no effect	Juveniles
				53.6	64.4	10,000 min	No LOE	Juveniles
				53.6	69.8	7,799 min	50% mortality	Juveniles
Fall-run chinook	Mokelumne River, CA American River, CA	Cech and Myrick 1999, cited in Myrick and Cech 2004	CTM	53.6	80.6	21 min	50% mortality	Juveniles
				66.2	83.8	Not reported	LOE	Juveniles
Fall-run chinook	Columbia River, WA	Coutant and Dean 1972, cited in Coutant 1972a	UILT	59	82.4	22.5 min	LT50	Juveniles

Notes: CTM = critical thermal maximum; hr = hours; LOE = Loss of equilibrium; LTXX = lethal temperature at which XX% of fish died; min = minutes; N/A = not applicable; sec = seconds; UILT = upper incipient lethal temperature; °F = degrees Fahrenheit.

^a Endpoint was the same for both acclimation temperatures.

^b Total time to physiological endpoint, including time from acclimation temperature to endpoint temperature.

^c An associated loss of a directed locomotor capacity and an inability to escape from high temperatures.

^d Time to physiological endpoint after reaching the temperature endpoint.

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018

Table 4.3-5 Sturgeon Thermal Tolerance Studies

Species	Locality	Author	Type of Study	Acclimation Temperature (°F)	Endpoint Temperature (°F)	Time to Endpoint	Endpoint Reported	Life Stage
White sturgeon	San Joaquin River	Heironimus and Jackson 2017	Field occurrence	N/A	80.6	N/A	Oversummered	Adult
White sturgeon	San Joaquin River	Faukner and Jackson 2014	Field occurrence	68–77	86	N/A	Oversummered	Adult
Green sturgeon	Broodstock from wild Klamath River (laboratory)	Mayfield and Cech 2004	Preference	51.8 66.2 75.2	60.6 ± 3.0 60.3 ± 5.2 68.7 ± 5.6	N/A	Tank location and swimming performance	Age-0
Green sturgeon	Progeny from fish spawned in laboratory	Allen et al. 2006	Growth	N/A	66.2 66.2–75.2 75.2	N/A	Growth fastest at 75.2 ^a	Age-0
Green sturgeon	Progeny from fish spawned in laboratory	Sardella et al. 2008	CTM	64.4	93.6 ^b 92.7 ^c	~ 50 min ~ 50 min	Cessation of ventilation	Juveniles
Green sturgeon	Broodstock from wild Klamath River (laboratory)	Verhille et al. 2015	CTM	65.3–66.2	94.1 ± 0.25	~ 50 min	Cessation of ventilation	Juveniles
Green sturgeon	Broodstock from wild Klamath River (laboratory)	Lee et al. 2016	CTM	65.5 ± 0.9	~ 90.5	~ 45 min	Cessation of ventilation	Juveniles
Green sturgeon	Broodstock from wild Klamath River (laboratory)	Rodgers et al. 2018	CTM	59.0 ^d 55.4–62.6 ^e 51.8–69.8 ^f	87.0 ± 0.45 86.7 ± 0.74 89.4 ± 0.45	~50 min ~55 min ~ 65 min	LOE for 10 seconds	Juveniles

Notes: CTM = critical thermal maximum; LOE = loss of equilibrium; min = minutes; N/A = not applicable; °F = degrees Fahrenheit.

^a With unlimited food over a period of 3 months.

^b Acclimated to estuarine salinities (10 grams per liter).

^c Acclimated to either fresh water or saltwater salinities (0.5 and 24 grams per liter, respectively).

^d Stable thermoperiod.

^e Narrowly variable thermoperiod.

^f Widely variable thermoperiod.

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018

Table 4.3-6 Upper Temperature Limits and Preferred Temperature Ranges for Native and Introduced Resident Fish Species Occurring in the San Joaquin River

Fish Species	Upper Temperature Limit (°F)	Preferred Temperatures (°F)	References
Native Species			
California roach	97–100	75–84 ^a 84–95 ^d	Cech et al. 1985 Cech et al. 1990
Hardhead	85.5 (acclimated to 51.8) 98.06 (acclimated to 77)	75–82	Moyle 2002; Thompson et al. 2012
Hitch	100.4 (acclimated to 86)	80.6–84.2	Moyle 2002
Pacific lamprey	77–83	<68	Mallat 1983; Claire 2004; PLTW 2017
River lamprey ^f	77–83	<68	Mallat 1983; Claire 2004; PLTW 2017
Sacramento pikeminnow	8 of 10 died when temperature increased from 86 to 95 acclimated to 86 with no mortality at 100	64–72 ^a 72.5–77 ^d	Cech et al. 1990 University of California, Davis 2017a
Sacramento sucker	79–86 Mortality occurred when acclimated to 86 85–88 ^b 85.3, 84.7 ^c	64–75 ^a 79–82 ^d	Estimated based on Cech et al. 1990 Cech et al. 1990 McKee and Wolf 1963 EPA 1973
Threespine stickleback	83.4 and greater (depending on salinity and acclimation temperature; fish acclimated at 50–68)	73.4–75.2	Jordan and Garside 1972 Moyle 2002
Introduced Species			
Bluegill	106 92.8–95.0 86.9–92.8 (UUILT ^e)	81 83.3 (zero net growth)	Becker 1983 McKee and Wolf 1963 EPA 1973:Table III-11, EPA 1973:Appendix II-C
Common carp	87.8–96.8	75.2	Moyle 2002
Green sunfish	91–93, 97	82.8, 80.2	Becker 1983
Largemouth bass	103.64 if acclimated to 86+	77–89.6	Nevada Division of Environmental Protection 2016a
Striped bass	101.4 when acclimated to 77+	77–83.3	Nevada Division of Environmental Protection 2016b
Western mosquitofish	>86 107	77–82 ^a	Cech et al. 1985 University of California, Davis 2017 ^b

Notes: °F = degrees Fahrenheit.

^a Estimated based on limited available information (i.e., professional opinion).

^b Upper incipient lethal limit for common white sucker (*Catostomus commersonni*) as reported in McKee and Wolf (1963).

^c Zero net growth for common white sucker (*Catostomus commersonni*) as reported in Table III-11 and lethal threshold as reported in Appendix II-C, respectively, of EPA (1973).

^d Temperature maxima reported for adult, wild fish (Cech et al. 1990).

^e UUILT = ultimate upper incipient lethal temperature; highest temperature at which tolerance does not increase with increasing acclimation temperatures.

^f The life history of western river lamprey has not been studied in California, so it is assumed that the thermal tolerance is similar to the Pacific lamprey (Moyle et al. 2015; PLTW 2017).

Sources: McEwan and Jackson 1996; Moyle 2002; NMFS 2014; USFWS 1995, 2015, 2018

4.3.3 Environmental Impacts and Recommended Mitigation Measures

SIGNIFICANCE CRITERIA

Based on Appendix G of the State CEQA Guidelines, the project would result in a potentially significant impact related to aquatic biological resources if it would:

- ▶ conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan;
- ▶ block or substantially delay the movement of any native resident or migratory fish species, including any special-status species;
- ▶ cause direct mortality to fish, phytoplankton, zooplankton, or BMI at levels that would cause population reductions;
- ▶ cause modifications to physical aquatic habitat of the San Joaquin River or Delta, that is located within designated critical habitat for a special-status species, of sufficient magnitude, permanence, and geographic extent that would cause reduction in the essential physical and biological features (PBFs) of the designated critical habitat to levels that could cause a reduction in abundance of the special-status species;
- ▶ cause adverse modifications to physical aquatic habitat of the San Joaquin River or Delta of sufficient magnitude, frequency, and geographic extent that would cause a reduction in the long-term population levels of any non-special-status aquatic species; or
- ▶ cause water temperature increases in the "near-field" area of the San Joaquin River (i.e., within the thermal plume near the RWCF outfall where effluent initially mixes with river flows) or in the "far-field" area of the San Joaquin River (i.e., downstream portions of the San Joaquin River and Delta where effluent discharged has become fully mixed with river flow) that would cause mortality or chronic, adverse sublethal effects to fish, phytoplankton, zooplankton, or BMI exposed to areas of elevated river temperature at levels that would cause population reductions.

METHODS AND ASSUMPTIONS

The primary way in which the project has the potential to affect aquatic biological resources in the San Joaquin River is through construction of the new (east bank) outfall structure and changes to the location where RWCF effluent enters the river. Potential effects on San Joaquin River and Delta water quality for constituents that would be affected by the project, and the effects of those water quality changes on beneficial uses, including aquatic life uses, are addressed in Section 4.1, "Hydrology and Water Quality."

Because temperature-related effects of the project have the potential to affect only aquatic life beneficial uses, detailed assessment of temperature-related effects of the project are provided in this section. In addition, this section addresses the effects of the project on physical aquatic habitat within the San Joaquin River and Delta related to construction of the new outfall and abandonment of the existing outfall in place and any impacts such project-related habitat effects may have on aquatic biological resources, including special-status species.

With the project, RWCF effluent would no longer be discharged into the river from the existing outfall structure on the west bank of the river. Rather, the RWCF effluent would be discharged into the San Joaquin River along the east bank of the river immediately adjacent to the main plant site, about 2,000 feet upstream from the existing outfall. Nevertheless, both river flows and the rate of RWCF discharge that would occur for the project throughout the year would be the same as those assessed in the RWCF Modifications Project EIR. Based on the RWCF effluent being discharged into the river at a new location and via a new outfall structure to be constructed on the east bank of the river, the following effects on aquatic life biological resources are assessed:

- ▶ construction-related effects on physical aquatic habitat and how such habitat effects could affect the river's aquatic biological resources;

- ▶ construction-related underwater noise and vibration impacts on fish and their prey organisms;
- ▶ construction-related fish injury or mortality and related impacts on fish populations;
- ▶ blockage or significant delay of fish movement or migrations related to the thermal plume in the San Joaquin River near the new outfall;
- ▶ mortality or chronic adverse sublethal effects on fish, phytoplankton, zooplankton, or macroinvertebrates passing through the thermal plume in the San Joaquin River near the new outfall;
- ▶ potential for the abandoned-in-place outfall structure to affect movements of fish or increase predation on special-status fishes at the site; and
- ▶ potential for the new (east bank) outfall structure and thermal plume to cause increased predation on special-status fishes at the outfall location.

Temporary Construction-Related Effects

Potential temporary construction-related effects on water quality and physical habitat were assessed considering the many aspects of the work that would be involved and potential environmental exposure to contaminants and elevated turbidity. The types of materials and contaminants that may be handled, stored, used, or produced and released to the environment and the related fate and transport and potential for discharge to adjacent water bodies were considered. Also, considered was the implementation of construction best management practices and other environmental commitments that are part of the project.

Permanent Effects Methodology: Physical Habitat

Permanent effects of the project on physical habitat were characterized relative to the permanent placement of the new outfall on the east bank of the San Joaquin River and the resulting effects of the permanent loss of 0.02 acre of riverine habitat and 0.04 acre of riparian habitat.

Permanent Effects Methodology: Temperature

The size, location within the channel, and thermal characteristics of the effluent plume in areas near the new outfall were modeled using the CORMIX model, which is supported by the U.S. Environmental Protection Agency (EPA). The thermal exposures of the most thermally sensitive fish (i.e., Chinook salmon and steelhead) and other ESA-listed fishes (i.e., green sturgeon and delta smelt) in the San Joaquin River were assessed in detail as surrogates for all other fish species that are either more thermally tolerant or have larger, more robust populations, or both. If no significant thermal effects are found for Chinook salmon, steelhead, green sturgeon, and delta smelt passing the thermal plume, then it can be assumed that there would be no significant adverse thermal effects on any of the river's other fish species as they move past/through the thermal plume. Thermal exposures that these fishes would experience as they pass alongside the plume or through the plume were compared to species-specific thermal tolerance information from the scientific literature to identify potential thermal impacts on fish from the thermal plume on the east bank of the river. The same approach was used for phytoplankton, zooplankton, and macroinvertebrates that drift through the thermal plume area.

Model Description

CORMIX is a mixing zone model that simulates pollutant discharges into receiving water bodies. CORMIX was chosen to simulate the temperature plume in the river near the new outfall created by the RWCF discharge on the east bank because of its ability to simulate heated discharges and their thermal effects on receiving water bodies.

CORMIX is able to simulate three discharge types: (1) single port discharges (CORMIX1), (2) submerged multiport discharges (CORMIX2), and (3) buoyant surface discharges (CORMIX3). The RWCF effluent discharge is a submerged pipeline discharge; therefore, the CORMIX1 model for single port discharges was used to simulate the effluent discharge to the San Joaquin River.

Within CORMIX1, the model transitions between simulation modules, depending on where the effluent plume is relative to the outfall. The first set of modules relate to the immediate near-field mixing of the effluent plume, closest

to the outfall itself. The first near-field module, the submerged buoyant jet mixing module, simulates immediate jet mixing of the discharge in which turbulent mixing is the primary mixing method. The model then transitions to a boundary interactions module, in which interactions between the effluent plume and the receiving water boundaries (i.e., river bottom, water surface, and banks) are simulated. Interactions with the receiving water boundaries can limit the mixing of the effluent plume with the receiving water body because the effluent plume is attached to the river bottom or banks. The boundary interactions module also provides the transition from the buoyant jet mixing module and the last module, the surface buoyant jet mixing module. The surface buoyant jet mixing module simulates vertical and lateral mixing of the plume as it travels through the receiving water body, further from the outfall.

After the immediate near-field simulations discussed above are complete, CORMIX1 transitions to buoyant spreading simulations, in which further vertical and lateral mixing of the effluent plume as it travels downstream are simulated. These simulations utilize buoyant forces (i.e., density differences between the effluent plume and the receiving water) to simulate spreading of the effluent plume.

Outfall Configuration

CORMIX is commonly used as a design tool for new outfalls. For this reason, CORMIX contains a built-in set of rules that govern the manner in which the outfall is configured in the receiving water. For single port discharges simulated by CORMIX1, discharges are classified as either "deeply submerged" or "slightly submerged." A discharge is deeply submerged when the distance between the outfall pipe centerline and the river bottom at the discharge location is less than or equal to one-third of the river depth at the discharge location. A discharge is slightly submerged when the distance between the outfall pipe centerline and the river bottom at the discharge location is greater than or equal to two-thirds of the river depth at the discharge location. The set of rules for outfall configurations in CORMIX are as follows:

- (a) The river depth at the discharge location must be at least three times greater than the diameter of the outfall pipe.
- (b) The distance between the outfall pipe centerline and the bottom of the river channel at the discharge location must be no greater than one-third (deeply submerged) or no less than two-thirds (slightly submerged) of the river depth at the discharge location.
- (c) The distance between the outfall pipe centerline and the bottom of the river channel must be no less than the radius of the outfall pipe.
- (d) The river depth at the outfall pipe location (i.e., depth at discharge) cannot be more than 30 percent greater than the average river channel depth across the transect at the outfall location.

The proposed new RWCF outfall was designed to comply with CORMIX's rules for a deeply submerged outfall. The average river depth at the proposed new outfall location is approximately 14.7 feet under mean lower low water tidal conditions. However, the depth of the river channel on the eastern side where the outfall would be placed is approximately 19.3 feet under mean lower low water tidal conditions. This depth of 19.3 feet where the outfall pipe would be placed is more than 30 percent greater than the average depth of the river channel at the discharge location and thus does not comply with CORMIX rule "d" listed above. To satisfy CORMIX rule "d," the river depth at the outfall location was set to 19.0 feet, which is 29 percent greater than the average river depth at the discharge location (14.7 feet x 1.29 = 19.0 feet). This modification to the river channel bathymetry was strictly done to enable simulation of the discharge in CORMIX. This modification also lends to the conservativeness of the model, as there would be 0.3 foot of additional water column above the outfall in reality, which would cause the plume to stay submerged for a longer period, thereby enhancing the mixing of the discharge with the receiving water. The proposed new RWCF outfall configuration is provided in Table 4.3-7.

Table 4.3-7 CORMIX Input Parameters for New RWCF Outfall Configuration

Parameter (units)	Value
Discharge classification	Deeply submerged
Pipe diameter (feet)	5.0
Average river depth (feet)	14.7
Modeled river depth at discharge (feet)	19.0
Modeled outfall pipe centerline height above river bottom (feet)	6.3
Modeled outfall pipe centerline submergence (feet)	12.7

Note: All values are calculated based on mean lower low water river stage of 2.85 feet (North American Vertical Datum of 1988).

Source: Modeling input parameter information provided by Robertson-Bryan, Inc. in 2022.

Scenarios and Input Data

CORMIX modeling of the RWCF effluent discharge to the San Joaquin River was performed for project conditions on a worst-case and median-case basis for the months of March, April, May, October, and November. Worst-case and median-case scenarios were modeled because they “book-end” the worst-case half of all plume conditions that can occur in the river. From an assessment standpoint, if no significant adverse effects on ESA-listed fishes Chinook salmon and steelhead (the most thermally sensitive species using the San Joaquin River) are determined for both the worst-case or median-case scenarios (i.e., the worst-case half of all possible plume conditions), then it can be concluded that there would be no adverse effects caused by the best-case half of plume conditions, where thermal gradients across the plume are lesser than those modeled and assessed for the worst-case half of conditions. Similarly, if there would be no significant adverse thermal effects on Chinook salmon and steelhead (the most thermally sensitive fish species), then it can be concluded that there would be no adverse effects on any other fish species that are less thermally sensitive than these salmonid species. The months of March, April, May, October, and November include key juvenile emigration and adult immigration months for Chinook salmon and steelhead and also characterize the thermal gradients that would occur across the plume in other months of the year. This approach reduced the number of scenarios that needed to be modeled and assessed. Worst-case and median-case scenarios for the CORMIX modeling were defined as follows:

- ▶ worst-case
 - 100th percentile effluent-river temperature differential
 - 100th percentile daily average effluent flow rate
 - slack-tide river velocity
- ▶ median-case
 - median effluent-river temperature differential
 - median daily average effluent flow rate
 - median river velocity

The temperature differentials, effluent flow rates, and river velocities for the above scenarios are defined in Table 4.3-8.

Table 4.3-8 CORMIX Flow and Temperature Input Parameters for Plume Scenarios Modeled

Month Modeled	Condition	Effluent Flow (mgd)	River Velocity (fps)	Temperature Differential (°F)	Effluent Temperature (°F)	River Temperature (°F)
November	Median	24.1	0.71	14.0	75.9	61.9
	worst-case	48.7	0.05	21.4	74.3	52.9
March	Median	32.2	0.86	13.4	74.6	61.2
	worst-case	52.0	0.05	20.1	69.6	49.5
April	Median	24.7	0.95	11.7	80.0	68.3
	worst-case	54.1	0.05	19.8	79.5	59.7
May	Median	24.3	0.89	11.5	80.9	69.4
	worst-case	52.8	0.05	18.8	74.6	55.8
October	Median	25.1	0.65	10.1	82.2	72.1
	worst-case	51.0	0.05	18.5	80.4	61.9

Notes: fps = feet per second; mgd = million gallons per day; °F = degrees Fahrenheit.

Source: Modeling input parameter information provided by Robertson-Bryan, Inc. in 2022.

The San Joaquin River velocity, stage, and temperature data used to establish the 100th percentile and median river velocity and temperature differentials were from the U.S. Geological Survey gage at Garwood Bridge, which records velocity, stage, and temperature on a 15-minute time step, for January 1, 2010, through December 31, 2019. Thus, for each day, there were 96 velocity, stage, and temperature values.

Based on the temperature modeling performed for biological assessments prepared for the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) in support of ESA consultations triggered by the project requiring a Clean Water Act Section 404 permit issued by the U.S. Army Corps of Engineers, no measurable buildup of temperature occurs over time near the outfall area during the months modeled (i.e., March–May, October, and November) (Robertson-Bryan, Inc. 2022a, 2022b). Therefore, background river temperature inputs to CORMIX did not need to be adjusted. Nevertheless, the average incremental increase in modeled temperatures for locations 0.4 mile upstream and 0.7 mile downstream from the outfall during these months (which approximate that shown in the RWCF Modifications Project EIR at these distances from the outfall) were acknowledged and addressed as part of the plume analyses for the new (east bank) outfall.

Regarding RWCF discharge rates, the project discharge rates were based directly on influent flow rates because evaporative losses that currently occur in the oxidation ponds and treatment wetlands would no longer occur with the project. The project RWCF effluent temperatures were developed from a mathematical regression model relating historical final effluent temperatures to historical secondary treatment process effluent temperatures. Secondary effluent temperature is measured before the effluent enters the oxidation ponds and treatment wetlands, and thus does not reflect the evaporative cooling or thermal heating that occurs in the ponds and wetlands and reasonably approximate what the final effluent temperature would be with the project in operation. Daily average secondary effluent temperature data from October 22, 2013, through July 31, 2016, were paired with final effluent temperature data from the same time period to develop a regression equation relating historical final effluent temperatures and secondary effluent temperatures. The regression equation (R-squared = 0.75) allowed for developing project final effluent temperatures outside of the period when no secondary effluent data are available. Thus, the project effluent temperature dataset consisted of final effluent temperatures based on the regression equation for January 1, 2010, through October 21, 2013, and August 1, 2016, through December 31, 2016, and measured secondary effluent temperatures for October 22, 2013, through December 31, 2019. All effluent and river datasets underwent review and analysis to remove obvious outliers and data anomalies.

All simulations were performed using CORMIX's tidal simulation function, in which CORMIX simulates potential buildup of effluent in the receiving water as the tide reverses. Additionally, because CORMIX requires some measurable ambient river velocity to conduct the simulations, the slack-tide river velocity was set to 0.05 foot per second, which is the minimum river velocity that will allow CORMIX to run.

Model Output

Output from the CORMIX modeling consisted of plume graphics provided by CORMIX's built-in Corvue three-dimensional graphical model and general plume mixing information provided within CORMIX. Corvue uses the CORMIX model output to generate three-dimensional graphics depicting the effluent plume's interaction with the receiving water. Corvue was used to generate plume graphics showing the temperature differential between the effluent plume and the receiving water as the plume disperses into the receiving water.

As stated above, the CORMIX model transitions between simulation modules to simulate the thermal plume within the river channel. The Corvue graphic model within CORMIX does not seamlessly graph the plume across the entire modeled domain. Rather, it graphs the output from each CORMIX module in sequence. The result is a graphical depiction of the plume that shows each of the distinct aspects of the plume modeled with clearly observable "seams" between each. Although the plume is not graphed seamlessly by CORMIX, the graphics presented are still adequate for fish assessment purposes.

ISSUES OR POTENTIAL IMPACTS NOT DISCUSSED FURTHER

The new (east bank) outfall would not affect effluent temperature or volume discharged to the river relative to that assessed in the RWCF Modifications Project EIR, nor would it in any way change river hydrology or river background temperatures. However, the outfall would be located approximately 2,000 feet upstream from the existing outfall, it would be located on the east bank rather than the west bank, and the invert of the outfall pipe would be deeper below the water surface than the invert of the existing outfall. With the new outfall, the thermal load added to the San Joaquin River would not change compared to that assessed in the RWCF Modifications Project EIR. The location where effluent and river flow initially become fully mixed would shift upstream somewhat, but the fully mixed temperatures at that location would remain unchanged from that assessed in the RWCF Modifications Project EIR. River temperatures would be further reduced with increasing distance away from the new outfall because of additional dilution and ambient cooling in the same manner as they are for the existing outfall. For these reasons, the new outfall would not cause any new or more severe thermal effects on the river's fully mixed condition and thus would not cause any new or more severe thermal effect on aquatic life compared to that assessed in the RWCF Modifications Project EIR. Consequently, the effect of the new outfall on fully mixed river water temperatures is not assessed further in this Draft Supplemental EIR.

Also, the project site and affected environment lie within San Joaquin County for which there is a *San Joaquin County Multi-Species Habitat Conservation and Open Space Plan*. For the reasons discussed in the RWCF Modifications Project EIR, Chapter 4, "Environmental Setting, Impacts, and Mitigation Measures," Section 4.7.3, "Environmental Impacts and Recommended Mitigation Measures," the project does not conflict with the provisions of this adopted Habitat Conservation Plan or any other approved local, regional, or state habitat conservation plan. Consequently, this issue is not discussed further in this Draft Supplemental EIR.

IMPACT ANALYSIS AND MITIGATION MEASURES

Construction-Related Impact Assessments

Impact 4.3-1: Potential for Project Construction-related Alterations in Aquatic and Riparian Habitat to Affect Aquatic Species

Implementation of the project, including construction of the proposed outfall and placement of stabilization materials, would result in disturbance to or direct removal of a small amount of riparian vegetation and modifications to a small area of riverine aquatic habitat. Such modification of this area of the lower San Joaquin River would not have a substantial effect on the overall quantity and quality of available habitat for fish, BMI, or plankton communities within the river. The effects would not modify riverine habitat, including designated critical habitat for ESA-listed fishes, to levels that would cause a reduction in long-term abundance of special-status or resident fish species or their prey organisms. Consequently, adverse effects on aquatic species related to alterations in aquatic and riparian habitats of the lower San Joaquin River from construction activities would be **less than significant**.

Construction-related activities associated with the project would result in temporary dewatering of a small area of the river behind the cofferdam (approximately 0.04 acre) and localized modification of riparian habitats (approximately 0.02 acre). When substantial riparian vegetation is present along a river, it can provide shaded riverine habitat features, including the ability to promote localized water cooling and increased BMI production. However, there is very limited riparian vegetation at the project site.

The temporary dewatering and disturbance of 0.04 acre of the San Joaquin River behind the cofferdam would have negligible, if any, effects on prey organism abundance, water temperature, and other physical characteristics of the area. Dewatering within the cofferdammed work area for outfall construction would result in a localized and temporary loss of BMI in the dewatered area. However, given the small area that would be dewatered and disturbed by this construction, relative to the total acreage of aquatic habitat available for BMI production in the lower San Joaquin River, the percentage of the lower San Joaquin River BMI community lost would be negligible, relative to the entire BMI community that exists in the lower San Joaquin River. Such losses would not be sufficiently large to adversely affect the prey base for fishes using the river. Given the rapid recolonization rate of BMI, the small disturbed area within the channel would be completely recolonized by BMI within a year of rewatering the dewatered area following construction. The new outfall construction activities would have even lesser effects on the river's phytoplankton and zooplankton populations.

Disturbance of 0.02 acre of riparian habitat would occur on a portion of levee that contains almost no vegetation or habitat under existing conditions. The area where construction of the new outfall would occur contains very little habitat or vegetation of any kind. Two small California sycamore trees and sparse cover of understory herbaceous riparian associates (e.g., California mugwort, common rush [*Juncus effusus*], Dallis grass, and dwarf nettle) would be removed to accommodate installation of the new outfall pipe. Ground cover in this area consists of riprap and compacted crushed rock. Although almost no vegetation currently occurs at the site, all areas temporarily affected during construction would be reseeded with a native plant mix to stabilize soils and prevent future erosion. The removal of the two California sycamore trees and sparse understory at the outfall location would not affect river water temperatures, streambank erosion, or local BMI production and would not adversely affect the overall habitat quality or complexity within the lower San Joaquin River or the project reach.

Such minor construction-related effects would not reduce the quantity or quality and thus conservation value of the PBFs designated for southern Distinct Population Segment (DPS) green sturgeon of food resources, substrate type/size, water flow, migratory corridor, water depth, or sediment quality. Likewise, these construction-related effects would not occur at levels that would reduce the quantity or quality and thus conservation value of the PBFs of freshwater migration corridors or freshwater rearing sites designated for Central Valley DPS steelhead. Finally, the minor construction-related effects on riverine and riparian habitat would not reduce the quantity or quality and thus conservation value of the PBFs of habitat designated for delta smelt. The other PBFs of water, river flow, and salinity

concentrations required to maintain delta smelt habitat for spawning, larval and juvenile transport, rearing, and adult migration would not be affected by the project's minor and localized effects on riverine and riparian habitats.

Based on the above considerations, construction-related activities are expected to cause short-term and localized alterations of aquatic, benthic, and riparian habitats where the new outfall would be constructed. However, because of the very small area of habitat that would be affected, the short-term nature of the dewatering, and the rapid recolonization ability of BMI populations, the construction of the project would not modify riverine habitat, including designated critical habitat for ESA-listed fishes, to levels that would cause a reduction in long-term abundance of special-status or resident fish species or their prey organisms. The magnitude and geographic extent of the effect on riparian and aquatic habitat would not result in a substantial adverse effect on the river's riparian community or other sensitive aquatic habitats or natural communities identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife, USFWS, or NMFS. Consequently, these small, localized, and temporary effects on benthic and riparian habitats would not result in any permanent adverse changes to designated critical habitat for green sturgeon, steelhead, or delta smelt. Therefore, impacts on aquatic species related to alterations in aquatic and riparian habitats within the lower San Joaquin River during construction would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 4.3-2: Potential for Project Construction-Related Underwater Noise and Vibration to Affect Fish and Their Prey Organisms

Construction-related underwater noise, vibrations, and disturbance from constructing the new outfall has the potential to affect migrations and movements of fish near the outfall site or cause adverse effects on prey resources in the area. Most fish would move past the construction site in the portion of the river channel away from the area of disturbance and thus would not experience noise or vibrations at levels that would cause any chronic, adverse physical or behavioral effects on fish. Fish that move close enough to the pile driving to experience a startle response from the underwater noise levels would simply move away from the noise or drift with the currents past the site and away from the disturbance. In addition, all work would be limited to daylight hours during the week, leaving extensive periods of uninterrupted passage for migrating fish and resident fish to move past the site daily in the evenings, in between periods of pile driving, and on weekends, when no construction would occur. Any small-magnitude, localized losses of resident larval fishes, BMI, and zooplankton from noise generated by pile-driving activities would be minimal and would not have population-level effects. Therefore, underwater noise and vibrations from construction-related activities would not lead to substantial adverse population-level effects on special-status fishes, resident fishes, or their prey resources and would not block or substantially delay the movement of any native resident or migratory fish species past the construction site. This impact would be **less than significant**.

The cofferdam dam would be constructed using approximately 50 interlocking steel sheet piles (approximately 40 feet tall and 55 inches wide) installed using a vibratory pile driver. The total linear length of the cofferdam would be approximately 125 feet and is anticipated to be driven 15–17 feet into the riverbed, extending above the riverbed to an elevation of 10.00 feet (North American Vertical Datum of 1988 [NAVD88]). Approximately 10 sheet piles can be placed per day, for a total of approximately 5 days to complete construction of the temporary cofferdam. Its removal is expected to occur over 1 to several days. The cofferdam would be put in place and removed during daylight hours during the resource agency–allowed in-water work window of July 1 through October 31.

Operating construction equipment on the waterside of the levee, and pile driving sheet piles into the San Joaquin River's bed and removing them later, both completed using a vibratory hammer, would result in temporary periods of elevated underwater noise and vibration levels. Noise levels associated with sheet pile removal would be less than those produced during their installation. Elevated noise and vibration levels associated with temporary pile-driving activities within the San Joaquin River would occur during daylight hours only, over a period of approximately 5 days, followed by substantially lesser underwater noise levels during the periods when the outfall is constructed and when the sheet piles are removed at the end of the construction period. Hence, this assessment focuses primarily on the cofferdam installation process, during which underwater noise and vibration generation would be greatest.

Resident fishes would be present at the site during the July 1 through October 31 construction window. ESA-listed species and life stages that would be present in the river near the outfall during this period would be adult and juvenile green sturgeon, and adult and juvenile steelhead. In addition, fall-run Chinook salmon would be present during the construction window. This analysis emphasizes these species because their low numbers make their populations more vulnerable to adverse impacts from underwater noise and vibrations at the outfall site than species with large populations. Spring-run Chinook salmon adults and juveniles and winter-run Chinook salmon juveniles would not be present in the river near the outfall during this construction window. Thus, there would be no impact on these special-status fish species/life stages.

Anthropogenic noise, such as pile driving, can trigger a reflexive startle and alarm responses in fish, causing fish to flee an area (Popper et al. 2019). Thus, increased noise can temporarily disrupt behavior patterns. However, such transient startle responses are unlikely to result in adverse impacts because fish quickly return to normal behaviors (Popper et al. 2019). Abiotic and biotic sounds are important to fish, and many fish use acoustic signals to communicate. Noise emanating from construction activities can temporarily reduce the auditory sensitivity of some species and interfere with signals that affect communication, behavior, and fitness (Popper and Hastings 2009; Purser and Radford 2011).

The type and severity of noise impacts would depend on several factors, including the intensity and characteristics of the sound, the distance of the fish from the source, the size of the fish, and the frequency and duration of the noise-generating activities. The Fisheries Hydroacoustic Working Group, which included representatives from the California Department of Transportation, Federal Highway Administration, Washington State Department of Transportation, Oregon Department of Transportation, Regions 1 and 8 of USFWS, and NMFS, developed criteria to address sound exposure thresholds for the onset of physical injury and adverse behavioral effects (Fisheries Hydroacoustic Working Group 2008). Although originally developed to assess impacts from pile driving, the criteria can be applied to any anthropogenic, intense, and relatively long-duration sound, such as that generated from heavy construction equipment (U.S. Bureau of Ocean Energy Management 2012). The criteria used to determine the onset of physiological effects on fishes are presented in Table 4.3-9.

Table 4.3-9 Underwater Noise Criteria for Injury and Adverse Behavioral Effects to Fish

Effect	Metric	Fish Mass	Threshold ^a
Onset of physical injury	Peak pressure	N/A	206 dB
	Accumulated sound exposure level	≥ 2 grams	187 dB
		< 2 grams	183 dB
Adverse behavioral effects	Root mean square pressure	N/A	150 dB

Notes: dB = decibels; N/A = not applicable.

^a Referenced to a pressure of 1 micropascal.

Source: Fisheries Hydroacoustic Working Group 2008, California Department of Transportation 2020

Although the criteria in Table 4.3-9 are the accepted noise criteria for assessing noise impacts on fish, the information used to determine the criteria was based on very limited experimental data (U.S. Bureau of Ocean Energy Management 2012). More recent research shows that the onset of physiological response to noise by fish species, including salmonids, does not occur until noise levels are substantially higher than the criteria in Table 4.3-9 (U.S. Bureau of Ocean Energy Management 2012). Popper et al. (2019) suggest that the sound pressures to which fish actually respond are closer to 163 decibels (dB) (referenced to a pressure of 1 micropascal [re: 1 μ Pa]). However, further studies on wild fishes in their natural environment are necessary before a definitive behavioral threshold can be developed (Popper et al. 2019).

Most special-status species, including salmonids and sturgeon, are primarily detectors of particle motion, not sound pressure (Lovell et al. 2005; Meyer et al. 2012; Popper et al. 2019). Sturgeon, like other fish with swim bladders far removed from the ear, are unlikely to hear anthropogenic sounds unless they are very close to the sound source. It is unknown what level of particle motion would lead to behavioral effects on these species, but it is assumed that it would take a very high level of signal to prompt behavioral changes (Popper et al. 2019).

Pile driving introduces high-intensity impulsive sound waves into the water column, resulting in a rise in sound pressure. Sound pressure levels generated by pile driving are variable depending on the substrate being penetrated, distance from the source, and depth of the water (Popper et al. 2019). Underwater noise levels measured during installation of a cofferdam in Fort Bragg, California, resulted in peak sound pressures in the water of 170–174 dB approximately 33 feet (10 meters) from the site of pile driving using an impact hammer (California Department of Transportation 2020). This is well below the onset of physical injury for small (i.e., <2 grams) and large (i.e., ≥ 2 grams) fish described in Table 4.3-9 and similar to the 163 dB (re: 1 μ Pa) that Popper et al. (2019) suggest is the level at which fish initially respond to sound. The total time that pile driving would occur (estimated at 5 days) within the river would be relatively short. Each pile would take less than 1 hour to install. Then there would be a period of time in between installation of each of the piles when little to no underwater noise would be generated. In addition, no pile driving would occur during nighttime hours.

Regardless of how noise is measured, studies have shown that fishes exposed to pile-driving sounds may show startle and alarm responses when close to the pile-driving activity. If a fish did come close enough to the sound to be startled, the startle response from pile driving sheet piles with a vibratory hammer would be expected to be brief and would not result in mortality or chronic, adverse behavioral effects on fish (Popper et al. 2019). The adult and juvenile green sturgeon, adult and juvenile steelhead, and other fish species that would be present would be strong swimmers. Therefore, they would be able to move away from the source of the sound rapidly into the largely unaffected, or minimally affected areas of the river away from the temporary noise generated by pile driving. Also, because pile driving would start on the upstream end and move sequentially downstream, any fish in the immediate vicinity of the sheet piling would be expected to move out of the area on their own volition and would not be expected to become entrained within the cofferdammed area.

Based on the above, noise levels would not result in injury, death, or substantial delays of juvenile or adult special-status species migration or movements. Because all construction work would be limited to daylight hours during the week, any potential delays in fish movement past the construction area would be short term (i.e., hours). Nevertheless, no delays are expected because fish would simply alter their migration route past the construction site rather than remain there. Hence, any potential minor, short-term behavioral effects on a small number of adult or juvenile green sturgeon, or adult or juvenile steelhead that may then move around or away from the site would have an insignificant effect on both the individual and its population.

Juveniles and adults of other species would be expected to behave similarly. Larval life stages of fishes present during the construction window, such as centrarchids (sunfishes) or mosquitofish could become entrained within the cofferdammed area. However, such loss of larval life stages from fishes having large populations within the river, such as those listed above, from entrainment within the cofferdammed area or from underwater vibrations immediately adjacent to a pile being driven would represent a negligible fraction of the total annual production and recruitment for the species and, therefore, would have no population-level effects on these species.

Sheet piles would be removed using a vibratory pile driver at the rate of 10 or more per day, for a total of a few days or less of sheet pile removal. Underwater noise levels are anticipated to be less during this period than during installation. Consequently, any potential minor, short-term behavioral effects on a small number of ESA-listed fishes that may move around or away from the site during cofferdam removal would have an inconsequential effect on both the individual and its population. The same would be the case for other, non-listed fish species.

There is substantially less information available on the ability of aquatic invertebrates to detect sounds relative to fish (Popper and Hawkins 2018). Unlike for fish, there are no guidelines available to protect invertebrates from anthropogenic underwater noise and vibrations.

Aquatic invertebrates have a variety of body parts that are likely responsive to particle motion, including hairs, chordotonal organs associated with joints (i.e., such as those in crayfish), and statocysts (i.e., balancing organs that are present in invertebrates such as mollusks), which resemble the sensory hair cells in vertebrate ears (Popper and Hawkins 2018 and references cited within). Evidence suggests that anthropogenic sounds within the water column and emanating from substrate can repress burying behaviors, reduce surface relocation activity, and affect recruitment of BMI (Solan et al. 2016; Hawkins and Popper 2017; Popper and Hawkins 2018). A variety of parameters,

including whether sounds are continuous, the types of substrate present, and species of macroinvertebrate, influence the potential for noise to affect invertebrates.

There is also very little information available regarding impacts of anthropogenic noise on plankton populations. A recent study found that sound exposure levels from an underwater air gun caused mortality to marine zooplankton (McCauley et al. 2017). However, air guns are substantially louder than pile-driving activities (220–250 dB at the source).

Short-term sounds that rapidly diminish are unlikely to translate into long-term consequences to invertebrates (Hawkins and Popper 2017). Therefore, the temporary noise generated by in-water construction activities, including placing and removing sheet piles for cofferdam construction would not have substantial adverse effects on zooplankton or the BMI population in the vicinity of the outfall. Although it is possible for some zooplankton to be affected by the pile-driving noise (i.e., those located close to the piles being driven), the potential loss of these individuals would be negligible relative to the total zooplankton population and biomass that occur in the lower San Joaquin River. Furthermore, zooplankton recolonize flowing waters rapidly. In summary, any short-term, localized losses in BMI and zooplankton production from pile-driving or removal activities would have negligible effects on the BMI and zooplankton populations and communities in the river. Likewise, the underwater noise and vibrations associated with the outfall construction would have minimal, if any, effects on the river's phytoplankton populations and communities. Based on the above findings, the impact of construction-related underwater noise and vibration on fish and their prey organisms would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4.3-3: Potential for Project Construction to Cause Direct Fish Injury or Mortality, Resulting in Impacts on Fish Populations

Construction of the cofferdam, subsequent dewatering of the area to provide a dry work area, and restoration of natural contours of the river postconstruction have the potential to cause direct mortality or injury to special-status fishes or other fish of the lower San Joaquin River. The potential for direct mortality or injury to special-status fishes would be minimized by limiting in-river construction activities to the July 1 to October 31 period and installing a cofferdam to hydraulically isolate the outfall installation from the river. The very limited injury or mortality that could potentially occur to non-special-status fish species would not occur at a level that would cause a reduction in their population. Nevertheless, it is possible that individual special-status fish could become stranded in the cofferdam footprint. The potential for direct mortality or injury to special-status fishes stranded within the cofferdam would constitute a substantial adverse effect on the special-status species and thus would be a **potentially significant impact**.

Before any construction on the waterside of the levee, a temporary cofferdam would be erected. The piles would be put into place using a crane positioned on the levee crown. All outfall construction would take place within the cofferdam footprint and thus would be isolated from the San Joaquin River. Following removal of the cofferdam after the outfall has been constructed, an excavator operating from the levee crown would restore the natural contours of the riverbank and bottom to preproject conditions, as needed. Thus, construction activities that could result in direct fish injury or mortality are installation and removal of the cofferdam, subsequent dewatering of the construction area within the cofferdammed area, and restoration of the natural contours of the riverbank and bottom through placement of riprap.

The special-status species and life stages that would be present in the river near the outfall during the July 1 through October 31 in-river construction window would be:

- ▶ adult and juvenile green sturgeon,
- ▶ adult and juvenile hardhead (California species of special concern),
- ▶ adult and juvenile steelhead,
- ▶ adult fall-run Chinook salmon (recreationally important species),

- ▶ juvenile Pacific lamprey (federal species of concern), and
- ▶ juvenile Sacramento splittail (California species of special concern).

All other special-status species and life stages of fish would not be present in the river near the outfall during this construction window and thus would not be affected during the construction phase of the project.

For cofferdam installation, sheet piles would be placed sequentially from upstream to downstream. Interlock sealant, such as sawdust, would be applied to sheet pile joints to keep them watertight. Upon completion of the cofferdam, submersible pumps fitted with screens to prevent them from entraining fishes would be placed inside the cofferdam to dewater the area to provide a dry work area. Water remaining inside the cofferdammed area would be pumped back over the levee into temporary ponds or Baker tanks on the landside of the levee for settling. Then the supernatant would be discharged to the river or pumped into the City sewer system in accordance with the Clean Water Act Section 401 Water Quality Certification, U.S. Army Corps of Engineers Section 404 permit, and other applicable permit requirements.

The potential for San Joaquin River fishes, including ESA-listed fishes or fishes with other special-status designations, to be directly killed or injured by construction activities would be minimized or avoided by limiting in-river construction activities to the July 1 to October 31 period and installing a cofferdam to hydraulically isolate the outfall installation from the river. The only ESA-listed species that would be expected to be present as a juvenile life stage, and thus be prone to potential entrainment, would be juvenile green sturgeon. Underwater noise, turbidity, and flow pattern disruption (i.e., disruption of laminar flow vectors immediately adjacent to the equipment itself) would cause fish in the work area to likely avoid the equipment, thereby enabling most fish to avoid direct injury or mortality related to encountering sheet piles, excavator buckets, or other equipment within the river. Nevertheless, dewatering the cofferdam could potentially result in some fish being stranded within the cofferdam footprint, which could result in direct mortality or injury of individual special-status fishes or other San Joaquin River fishes. Any losses or injury of non-special-status fish species would not result in population reductions, because their populations are large and robust with adequate annual reproduction and recruitment. Conversely, mortality or injury of individual ESA-listed fishes could potentially have population-level effects. Therefore, the impact of construction-related direct mortality or injury to individual special-status fish that use the lower San Joaquin River would be **potentially significant**.

Mitigation Measures

Mitigation Measure 4.3-3: Conduct Fish Rescue and Relocation Operation

The City will implement the following measures to avoid, minimize, and mitigate this potentially significant impact on San Joaquin River special-status fishes:

- ▶ A fish rescue operation will be completed as water elevations within the cofferdam reach low levels. Fish rescue will be completed by qualified biologists using dip and seine nets to remove any fish remaining within the cofferdammed area. All fish rescued from inside the cofferdammed area will be placed into the San Joaquin River away from construction activities.
- ▶ After the dewatered area has been deemed free of any entrained fishes, the area will be completely dewatered using the submersible pumps. Depending on the amount of leakage between the sheet piles, the submersible pumps may have to be operated at regular intervals to keep the work area dry.

Significance after Mitigation

Implementing Mitigation Measure 4.3-3 would reduce the potentially significant impact on fish to a **less-than-significant** level because construction would occur during the NMFS-approved July 1 through October 31 window, when no ESA-listed salmonid juveniles or delta smelt are expected to be in the project reach of the river and thus would not be expected to become entrained within the cofferdammed area; any juvenile green sturgeon present in the river during construction that become entrained are hardy and would handle being rescue-seined and placed back into the river; most, if not all non-special status fishes that become entrained within the cofferdammed area would be safely removed and returned to the San Joaquin River before the start of construction work within the

cofferdammed area; and any losses of small numbers of individual non-special-status fishes within the cofferdammed area would have no population-level effects on the species.

Operations-Related Impact Assessments

All permanent effects on San Joaquin River water quality, with the exception of temperature, and their effects on beneficial uses, including impacts on aquatic life beneficial uses, are assessed in Section 4.2 "Hydrology and Water Quality," and thus are not repeated here. Therefore, the project's operations-related impacts on aquatic biological resources provided below focuses on direct and indirect temperature-related impacts and direct and indirect impacts from modified in-river physical habitat conditions.

Impact 4.3-4: Potential for the RWCF's Thermal Plume in the San Joaquin River to Thermally Block or Substantially Delay the Migrations or Movements of Fishes Past the New Outfall

The project would move the discharge location, and thus the warmest portion of the thermal plume, approximately 2,000 feet upstream from its existing location and to the opposite (east) bank of the river. Despite its new location, the geographic shape and size of the thermal plume, and the thermal gradients across the plume, would remain very similar to those of the existing outfall. The temperature differentials within the plume, relative to river background temperatures, near the outfall from higher effluent temperatures being discharged would change minimally compared to those assessed for the RWCF Modifications Project. The reason for the minimal change is that both river and effluent flows and temperatures would remain the same as those assessed for the RWCF Modifications Project, and only the outfall pipe itself and its location within the channel would change with the project. Where plume temperatures differ the most from river background temperatures near the outfall in the zone of initial mixing, the plume would continue to cover a very small percentage of the overall cross-sectional area of the river (i.e., a few percent of the cross-sectional area). For this reason, adult and juvenile resident fishes moving upstream and downstream past the outfall and adult immigrating and juvenile emigrating anadromous fishes moving through this reach of the San Joaquin River would continue to have ample zones of passage within the river channel that would be unaffected by the plume. Fishes moving through the warmest portion of the thermal plume either would pass through the plume quickly (i.e., seconds to minutes) because of its size within the channel or would move laterally or vertically in the water column to move around the plume if the temperatures experienced when initially encountering the plume are above preferred temperatures. For this reason, the internal temperature gradients for the thermal plume in the near-field zone of initial mixing (i.e., area near the outfall before full mixing of effluent with river flows) under the project would not block or substantially delay the movement of any native resident or migratory fish species, including any special-status species, past the new (east bank) outfall. This would be a **less-than-significant** impact.

Adult and juvenile resident fishes moving past the RWCF outfall (in an upstream or downstream direction) and adult anadromous fishes immigrating upstream and juvenile anadromous fishes emigrating downstream may encounter the thermal plume at and near the outfall, where they may encounter a gradient of elevated water temperatures, relative to river background temperature, across a portion of the channel cross-section occupied by the thermal plume. Temperatures would be highest (i.e., most elevated compared to river background) at the outfall, where the plume covers the smallest portion of the river cross-section. As the effluent mixes with river flow with increasing distance from the outfall, water temperatures within the plume would become decreasingly elevated relative to river background temperatures while the plume gradually covers a greater percentage of the river channel cross-section with increasing distance from the outfall.

The project outfall would be a side-bank outfall on the east bank of the river, where the river is approximately 225 feet wide at the surface, about 175 feet wide at the river bottom, and 15–20 feet deep (depending on river flow and portion of the tidal cycle). The new outfall outlet would be created by demolishing the existing apron structure and installing a new 60-inch cement-lined and coated steel pipe connected to the reinstated 60-inch pipe. The new steel pipe would be installed with premanufactured bends. The new outfall pipe would be covered with riprap, except for the final 7 feet extending into the river (see , Figure 3-7 in Chapter 3, "Project Description"). The outlet would be at an invert elevation of -12.37 feet NAVD88 to ensure compliance with National Pollutant Discharge Elimination System

permit temperature limitations, which derive from the State Water Resources Control Board's "Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California."

Modeling of the plume indicates that under all river flow and velocity conditions, the effluent discharged would reach the surface of the river within a short distance from the outfall (i.e., less than 100 feet), at which point the cross-sectional area of the plume would cover less than 3 percent of the total cross-sectional area of the channel.

Consequently, in the near-field area immediately adjacent to the outfall, more than 97 percent of the river channel cross-section would be unaffected by the plume, and ample zones of passage for fish past the warmest part of the plume would continue to be available at the new outfall. When the plume reaches the river water surface, it would spread laterally and longitudinally in the upper feet of the water column until the temperature cools to within a few degrees of river background, at which point it has lost enough of its temperature-driven buoyancy property to begin mixing vertically downward into the water column as well.

As fish move past the outfall itself, they most likely would pass through portions of the water column unaffected by the plume (i.e., greater than 97 percent of the river channel cross-section). If fish move through the plume near the outfall, they would pass through it in a matter of seconds because of its small size near the outfall (i.e., tens of feet in diameter). The effluent that has reached the surface would mix primarily laterally and longitudinally. Because of its buoyancy, the effluent would mix to a limited degree vertically in the water column until it has cooled sufficiently to begin vertical mixing. Examples of the small size of the thermal plume close to the outfall and the zones of passage within the channel described above can be seen in the median-case and worst-case (slack tide) scenarios for November and March presented in the Figures below.

All three panels in Figure 4.3-1 show that the plume temperature would rapidly attenuate within the initial 25 feet from the outfall pipe, to within about 1–2 degrees Fahrenheit (°F) of river background. Where the most rapid initial temperature attenuation would occur, within about 10–15 feet of the outfall, the plume would occupy a very small portion of the water column, leaving the vast majority of the channel cross-section unaffected by the plume; thus, the plume would be easily avoided by immigrating adult fish. Most immigrating adult fish would never be exposed to plume temperatures that are substantially above river background temperatures nearest the outfall because substantial zones of passage exist within the channel here.

When adult fish moving low in the water column, for example, approach the outfall, they may encounter unfavorably high water temperatures if they swim directly into the plume, near the eastern bank. Numerous studies have shown that, when presented with a range of temperatures, fish will seek a temperature that is preferred and will not submit themselves to temperatures sufficiently high to cause adverse physiological effects (Cherry et al. 1975; Gray et al. 1977; Biro 1998). Therefore, these fish would move either laterally or vertically within the river channel until they encounter a migration pathway having suitable temperatures or they enter into the unaffected zone of passage. In doing so, they could continue along a selected channel migration route that would expose them to temperatures less different, or even no different, from river background. In either case, if fish "drift" back toward the affected area of the plume before passing the outfall, the same behavioral response would be repeated until the migrating fish was past the diffuser.

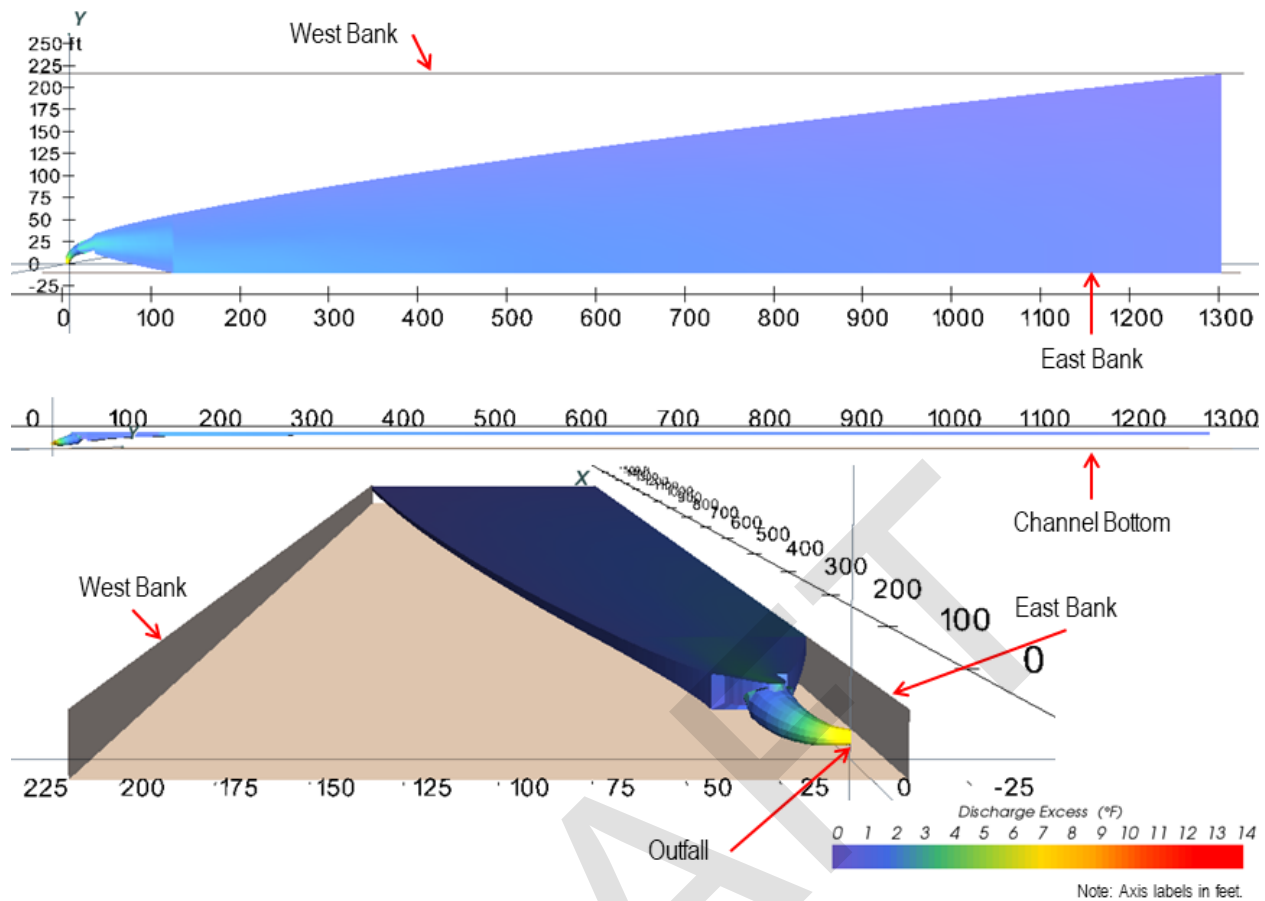


Figure 4.3-1 November Median-Case Thermal Plume, Based on Effluent Temperature of 75.9°F, River Temperature of 61.9°F (14.0°F Temperature Differential), Effluent Flow of 52.0 mgd, and River Velocity of 0.71 fps

Under slack-tide conditions (Figure 4.3-2), fish immigrating or emigrating past the outfall close to the east bank most likely would pass over the top of the warmest portion of the thermal plume. Fishes that emigrate along the river bottom would pass through the plume in a matter of seconds because the plume would be only about 15–20 feet wide along the river bottom in the eastern half of the river channel. When the buoyant plume rises to the surface, it would spread laterally, and the elevated temperature plume would remain in the upper few feet of the water column until it cooled to within a few degrees of background, at which point it would again mix deeper into the water column, continuing to attenuate its temperature with increasing distance from the outfall. Hence, during slack tide conditions, fishes immigrating upstream or emigrating downstream past the outfall in the western half of the river channel would pass underneath the plume unless they were moving in the upper few feet of the water column. Those fish moving through the upper few feet of the water column would encounter temperatures within 1–2°F of river background (Figure 4.3-1). Because the movement of the plume would fall below 0.05 feet per second between 75 and 100 feet from the outfall under worst-case November slack-tide conditions (Figure 4.3-2), CORMIX is not able to model its dispersion; hence, the graphical depiction of the plume stops here.

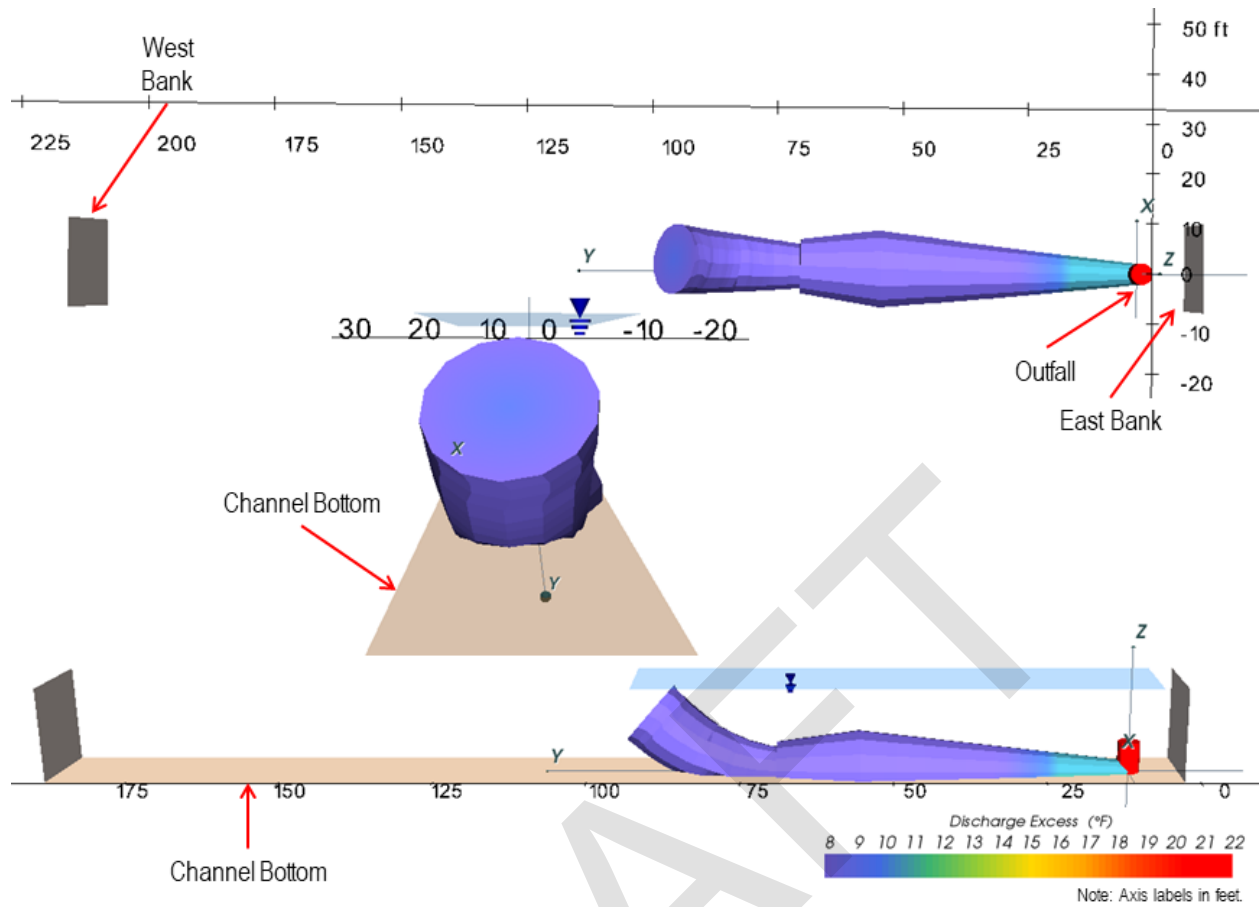


Figure 4.3-2 November Worst-Case Thermal Plume, Based on Effluent Temperature of 74.4°F, River Temperature of 52.9°F (21.4°F Temperature Differential), Effluent Flow of 48.7 mgd, and River Velocity of 0.05 fps

The median-case (Figure 4.3-3) and worst-case (Figure 4.3-4) thermal plumes would be very similar in geometry within the channel during March, and during other months of the year (Appendix A), with the thermal gradients across the plume changing based on river background temperatures and effluent temperatures. Substantial zones of passage where the river would be unaffected by the plume would exist in all months of the year based on the physical nature of the outfall and river channel.

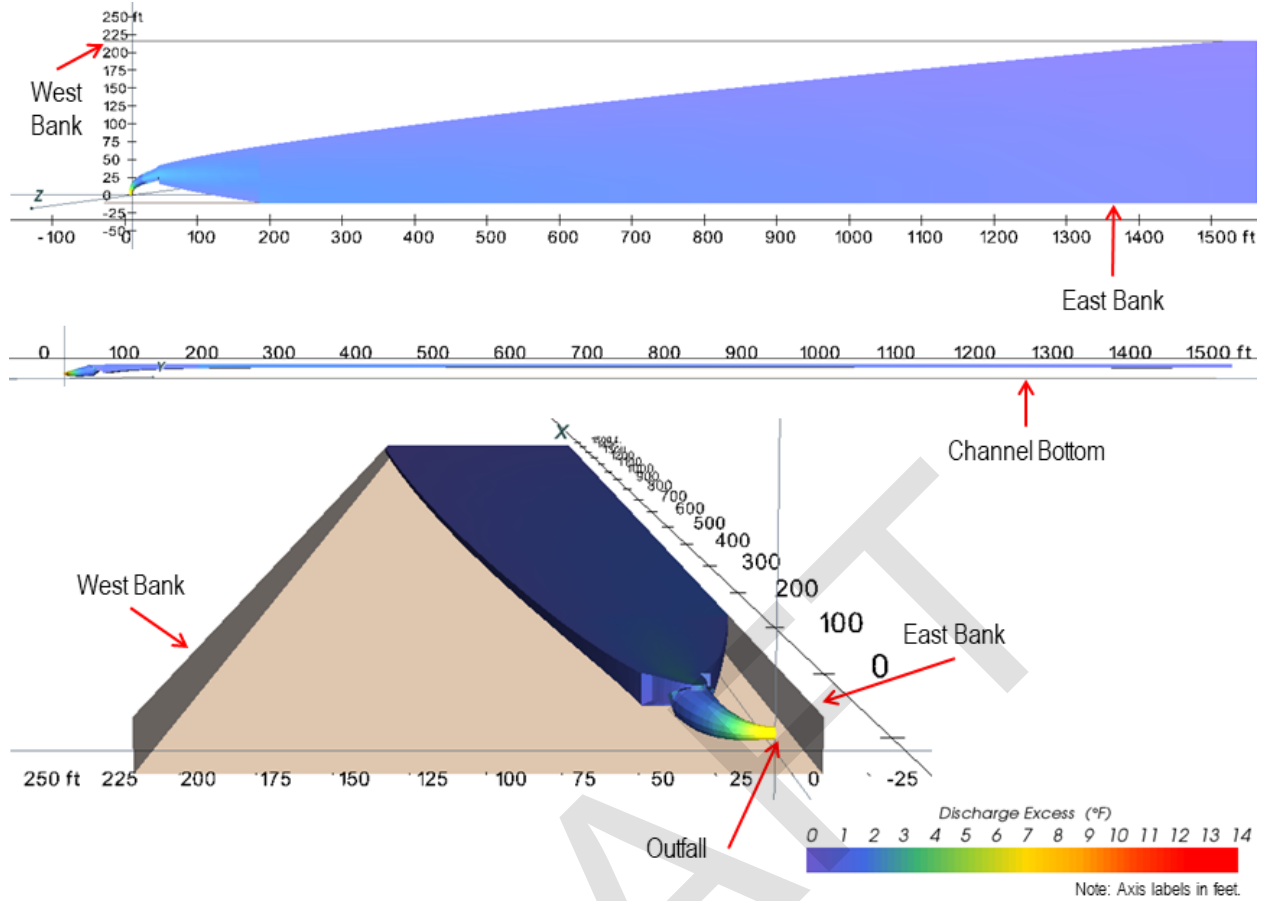


Figure 4.3-3 March Median-Case Thermal Plume, Based on Effluent Temperature of 74.6°F, River Temperature of 61.2°F (13.4°F Temperature Differential), Effluent Flow of 32.2 mgd, and River Velocity of 0.86 fps

During the warmest months of June through September (not modeled), when the median difference between effluent and river background temperatures is only 3–5°F, the geographic shape of the plume would remain similar to that shown in Figure 4.3-3. However, the greatest elevation in river temperature in the plume would be only 1–3°F and would occur only within feet of the outfall, with river temperatures being elevated about 1°F or less within about 25–50 feet of the outfall. In short, when both river and effluent temperatures are similar during the summer months, very little thermal plume exists within the river. In fact, on some occasions during these summer months, the effluent temperature can be colder than river background temperatures.

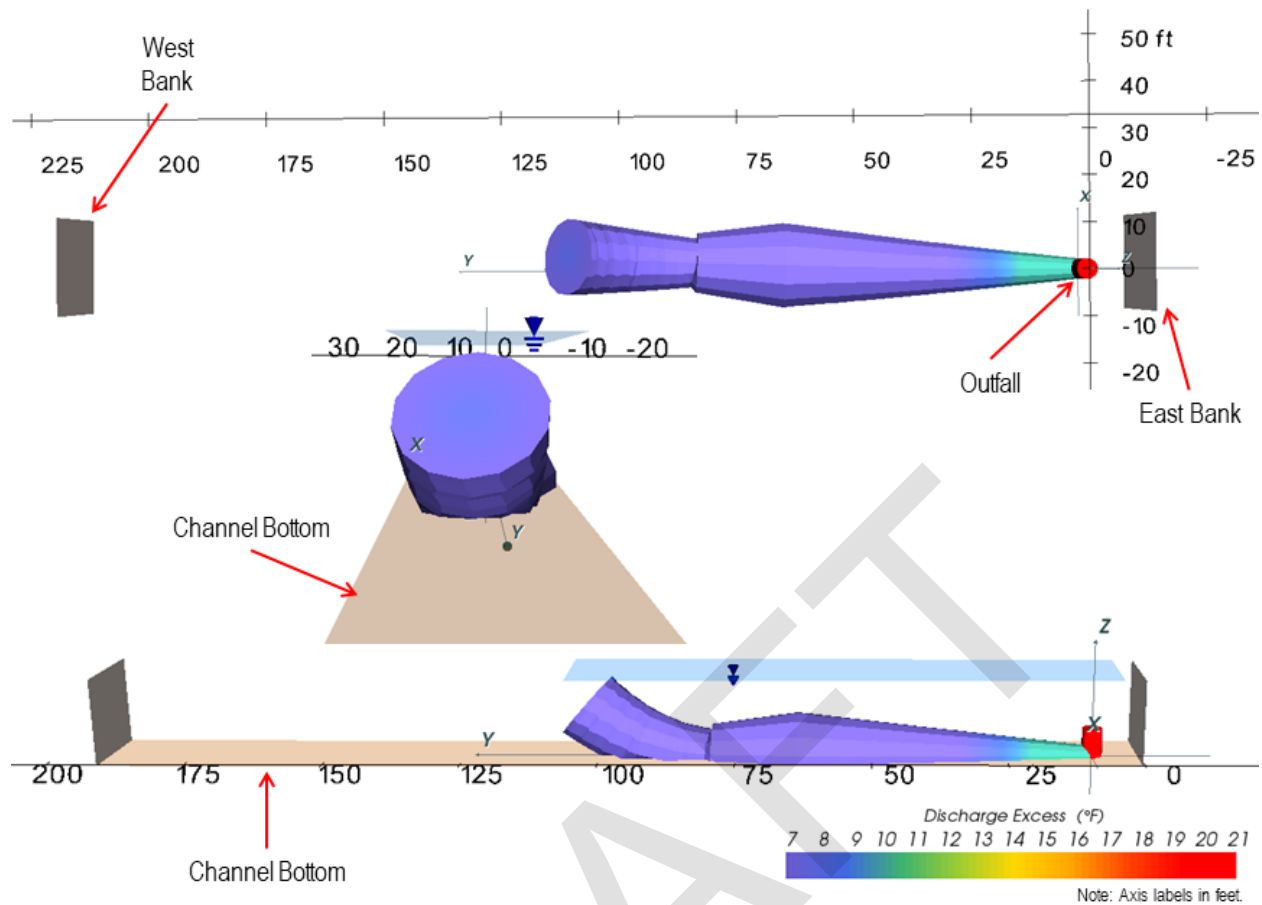


Figure 4.3-4 March Worst-Case Thermal Plume, Based on Effluent Temperature of 69.6°F, River Temperature of 49.5°F (20.1°F Temperature Differential), Effluent Flow of 52.0 mgd, and River Velocity of 0.05 fps

The primary project-driven changes in the thermal plume would be that the origin of the thermal plume would be moved 0.4 mile upstream from the existing plume and to the opposite (east) bank. The new outfall also would discharge RWCF effluent from a greater depth within the channel, closer to the river bottom. Nevertheless, the geographic shape of the thermal plume and the thermal gradients across the plume would remain very similar to those for the existing outfall. Moreover, the plume would continue to cover a very small percentage of the overall cross-sectional area of the river where temperature gradients are greatest nearest the outfall. For these reasons, adult and juvenile resident fishes moving upstream and downstream past the outfall and adult immigrating and juvenile emigrating anadromous fishes, including special-status species, moving through this reach of the San Joaquin River would continue to have ample zones of passage unaffected by the plume. Consequently, the movement of the outfall (i.e., origin of the plume) and the minor changes in internal thermal plume temperatures that would occur because of differences in channel geometry and outfall pipe size would not block or substantially delay the movement of any native resident or migratory fish species, including any special-status species, past the RWCF outfall. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4.3-5: Potential for the RWCF Effluent Discharge to Cause Mortality or Chronic Adverse Sublethal Effects on Fish, Phytoplankton, Zooplankton, or Macroinvertebrates Moving through the Thermal Plume

Most fish moving through the river reach where the new (east bank) outfall would be located would never encounter the thermal plume because of its small size within the channel. Adult and juvenile migrating fishes, and resident fishes moving locally, that move near the outfall would be able to choose either to move through the thermal plume in seconds to minutes or to move around the plume. Phytoplankton, zooplankton, and invertebrates that drift through the plume would not experience thermal conditions within the plume that exceed their upper thermal tolerances. For these reasons, the plume would not cause lethality to or population reductions for these organisms. For larval fishes drifting through this river reach, most would not encounter the plume. For those that do, they would move through the plume in seconds to minutes under conditions that do not exceed their thermal tolerances; thus, the plume would not cause lethality or any chronic, adverse sublethal effects. Consequently, the existence of the thermal plume within the river would not cause sufficient temperature-related effects to cause population reductions for fish, phytoplankton, zooplankton, or BMI. This would be a **less-than-significant** impact.

This impact assessment addresses the effects that the thermal plume created by the RWCF discharges before effluent fully mixes across the river channel could have on fish, phytoplankton, zooplankton, and macroinvertebrates that pass through the warmest portions of the plume. Effects on fish prey organisms (i.e., phytoplankton, zooplankton, and macroinvertebrates) are also assessed in terms of their effects on the quantity and value of critical habitat that has been designated for ESA-listed green sturgeon, steelhead, and delta smelt, which includes the project reach of the San Joaquin River. Finally, the energetic expenditures of fish altering their migration routes because of the thermal plume are assessed.

CORMIX modeling of the RWCF discharge to the San Joaquin River from the new (east bank) outfall was performed for project conditions on a worst-case and median-case basis for the months of March, April, May, October, and November. Worst-case and median-case scenarios were modeled because they “book end” the worst-case half of all plume conditions that can occur in the river over time. From an assessment standpoint, if no significant adverse thermal effects on fishes, plankton, or BMI would occur for either the worst-case or the median-case scenarios (i.e., the worst-case half of all possible plume conditions), then there would be no adverse effects caused by the best-case half of plume conditions, in which thermal gradients across the plume would be less than those modeled and assessed for the worst-case half of conditions. Likewise, from a fish assessment standpoint, if no significant adverse effects on Chinook salmon and steelhead (the most thermally sensitive fish species in the river) would occur from passing through the plume, then it can be concluded that there would be no adverse effects on any fish species that are less thermally sensitive than these salmonid species.

The months modeled include key juvenile emigration and adult immigration months for spring-run Chinook salmon, steelhead, green sturgeon, and delta smelt, which are all ESA-listed species. These months also characterize the thermal gradients (i.e., degrees above river background) that would occur across the plume in other months of the year. For example, background river temperatures for the months December through February are colder than those for November, making November a conservative assessment month (for thermal effect) for this period. During the warmest months of June through September (not modeled), when the median difference between effluent and river background temperatures is only 3–5°F, the geographic shape of the plume remains similar to those shown for the months modeled because it is primarily the river channel geometry, outfall pipe diameter and depth, and river and effluent flow rates that affect plume geometry. Hence, in summer, the greatest elevation in river temperature in the plume is only 1–3°F and would occur only within feet of the outfall, with river temperatures being elevated about 1°F or less within about 25–50 feet of the outfall. In short, when both river and effluent temperatures are similar during the summer months, very little thermal plume exists within the river. In fact, on some occasions during these summer months, the effluent temperature can be colder than river background temperatures, resulting in the plume being characterized by slightly cooler water.

Fish: Thermal Effects

Fish lethality, loss of equilibrium, or short-term energetic and metabolic effects could theoretically occur if plume temperatures reach sufficiently high levels relative to the species' and life stage thermal tolerance limits as they relate to plume thermal exposure scenarios (i.e., temperatures and times of exposure). If plume temperatures and exposure times do not exceed effect thresholds, then fish that migrate through the plume would not be expected to experience any chronic adverse sublethal physiological or behavioral effects because the short exposure time to elevated plume temperatures would not be sufficiently long to result in such adverse chronic effects.

Adult Chinook salmon immigrating upstream past the outfall, steelhead migrating upstream and downstream past the outfall, and juveniles of these species emigrating downstream may encounter the thermal plume at and near the new outfall, where they may encounter a gradient of elevated water temperatures, relative to river background temperature, across a portion of the channel cross-section occupied by the thermal plume. Thermal effects on adult fish immigrating and juvenile fish emigrating through the warmest portions of the thermal plume are discussed in detail below for the months of the year, with a focus on the most thermally sensitive species of Chinook salmon and steelhead. Green sturgeon and delta smelt are also addressed in these analyses because of their ESA-listed status. However, compared to the salmonid species, they are either similarly tolerant (delta smelt) or more thermally tolerant (green sturgeon).

Adult Upstream Immigration

For fishes migrating upstream from where the effluent has fully mixed with the river's flows, temperatures would initially differ little from background river temperatures. As the fish continue to move upstream toward the outfall, they would eventually encounter waters within the plume that are detectably warmer than river background, with an increasing gradient of more elevated temperature as the fish moves over the final tens of feet toward the outfall. Once past the outfall, upstream-immigrating fishes would immediately reenter river background temperatures to which they are acclimated as they move upstream from the plume.

In some flood-tide scenarios in which the river flow reverses and flows upstream (south), the plume would be located to the south of the outfall. Immigrating adult fish moving north to south may encounter the warmer portion of the plume first (going from a portion of the river unaffected by the discharge into the plume near the outfall), followed by rapidly exiting the plume and continuing their migration through a zone of passage unaffected by the discharge. Alternatively, fish may take an immigration route that takes them through the center of the plume, where temperatures would become rapidly reduced with increasing distance from the outfall.

November through February

Figure 4.3-1 provides a graphic depiction of the median-case project thermal plume for November effluent and river flow and temperature conditions. The temperature differential (calculated as $\text{temperature}_{\text{effluent}} - \text{temperature}_{\text{river}}$) primarily dictates the thermal gradient that exists within the initial 100 feet from the outfall pipe. As stated above, channel geometry, outfall pipe diameter and depth, and effluent and river flows primarily affect the shape of the plume within the channel.

All three panels in Figure 4.3-1 show that the plume temperature is rapidly attenuated within the initial 25 feet from the outfall pipe, to within about 1–2°F of river background. Where the most rapid initial temperature attenuation occurs, within about 10–15 feet of the outfall, the plume occupies a very small portion of the water column, leaving the vast majority of the channel cross-section unaffected by the plume; thus, the plume would be easily avoided by immigrating adult fish.

Nevertheless, if immigrating Chinook salmon or steelhead swim through the plume within about 25 feet of the outfall pipe, where temperatures are substantially higher than river background temperatures, fish would pass through the small footprint of the plume that exists here in a matter of seconds because the plume is extremely small in diameter this close to the outfall (Figure 4.3-1). River background temperature for this median scenario in November is in the low 60s (°F). Adult fish that swim through the plume close to the outfall would encounter plume temperatures up to about 7°F above river background temperatures and thus in the high 60s (°F) (see yellow color closest to outfall pipe in Figure 4.3-1). Hence, even the warmest portion of the plume shown in the graphic would remain in the high 60s (°F). Based on Chinook salmon and steelhead thermal tolerances (Tables 4.3-3 and 4.3-4), no thermal effect on

immigrating adult fish acclimated to temperatures in the low 60s (°F) would occur when these fish swim through a small plume of water in the high 60s (°F), passing through it in a matter of seconds.

The same can be said for steelhead immigrating through the area in January and February, fall-run Chinook salmon in November through January, any early immigrating spring-run Chinook salmon in February, green sturgeon and delta smelt in February, and other fishes that immigrate through a similar plume in December through February, when temperatures differentials would be similar. This is because the exposure scenarios would be similar in December through February, with somewhat colder background and plume temperatures during these winter months. Nevertheless, plume temperatures, including those near the outfall pipe, would remain well within the thermal tolerances of steelhead and Chinook salmon (Tables 4.3-3 and 4.3-4) and thus within those of all other fish species that are more thermally tolerant as well.

Figure 4.3-2 provides a depiction of the “worst-case” November thermal plume that could occur for the project under slack-tide conditions. Evident in Figure 4.3-2 is that CORMIX’s graphical depiction of the plume stops at approximately 100 feet from the outfall. When river directional velocity falls below a minimum threshold, the model is no longer able to simulate plume dispersion and mixing within the channel. Nevertheless, the warmest portion of the worst-case plume is shown and thus used for assessment purposes.

Because the river velocity modeled is approaching zero, the velocity of the effluent leaving the pipe pushes the effluent plume straight across the channel toward the west bank. This occurs because there is insufficient river flow velocity in a downstream direction to “bend” the plume downstream, as is shown in the November median scenario (Figure 4.3-1). In addition, the plume stays along the river bottom for the initial 85 feet from the outfall because of the depth of the outfall, before its warmer temperature and buoyancy cause it to rise up off the bottom. The initial portion of the plume shown in Figure 4.3-2 is small in diameter, and temperatures in the plume shown cool to within about 8°F of river background within about 30 feet of the outfall pipe. Absolute temperature within this initial portion of the plume would be in the mid-60°F range or lower, as the river background temperature modeled is 52.9°F.

The plume would reach the surface between about 75 and 100 feet from the outfall pipe. Once at the surface, the effluent would disperse rapidly in all directions, forming a “mushroom-like” plume near the outfall during such slack-tide conditions. The effluent would continue to cool rapidly as it mixes with river water and becomes exposed to ambient air temperatures at the surface. Temperatures are expected to attenuate to within a couple of degrees or less of river background within about 300–400 feet of the outfall, based on the nature of plume dispersion relative to that shown for the median scenario and the typically short duration of slack tide conditions in this reach of the San Joaquin River.

Adult fish immigrating in the lower portion of the water column within about 85 feet of the east bank under slack tide conditions could pass directly through the plume. Because the plume’s width here would be only about 20 feet or less, immigrating adult fish would pass through the plume in a matter of seconds. Fish immigrating along the river bottom in the western half of the channel would not encounter the plume; rather, they would pass alongside it or beneath it (Figure 4.3-2).

Adult fish immigrating in the upper portion of the water column within the eastern half of the river channel as they approach the outfall would pass over the plume or through the plume if immigrating near the center of the channel. Those fish immigrating in the western half of the channel that encounter the plume would encounter plume temperatures that are only a few degrees or less above river background because of the physical distance from the outfall and the cooling that occurs over that distance (see Figures 4.3-1 and 4.3-2).

Because the 21.4°F temperature differential for this worst-case scenario is greater than the 14°F differential modeled for the median scenario, and because there is almost no river velocity to aid in effluent mixing and thermal attenuation under slack-tide conditions, the gradation of temperature across the initial 100 feet of the plume is notably higher in this worst-case November plume compared to the median-case November plume. The majority of the warmest portion of the plume, within 100 feet of the outfall pipe, would have absolute temperatures in the 60s (°F), with river background temperatures in the mid-50s (°F). Immigrating adult Chinook salmon and steelhead, acclimated to temperatures in the mid-50s (°F), would pass through this warmest portion of the plume within seconds because of its small size. Based on their thermal tolerances, no thermal effect on immigrating adult Chinook

salmon and steelhead acclimated to temperatures in the mid-50s (°F) would occur when these fish swim through a small plume of water in the 60s (°F) in a matter of seconds (Tables 4.3-3 and 4.3-4). Hence, despite the worst-case thermal plume under near slack-tide conditions occupying a different shape within the channel compared to the plume that occurs under median temperature and flow conditions, adult immigrating steelhead would be able to pass the worst-case thermal plume in November as they would pass the median scenario plume, without experiencing adverse thermal effects. The same is true for these or other fish species immigrating through both the median-case and worst-case thermal plumes during the months of December through February, when river background and effluent temperatures would be colder.

Because the river is tidal at the outfall location, the river can flow in a downstream (north) or upstream (south) direction. For the same temperature differentials and effluent and river flow conditions presented and discussed above for net flow in the downstream (north) direction, the plume would look virtually the same if the net river flow were to be in the upstream (south) direction. The plume would simply exist upstream (south) of the outfall pipe rather than downstream (north) of it. Although channel topography differs somewhat upstream from the outfall versus downstream from the outfall, they are sufficiently similar that topography would not change the plume footprint upstream from the outfall substantially from that presented and discussed downstream from the outfall. Consequently, the above assessment for the median scenario when net river flow is in the downstream (north) direction under an ebb tide also reasonably represents the plume for the same temperature differential and effluent and river flows when the net river flow is in the upstream (south) direction under a flood tide, assuming similar river velocities. Consequently, the same findings regarding thermal effects on the species assessed would apply for this reverse-flow scenario.

Following full tidal reversal, and movement of river and effluent in the upstream direction, the previously discharged effluent that has fully mixed with the river flow downstream from the outfall now becomes "river background" for the upstream plume. This river water already has effluent fully mixed and thus may be warmer than river water miles upstream from the outfall. Project temperature increases at the location where effluent is initially fully mixed with river flows were estimated to be a few tenths of a degree during the April through October period of the year and from tenths of a degree up to about 1.0°F to 1.5°F during the November through March period of the year. Because project river temperatures from November through March at the outfall location range from the low 50s (°F) to the mid-60s (°F), adding tenths of a degree up to a little more than 1°F to river background temperatures to account for the tidal effects on background river temperature results in no change to the findings made above.

There is no similar change for the worst-case plume presented for slack-tide conditions. This plume would look the same under slack-tide conditions regardless of the prior direction of net river flow. For this reason, only one worst-case, slack-tide condition exists for each month.

Based on the above assessment findings, thermal plumes that would occur in the months of November through February within the project area would not cause lethality to or chronic adverse sublethal thermal effects on adult steelhead or Chinook salmon immigrating past the outfall. Because these are the most thermally sensitive fishes using the river, it can be concluded that the November through February thermal plumes also would not cause lethality to or any adverse chronic sublethal effects on delta smelt, green sturgeon, or any other fish species moving upstream past the outfall during these months of the year.

March, April, and May

Figure 4.3-3 and Figure 4.3-4 show the median-case and worst-case thermal plume scenarios, respectively, for the project condition in March—a key month of adult immigration for steelhead, spring-run Chinook salmon, green sturgeon, and delta smelt. Table 4.3-8 summarizes the CORMIX input parameters modeled for November versus March. Model input parameters are very similar between the November and March modeled scenarios, with the exception that the worst-case condition effluent temperature for March is 69.6°F versus 74.3°F for November.

The result is that the median-case (Figure 4.3-3) and worst-case (Figure 4.3-4) condition thermal plumes in March are very similar in size, shape, and thermal gradients compared to the median-case and worst-case thermal plume conditions already analyzed above for November (Figures 4.3-1 and 4.3-2). Differences in plume characteristics are

slight and include distance downstream at which the plume spreads across the entire width of the channel at the surface and the exact distance downstream to reach specified temperatures within the plume.

Based on this high degree of similarity between modeled March and November thermal plumes (where the November plumes represented plumes that can occur throughout the November through February period), the assessment findings regarding thermal plume effects on adult immigration lethality and chronic adverse effects made based on the November plumes assessed for steelhead and Chinook salmon also apply for these and other less thermally sensitive species immigrating through the reach during March.

The worst-case thermal plumes that would occur for the project in April and May differ little from those presented above for March and in fact have somewhat lesser thermal gradients across the initial portion of the plume because worst-case temperature differentials in April and May are smaller than those modeled for November and March (Table 4.3-8 and Appendix A). River background temperatures for the worst-case scenario in April and May, where the temperature differential was set to the monthly maximum for the simulation period, remain in the 50s (°F), which is similar to that defined for March and November.

A key difference for the median-case plume condition modeled for April and May is that the river background temperatures have increased from the low 60s (°F) set for November and March to 68.3°F in April and 69.4°F in May. Based on this, the warmest portion of the plume close to the outfall pipe in April and May that has temperatures about 6°F higher than river background temperatures (Appendix A) would have absolute temperatures in the mid-70s (°F). Based on the thermal tolerances of steelhead, Chinook salmon, green sturgeon, and delta smelt, exposure to temperatures in the mid-70s (°F) for seconds for fish passing through the warmest portion of the plume, when acclimated to temperatures in the high 60s (°F), would not cause thermally induced lethality or any chronic adverse sublethal thermal effects. Again, the latter is true because the exposure to the warmest plume temperatures closest to the outfall is not sufficiently long to cause any chronic effects.

Based on the above assessment findings, thermal plumes that would occur in the months of March through May within the project area would not cause lethality to or chronic adverse sublethal thermal effects on adult steelhead or Chinook salmon immigrating past the outfall. Because these are the most thermally sensitive fishes using the river, it can be concluded that the March through May thermal plumes also would not cause lethality to or any adverse chronic sublethal effects on delta smelt, green sturgeon, or any other fish species moving upstream past the outfall during these months of the year.

June through October

Although adult steelhead are reported to immigrate through the project area as early as July, they are believed to do so only in July, August, and September, when hydrologic and temperature conditions are conducive to do so. Delta smelt may immigrate through the project area as late as June and green sturgeon as late as July in some years.

Because project discharges during these months elevate river temperatures by about 5°F or less within feet of the outfall, with plume temperatures being reduced to about 1°F within about 50 feet or less of the outfall, project discharges would not significantly reduce the percentage of time that river temperatures are conducive for adult steelhead immigration during these months. When river background temperatures during these months are in the mid- to upper 70s (°F), little steelhead immigration through the project area is expected to occur. Nevertheless, if any steelhead immigrate through the project area under such conditions, the thermal plume that exists under these conditions would be similar in shape and size to those presented and discussed above close to the outfall. However, the warmest portion of the plume closest to the outfall pipe would be only a couple of degrees warmer than river background because of the small temperature differentials during the June through September months. Temperatures in the more distant reaches of the plume (i.e., more than about 50–75 feet from the outfall) would differ from river background temperatures by just tenths of a degree.

Substantial steelhead immigration begins in October annually. Both the worst-case and the median-case thermal plumes in October would have a size, shape, and thermal gradient similar to those discussed above for November (Appendix A).

For the median-case condition plume, river background temperatures would be in the low 70s (°F), with a temperature differential of about 10°F (Appendix A, October median case). Because of the low temperature differential and the rapid attenuation of effluent temperatures within the river channel, plume temperatures would be within about 1°F of river background (i.e., low 70s [°F]) within about 50–75 feet of the outfall and would be reduced further with increasing distance downstream (Appendix A, October median case). Such small temperature increases within much of the plume would be expected to have little effect on the migration route of adult steelhead. The warmest portion of the plume at the outfall would be $\leq 5^\circ\text{F}$ above river background temperatures, which results in absolute temperatures in this portion of the plume being about 77°F (Appendix A, October median case). Immigration by adult steelhead through the warmest portion of the plume near the outfall, where the plume diameter is 5–10 feet, would take just seconds. Exposure of adult steelhead acclimated to temperatures in the low 70s (°F) to temperatures in the warmest portion of the plume that are in the upper 70s (°F) for just seconds would not be lethal and would not result in any chronic adverse sublethal thermal effects on immigrating fish. The same is true for fall-run Chinook salmon moving through the area in October.

For the October worst-case plume condition, the maximum temperature differential of 18.5°F exists when effluent temperatures are about 80°F and river background temperatures are about 62°F (Table 4.3-8 and Appendix A). This results in a worst-case thermal plume within the outfall area very similar to that of November but where river background temperatures are in the low 60s (°F) in October versus the low 50s (°F) in November. Absolute temperature within this initial portion of the plume would be $\leq 72^\circ\text{F}$. Adult steelhead and fall-run Chinook salmon acclimated to temperatures in the low 60s (°F) that move through the warmest portion of the plume would be exposed to temperatures in the low 70s (°F) for seconds. This thermal exposure would not cause lethality to or any chronic adverse effects on these species.

Based on the above assessment findings, thermal plumes that would occur in the months of June through October within the project area would not cause lethality to or chronic adverse sublethal thermal effects on adult steelhead or Chinook salmon immigrating past the outfall. Because these are the most thermally sensitive fishes using the river, it can be concluded that the June through October thermal plumes also would not cause lethality or any adverse chronic sublethal effects on delta smelt, green sturgeon, or any other fish species moving upstream past the outfall during these months of the year.

Juvenile Emigration

Like upstream immigrating adult fish, juvenile fish emigrating downstream would likely pass the new outfall via a zone of passage that is unaffected, or minimally affected, by the thermal discharge. Those fish migrating in the mid-to-lower water column near the eastern bank of the river that move through the thermal plume as they pass the outfall would be subjected to one of two possible thermal exposures. The first is when there is net flow in a downstream (north) direction. In this case, fish would be subjected briefly to an abrupt and substantial increase in temperature upon encountering the warmest portion of the plume, followed by a gradient of rapidly decreasing temperatures as the thermal plume mixes with river water, thereby causing temperatures to become attenuated, ultimately returning to within 1°F or less of background temperatures. This type of exposure, commonly referred to as thermal shock when the temperature increase is substantial, could have adverse effects, particularly if the exposure temperatures are outside the range of the thermal tolerance for the species and life stage. At slack tide, a very similar thermal exposure scenario would occur, particularly for fish emigrating through the lower portion of the water column. However, in the slack-tide scenario, fishes would move through the plume near the outfall and reenter a portion of the channel unaffected by the plume if they maintained their migration route through the lower portion of the water column. This is because the plume exists perpendicular to the long-axis of the river channel under slack-tide conditions. Hence, their exposure to the plume would be very brief (i.e., seconds).

The second exposure scenario exists on a flood tide when the thermal plume moves upstream (south) of the outfall on a reverse-flow and emigrating fish are coming from the south. These fish would initially encounter the far reaches of the plume where temperatures are elevated only tenths of a degree above background. As fish move closer to the outfall, they likely would encounter zones of passage and avoid passing through the warmest portion of the plume. Those fish migrating near the eastern bank of the river under this scenario would experience increasing temperatures as they get closer to the outfall, followed by a rapid return to background temperatures after they pass the outfall.

Although these two thermal exposure scenarios differ, both can be similarly evaluated primarily because the length of time that fish would be exposed to plume temperatures would be short, and the time exposed to plume temperatures multiple degrees above river background nearest the outfall would be very short—on the order of tens of seconds in most cases and less than 1 minute under worst-case, slack-tide conditions.

Thermal shock and upper incipient lethal temperature (UILT) studies typically expose fish to abrupt changes in water temperatures. However, many published UILT studies expose test organisms to periods of elevated constant temperatures for long periods (e.g., hours or days). In the absence of short-term acute thermal shock data for a given species or life stage, thresholds derived from UILT or critical thermal maximum studies may be considered as a conservative estimate of the potential risk associated with short-term (e.g., seconds or minutes) exposure to a given temperature or temperature difference.

Hart (1947, cited in Hokanson et al. 1977; 1952, cited in Hokanson et al. 1977) reported that most fish species can tolerate short-term increases in temperature of 27–32 °F above acclimation temperature, provided that the higher exposure temperature is below the lethal threshold for the species. EPA (1973) states that moderate temperature fluctuations can generally be tolerated as long as a maximum upper limit is not exceeded for long periods. This is supported by more recent work conducted by Cech et al. (1990), where several species of native California fishes were acclimated to certain temperatures (i.e., 50°F, 59°F, 68°F, 77°F, 86°F) and then exposed to a 9°F temperature increase over a 3- to 5-hour period. Findings from this study showed that fish metabolic rates were generally, but not always, elevated following such rapid changes in temperature but that mortality did not occur unless the elevated temperature to which fish were rapidly exposed was at or higher than their UILT. Metabolic rates would return to normal background levels when fish were returned to their acclimation temperatures.

The juvenile life stages of Chinook salmon and steelhead have thermal tolerances similar to those of adults (Table 4.3-4). Considering the first juvenile emigration exposure scenario identified above, and the geographic shape, size, and thermal gradients across the plume established above for adult immigration, exposure of downstream-moving juvenile salmonids to the highest plume temperatures would typically occur for only seconds before the fish would exit the plume into a portion of the river unaffected thermally by the discharge. Exposure to the portion of the plume closest to the outfall for a matter of seconds would not cause lethality to or adverse chronic effects on emigrating salmonids during any month of the year (Table 4.3-8 and Appendix A). In some cases, emigrating juveniles may take a line of travel where they would continue to move through the plume where temperature would rapidly reduce with increasing distance from the outfall, until plume temperatures were within about 1°F of river background within about 25–100 feet of the outfall, depending upon month of the year and effluent and river flow and temperature conditions. Nevertheless, in this case, juvenile emigrants would still be exposed to multi-degree elevated plume temperatures for seconds to a few minutes.

Such thermal exposures of juvenile Chinook salmon and steelhead to the RWCF plume would not result in lethality or any chronic adverse sublethal thermal effects because the exposures to temperatures substantially above their acclimation temperatures within the plume would be too short to cause thermally induced lethality or any chronic adverse sublethal effects. Because these species are the most thermally sensitive of all river fishes, and because other species emigrating past the outfall would have similar thermal exposure scenarios, it can be concluded that no lethality or chronic adverse sublethal thermal effects would occur for juvenile delta smelt, green sturgeon, or any other species' early life stages moving past the outfall (Tables 4.3-2 through 4.3-6). Any minor increase in fish metabolic rate that could occur from the short-term exposure to elevated plume temperatures would quickly return to baseline levels after fish reach the downstream portions of the plume and fully mixed condition where temperatures have returned to near-background levels.

Based on the above assessment findings, thermal plumes that would occur in the project area throughout the year would not cause lethality to or chronic adverse sublethal thermal effects on juvenile steelhead or Chinook salmon emigrating past the outfall. Because these are the most thermally sensitive fishes using the river, it can be concluded that the thermal plumes also would not cause lethality to or any adverse chronic sublethal effects on juvenile emigrating delta smelt, green sturgeon, or any other fish species moving downstream past the outfall during any month of the year.

Fish: Energetic Effects

Most fish immigrating past the new (east bank) outfall and associated thermal plume would not be expected to alter their migration route past the outfall because of the thermal plume. Nevertheless, if the thermal plume causes immigrating adult green sturgeon, steelhead, spring-run and fall-run Chinook salmon, or delta smelt to alter their migration route past the outfall to avoid large temperature differentials, such course change(s) within the channel would be small in nature (i.e., 20–50 feet or less). The extra energetic output immigrating adult or emigrating juvenile fish may expend to make such an alteration to their migration route within the channel near the outfall would be negligible and thus inconsequential relative to the energetic expenditures these fish make for their overall migrations. Therefore, any minor alteration to fish migration routes would not have a substantial effect on the metabolic energy reserves of the fish that use the river for adult upstream migrations to spawning areas and juvenile emigrations to downstream rearing sites. These minor additional energetic expenditures would not affect the survival of individual adult or juvenile fish migrating past the outfall, nor would such movements adversely affect immigrating adult or emigrating juvenile fish in sublethal ways (e.g., adult fecundity or juvenile growth or predation avoidance). Consequently, the minor effects on immigrating fish energetic expenditures would have no population-level effects on these fishes. The same findings (i.e., lack of effects on individuals and no population-level effects) are made for more thermally tolerant non-special-status resident and introduced fishes passing through the reach of river where the proposed outfall would be located.

Downstream Drifting Larval Fishes, Phytoplankton, Zooplankton, and Benthic Macroinvertebrates

Larval fishes drifting downstream and phytoplankton, zooplankton, and detached and drifting BMI all move downstream with the currents and do not have the ability to choose their migration pathway, unlike mobile swimming fishes. Downstream-drifting organisms in the San Joaquin River (or organisms in the upstream tidal flow) may be briefly exposed to instantaneous increases in temperature of the RWCF effluent discharge plume.

The vast majority of these organisms would not encounter the thermal plume where temperature gradients are multiple degrees above river background, because of the small size of the RWCF discharge thermal plume, as described above. Nevertheless, some fraction of these organisms would drift through the plume. The amount of time that drifting organisms would take to pass through the plume's gradient of temperatures would vary based on river flow rate but is estimated to be seconds to minutes until they reach downstream areas where mixed temperatures differ little from river background temperatures. Based on the fish assessments provided above, the larval life stages of resident fishes that are more thermally tolerant than are salmonids would not experience lethality or any adverse chronic sublethal thermal effects from drifting through the plume.

Langford (1990) concluded that regardless of experimental data, short-term exposures to maximum temperatures that are below 95°F do not cause significant damage to entrained freshwater algae. Rajadurai et al. (2005) concluded that the growth rate of a diatom, *Amphora coffeaeformis*, cultured in 82.4°F waters was not significantly affected by temperature shock to 107.6°F for up to 45 minutes, and a second diatom, *Chaetoceros wighamii*, also cultured at 82.4°F, had a minimal reduction in growth when subjected to 107.6°F for 15 minutes (97 percent of control growth), 30 minutes (94 percent of control growth), and 45 minutes (89 percent of control growth). Kivivuori and Lahdes (1996) found that a water flea (*Daphnia magna*) cultured at 68°F had a median lethal temperature (i.e., the temperature that resulted in lethality to 50 percent of experimental organisms) of 94.6°F when subjected to an acute 24-hour heat exposure, and 100.0°F following a thermal shock for 15 minutes. Goss and Bunting (1976) determined that *Daphnia pulex* acclimated from 41 to 86°F and *Daphnia magna* acclimated from 50 to 86°F can withstand immersion for 48 hours or more in temperatures that differed from acclimation temperatures by 18°F or more without experiencing any appreciable mortality directly attributable to the temperature change.

Benthic organisms can acclimate to changes in temperature, and taxa, including those that are considered intolerant to mildly tolerant of environmental perturbation, are generally resistant to short-term, rapid changes in temperature. Wood et al. (1996) tested caddis and mayfly larvae for their response to rapid changes in temperature and found that with acclimation at 82.4°F, *Helicopsyche borealis*, a caddisfly, could withstand 1-hour thermal shocks of up to 101.3°F (median lethal temperature). This represents a temperature change of 19°F for a 1-hour exposure. Wood et al. (1996) suggested that the magnitude of the change in temperature is not as important

as the acclimation of the insects, the duration of the exposure to the higher temperature, and the absolute maximum temperature to which the BMI are exposed.

Based on the above-cited scientific literature regarding thermal shock studies for aquatic life that serve as the prey base for the listed fish species, it is determined that the small portion of the San Joaquin River's phytoplankton, zooplankton, and invertebrate populations that drift through the RWCF thermal plume for the project condition would not experience lethality or chronic, adverse sublethal effects. This is because movement through the largest temperature gradient portion of the plume (near the outfall) would take only seconds to minutes, based primarily on river velocity. In addition, the absolute temperatures to which phytoplankton, zooplankton, and invertebrates would be exposed would always be below their upper thermal tolerances.

Based on the above findings, the project thermal plumes that would exist within the project area would not cause mortality to or chronic, adverse effects on phytoplankton, zooplankton, or BMI exposed to the plume. Consequently, the prey base for ESA-listed fishes would not be adversely affected by the project plume temperatures. Project thermal plumes would not reduce the quantity or quality and thus value of the food resources PBFs for southern DPS green sturgeon designated critical habitat. For the same reasons, project plume temperatures would not be of sufficient magnitude to reduce the quantity or quality and thus value of the food resources aspect of the freshwater rearing sites PBFs designated for Central Valley Distinct Population Segment (DPS) steelhead critical habitat. Finally, project plume temperatures would not affect the PBFs of water, river flow, and salinity concentrations required to maintain delta smelt habitat for spawning, larval and juvenile transport, rearing, and adult migration.

When all assessments under this impact are considered together, it is concluded that the project would not cause water temperature increases in the thermal plume near the new (east bank) outfall that would cause mortality or chronic, adverse effects on fish, phytoplankton, zooplankton, or BMI exposed to areas of elevated river temperature within the plume. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4.3-6: Potential for the Abandoned-in-Place Outfall Structure to Affect Movements of Fishes or Increase Predation on Special-Status Fishes

The project would involve abandoning in place the existing west bank outfall structure, located below the river's water surface. Therefore, the two 48-inch-diameter outfall pipes would remain unchanged compared to existing conditions, except that RWCF effluent would no longer enter the river via these pipes. The continued existence of these submerged pipes on the west bank of the river would not provide any additional physical structure within the channel compared to existing conditions. Consequently, these pipes would not block or delay fish movement past the site or provide physical structure and associated hydraulic breaks for predatory fish to hold behind beyond that which presently occurs. This would be a **less-than-significant** impact.

As part of decommissioning the west bank tertiary treatment facilities, the project involves abandoning the existing outfall structure, located below the river's surface, in place. The existing RWCF outfall is composed of two parallel 48-inch-diameter pipes spaced approximately 10 feet apart on-center. Effluent is discharged through the outfall pipes via a siphon system. The invert elevation of each pipe is approximately -6.87 feet (NAVD88), with the crest elevations at -2.87 feet (NAVD88). Under mean water level conditions, the outfall pipes are submerged approximately 7 feet, placing them at about the middle of the water column at the outfall location. The pipes run down the west bank of the San Joaquin River following the slope of the bank until extending horizontally into the river cross-section a distance of 10 feet. The outfall apron consists of a 2-foot layer of riprap placed over a 25-foot by 15-foot area around the outfall pipes to protect the pipes from debris flows and scour.

The continued existence of these submerged pipes on the west bank of the river would not provide any additional physical structure within the channel compared to existing conditions. Consequently, these pipes would not block or delay fish movement past the site or provide physical structure and associated hydraulic breaks for predatory fish to hold behind beyond that which presently occurs. Hence, the abandonment in place of the existing outfall

structure would have a **less-than-significant** impact on movement of fishes past the site and predation on special-status fishes at the site.

Mitigation Measures

No mitigation is required.

Impact 4.3-7: Potential for the New East Bank Outfall Structure and Thermal Plume to Cause Increased Predation on Special-Status Fishes

The new (east bank) outfall would provide a small area within the channel for striped bass and other predatory fishes to hold behind. Studies of larger thermal plumes downstream from wastewater discharges in the Delta have not found the existence of the thermal plume itself to attract predatory fishes and increase predation substantially at the site. The geographic size and thermal gradients across the plume of the new outfall would be similar to those that currently exist for the (west bank) outfall. Hence, the thermal plume associated with the new outfall would not cause a predation "hot spot" in the river and would not be expected to increase predation rates on emigrating juvenile ESA-listed and other special status fishes above those that currently occur at the existing west bank thermal plume. This would be a **less-than-significant** impact.

The RWCF outfall structure could potentially cause increased predation on juvenile special-status fishes as they emigrate downstream past the outfall in two ways. The first is by creating physical structure associated with the outfall that causes a hydraulic break in the river's current (much like a bridge abutment does in a flowing river) that predatory fish like striped bass can hide behind, out of the current, and ambush emigrating ESA-listed and other special-status fishes as they pass the outfall. The second way is by attracting predatory fish, such as striped bass and black bass, to hold in numbers within the warmer water of the thermal plume near the outfall, thereby providing a predation "hot spot" in the river.

The project outfall is a side-bank outfall on the east bank of the river, where the river is approximately 225 feet wide at the surface, about 175 feet wide at the river bottom, and 15–20 feet deep (depending on river flow and portion of the tidal cycle). At mean high water, approximately 5 feet of the new gatewell structure would be inundated, and at mean low water less than 1 foot of the structure would be inundated (see Figure 3-7 in Chapter 3, "Project Description"). The new single 60-inch-diameter outfall pipe that would extend down the waterside of the levee would be covered with riprap except for the final 7 feet, which would extend into the river, perpendicular to the current (see Figure 3-7 in Chapter 3, "Project Description"). This structure is nearly identical to that of the existing outfall except that the existing outfall has two 48-inch pipes that are located about 10 feet apart and extend into the river from the levee a distance of approximately 10 feet. Hence, the new (east bank) outfall would provide less structural area within the channel for striped bass and other predatory fishes to hold behind compared to the existing (west bank) outfall. In past years, the fishery agencies have conducted salmonid smolt tagging studies to determine the fate of emigrants through the San Joaquin River system. The hydroacoustic-tagged fish emigrated past the existing RWCF, and the outfall location was not identified by these tracking studies as an area of substantial predation losses of these fish. This indicates that the existing (west bank) outfall structure does not attract a sufficient number of predatory fish to hold at the site to increase predation there beyond background levels elsewhere in the river.

In terms of the second factor of attracting predatory fishes to the warm plume waters, it can be concluded, based on the thermal plume modeling conducted for the project (Appendix A), that the area within the channel where the plume temperature would be multiple degrees above river background temperatures would be geographically small and would be similar in size to the thermal plume that currently exists downstream from the current outfall. Moreover, the initial jet mixing of the effluent discharged close to the end of the outfall pipe would have velocities that would not be attractive to predatory fishes to hold within. In a study of the thermal impacts of the Sacramento Regional County Sanitation District's Sacramento Regional Wastewater Treatment Plant (SRWTP) discharge on the aquatic life of the lower Sacramento River, Robertson-Bryan, Inc. (2013) found no increased predation of hydroacoustic-tagged juvenile Chinook salmon smolts as they emigrated past the thermal plume associated with the SRWTP diffuser outfall in the Sacramento River near Freeport. The SRWTP thermal plume is much larger geographically than the RWCF's thermal plume and covers more of the river cross-section because it is a much larger

discharge (permitted capacity of 181 million gallons per day) that enters the river through a bottom diffuser that covers about 65 percent of the river width. Because the warmer plume waters of the SRWTP discharge did not result in a "predation hotspot," one would not expect the much smaller RWCF thermal plume to result in predation rates on special-status fishes higher than those that occur elsewhere in the project reach of the river. Also, the geographic size and thermal gradients across the plume of the new outfall would be similar to those that currently exist for the existing outfall.

Finally, studies have shown that exposure of juvenile Chinook salmon to elevated temperatures for short periods of time does not increase their vulnerability to predation. Juvenile Chinook salmon collected from the Columbia River showed no vulnerability to predation after being acclimated to 53.6°F and then exposed to 78.8°F (a 25.2°F temperature differential) for up to 120 minutes (Mesa et al. 2002).

Based on the above findings, the thermal plume associated with the new outfall would not cause a predation hot spot in the river and would not substantially increase predation rates on emigrating juvenile ESA-listed and other special-status fishes above those that currently occur in the project reach of the river. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required.

5 CUMULATIVE IMPACTS

This Supplemental EIR provides an analysis of the cumulative impacts of the project taken together with other past, present, and probable (i.e., reasonably foreseeable) future projects producing related impacts, as required by the State CEQA Guidelines (14 California Code of Regulations Section 15130). The goal of this analysis is twofold: first, to determine whether the impacts of all such projects would be cumulatively significant; and second, to determine whether the project would itself cause a “cumulatively considerable” (and thus significant) incremental contribution to any such cumulatively significant impacts.

5.1 REGULATORY BACKGROUND

Section 15130 of the State CEQA Guidelines requires that an EIR discuss cumulative impacts of a project and determine whether the project’s incremental effect is “cumulatively considerable.” The definition of “cumulatively considerable” is provided in Section 15065(a)(3):

“Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

According to Section 15130(b) of the State CEQA Guidelines,

[t]he discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion should be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

Issues that could contribute considerably to cumulatively significant effects are discussed below.

5.2 GEOGRAPHIC CONTEXT

The geographic area that could be affected by implementation of the project varies depending on the type of environmental resource being considered. The geographic area associated with different types of environmental effects defines the scope of the areas considered in the cumulative impact analysis (Table 5-1).

Table 5-1 Geographic Scope of Cumulative Impacts

Resource Issue	Geographic Area
Hydrology and water quality	Local area and Sacramento-San Joaquin Delta
Terrestrial biological resources	San Joaquin River watershed
Aquatic biological resources	San Joaquin River watershed and Sacramento-San Joaquin Delta

Source: Data compiled by Ascent Environmental in 2022

5.3 RELATED PROJECTS

The RWCF Modifications Project EIR contains a list of related projects, or those past, present, and probable future projects located in the City of Stockton that could relate to the project (City of Stockton 2018). That list consists of approved major development projects. The impacts from the proposed outfall relocation addressed by this Supplemental Draft EIR would be related to construction activities in the San Joaquin River and adjacent levee, along with the resultant discharge of RWCF effluent from the new outfall to the river and cessation of discharge from the existing outfall. Consequently, the related projects identified for the cumulative analysis are those that also involve

construction activities within or adjacent to the San Joaquin River and downstream Sacramento-San Joaquin Delta (Delta) waterways, as well as discharges to surface waters. These projects are listed in Table 5-2.

Table 5-2 Cumulative Projects List

Project	Description	Status
Lathrop Consolidated Treatment Facility Surface Water Discharge Project	This project involves construction and operation of treatment plant modifications, a new effluent discharge pipeline, and a new outfall to discharge treated wastewater from the City of Lathrop's Consolidated Treatment Facility to the San Joaquin River. Agency: City of Lathrop	EIR certified March 2021; construction initiated in November 2021
San Joaquin River Restoration Program	This program is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River to restore and maintain naturally reproducing and self-sustaining populations of salmon and other fish while reducing or avoiding adverse water supply impacts from restoration flows. Agencies: U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Wildlife, and California Department of Water Resources	Ongoing
Reclamation District 17 Levee Seepage Repair Project	This project involves implementing landside and isolated waterside levee improvements along portions of approximately 19 miles of the levee system on the right bank of the San Joaquin River that protect the cities of Stockton, Lathrop, Manteca, and unincorporated San Joaquin County. The project involves repairing seepage deficiencies where needed to meet U.S. Army Corps of Engineers seepage criteria and modifying the levee profile to meet the geometry requirements of the permitting agencies to reduce the risk of flooding in the Reclamation District 17 service area during a 100-year flood event. Agencies: Reclamation District 17 and California Department of Water Resources	Estimated completion in December 2022
Lower San Joaquin River Feasibility Study	The purpose of the study is to identify a cost-effective plan to reduce flood risk in the Stockton metropolitan area. The recommended plan includes 23 miles of levee improvements and two closure structures: one at Fourteen Mile Slough and the other at Smith Canal. In addition to the structural features, the plan also recommends that the local sponsors complete a floodplain management plan, including a comprehensive flood warning emergency evacuation plan, to address residual flood risks. Agencies: U.S. Army Corps of Engineers, Central Valley Flood Protection Board, and San Joaquin Area Flood Control Agency	Final Integrated Interim Feasibility Report/ Environmental Impact Statement/Environmental Impact Report, January 2018; project construction is anticipated to start in 2022 and be completed in 2032
South Delta Temporary Barriers Project	This project consists of annual construction, operation, and removal of four temporary rock barriers in south Delta channels to improve water levels and water circulation in the south Delta and improve migration conditions for San Joaquin River salmon. The barrier at the head of Old River serves as a fish barrier (intended to primarily benefit migrating San Joaquin River Chinook salmon) and is installed and operated in April–May and again in September–November. The remaining three barriers (located at Old River at Tracy, Grant Line Canal, Middle River) serve primarily to benefit agricultural water users in the south Delta and are installed and operated between April 15 and November 30 of each season. Agency: California Department of Water Resources	Ongoing
Delta Conveyance Project	This project proposes to create new intakes on the Sacramento River near Hood that would convey water into a tunnel routed underneath the Delta to south Delta export facilities. Agency: California Department of Water Resources	EIR in preparation
California EcoRestore	This program was established in 2015 to advance 30,000 acres of critical habitat restoration and enhancement in the Delta, Suisun Marsh, and Yolo Bypass region. It consists of several individual restoration projects across the Delta. Agency: California Department of Water Resources	Ongoing

5.4 CUMULATIVE IMPACTS BY RESOURCE TOPIC

For purposes of this EIR, the project would have a significant cumulative effect if:

- ▶ the cumulative effects of related projects (past, current, and probable future projects) are not significant and the incremental impact of implementing the project is substantial enough, when added to the cumulative effects of related projects, to result in a new cumulatively significant impact, or
- ▶ the cumulative effects of related projects (past, current, and probable future projects) are already significant and implementation of the project makes a considerable contribution to the effect.

5.4.1 Hydrology and Water Quality

HYDROLOGY

Past projects in the San Joaquin River watershed, including impoundments to store river flows and provide flood protection, have substantially modified the river's seasonal hydrology. Past, present, and probable future levee improvement projects in the watershed also have contributed to alteration of the river hydrology. These past, present, and probable future projects represent a significant cumulative impact on San Joaquin River hydrology. Implementation of the project would have no effect on river hydrology because the project does not contribute additional flows to the river, the outfall components within the river channel would be installed within the channel's existing profile, and the natural contours of the riverbed would be restored to preproject conditions at the end of construction. Therefore, implementing the project would not contribute to the existing significant cumulative effect related to the seasonal hydrology of the river.

The San Joaquin River in the reach where the project is located is contained by levees. These levees, although intended to reduce the risk of flooding in upland urban areas and farmlands protected by the levees, are subject to forces that, over time, potentially reduce the level of flood protection afforded by the levees. Such forces include long-term channel erosion that leads to levee instability, seismic ground shaking, and climate change with associated hydrologic changes in the upper watershed and sea-level rise that may lead to more frequent high-flow events or overtopping of levees. A number of projects listed in Table 5-2 are being undertaken to improve levee stability and reduce flood risk in the San Joaquin River watershed, particularly in the vicinity of the City of Stockton, where the project is located. Because these projects are focused on improving levee stability and reducing flood risk, the cumulative effects of these projects would result in a net beneficial effect on flood risk for the lower San Joaquin River. Other construction projects within the bed and banks of the San Joaquin River are expected to avoid adverse effects on the river's hydrology and levee system or would fully mitigate any negative effects on levee stability. Therefore, the cumulative effects of related past, current, and probable future projects affecting the lower San Joaquin River and its levees would not result in a cumulatively significant impact related to flooding.

The project would be constructed between July 1 and October 31, which is the period of lowest river flows. The San Joaquin River channel has sufficient capacity to convey the lower river flows during the construction period. The outfall components within the San Joaquin River channel would be installed within the channel's existing profile, and the natural contours of the riverbed would be restored to preproject conditions at the end of construction. Therefore, implementing the project would not affect the river channel capacity for conveying flood flows. Consequently, the project, when added to the effects of related projects, would not result in a cumulatively significant impact related to flooding.

For these reasons, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to hydrology.

WATER QUALITY

Construction and operations/maintenance of projects of the type listed in Table 5-2 often require soil disturbance and the use of motorized equipment, which may require the storage and handling of fuels and equipment lubricants. The discharge of sediment and petroleum products can be harmful to water quality if they directly enter surface waters or are spilled on the ground where they may be mobilized and transported in stormwater runoff into surface waters. Other potential contaminants associated with the equipment used or inadvertently discharged by construction workers may include trash, cleaners, solvents, and human sanitary wastes.

Projects listed in Table 5-2 that would involve placement of fill material into waters of the United States would be required to obtain a Clean Water Act (CWA) Section 404 permit from the U.S. Army Corps of Engineers, a CWA Section 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board, and a California Fish and Game Code Section 1600 Streambed Alteration Agreement with the California Department of Fish and Wildlife. Projects involving disturbance of more than 1 acre also would be subject to authorization under the State Water Resources Control Board National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ/NPDES Permit No. CAS000002, as amended by 2010-0014-DWQ and 2012-0006-DWQ), which requires that a stormwater pollution prevention plan (SWPPP) be prepared. Implementation of SWPPP erosion control and pollution prevention best management practices (BMPs) would avoid and minimize erosion and contaminant discharges to surface waters or groundwater. In addition to the BMPs, the SWPPP would include BMP inspection and monitoring activities and would identify the responsibilities of all parties; contingency measures; agency contacts; and training requirements and documentation for those personnel responsible for installation, inspection, maintenance, and repair of BMPs. The CWA Section 401 Water Quality Certification also would require implementation of measures to prevent, minimize, and contain spills and minimize the amount of soil, sediment, and trash entering surface waters.

Project construction activities and any associated effects on surface water quality would be short term and temporary. Furthermore, as described above, BMPs would be required to be implemented during construction of the project and the other related construction projects to control the discharge of pollutants to surface waters. Finally, the likelihood that all the projects identified above would be undergoing construction simultaneously is low. Consequently, the cumulative construction-related effects of the projects listed above, in combination with the effects of the project, would result in a less-than-significant cumulative impact on San Joaquin River water quality.

For these reasons, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to water quality.

5.4.2 Terrestrial Biological Resources

In general, habitat conditions for terrestrial biological resources along the San Joaquin River and throughout the watershed have been substantially degraded from past and present human activities, including substantial alteration of flow regimes and reduced flows; dewatering of stream reaches; isolation of floodplains from the river channel by channelization and levee construction; substantial reductions in the frequency, magnitude, and duration of floodplain inundation; conversion of riparian habitat to agriculture; habitat fragmentation from the introduction of physical barriers; and poor water quality. These alterations have resulted in significant adverse effects on the extent, species composition, and functioning of wetlands, riparian habitats, and other sensitive communities and on the distribution and abundance of plant and wildlife species associated with riparian and wetland habitats throughout the San Joaquin River watershed. The threatened and endangered status of numerous plant and wildlife species and the dramatic reductions in the extent of wetland and riparian vegetation along the river and in the watershed are evidence of these overall significant adverse effects.

Two of the projects listed in Table 5-2 (i.e., California EcoRestore and San Joaquin River Restoration Program) will enhance riparian and floodplain habitat in the San Joaquin River and Delta. Other probable future projects involving construction on the banks of the river (e.g., Lathrop Consolidated Treatment Facility Surface Water Discharge Project) and levee improvements (e.g., Reclamation District 17 Levee Seepage Repair Project) are expected to be implemented

in a manner that avoids or mitigates adverse effects on San Joaquin River riverine aquatic and riparian habitats. Nevertheless, both past and future levee enhancement and maintenance projects and flood management projects have resulted and will likely result in permanent loss of riparian habitat. Consequently, the cumulative effects of past, current, and probable future projects would result in a cumulatively significant impact on upland and riparian habitat and the species that rely on these habitats in the lower San Joaquin River and Delta. However, the new outfall location would largely be restored to its existing character and the riparian vegetation that would be removed would be replaced through mitigation. In addition, significant impacts on plant and wildlife species would be avoided.

For these reasons, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to terrestrial biological resources.

5.4.3 Aquatic Biological Resources

As stated in Section 5.4.1, "Hydrology and Water Quality," the cumulative construction-related effects of the projects listed in Table 5-2, in combination with the effects of the project, would result in a less-than-significant cumulative impact on San Joaquin River water quality. Consequently, the construction of the project would result in a less-than-significant cumulative water quality-related impact on aquatic biological resources of the San Joaquin River.

Two of the projects listed in Table 5-2 (i.e., California EcoRestore and San Joaquin River Restoration Program) will enhance aquatic habitat in the San Joaquin River and Delta. Other probable future projects involving in-river construction (e.g., Lathrop Consolidated Treatment Facility Surface Water Discharge Project) and levee improvements (e.g., Reclamation District 17 Levee Seepage Repair Project) are expected to be implemented in a manner that avoids or mitigates adverse effects on San Joaquin River riverine aquatic and riparian habitats. Nevertheless, both past and future levee enhancement projects have resulted and will likely result in permanent loss of both riverine aquatic and riparian habitat. Consequently, the cumulative effects of past, current, and probable future projects, including the project, would result in a cumulatively significant impact on riverine aquatic and riparian habitat in the lower San Joaquin River. However, implementation of the project **would not result in a cumulatively considerable incremental contribution to this significant cumulative impact related to loss of habitat for aquatic biological resources**, because the new outfall location would largely be restored to its existing character and the riparian vegetation that would be removed would be replaced through mitigation.

Past projects in the San Joaquin River watershed and Delta have blocked anadromous fish migrations to upstream spawning grounds; resulted in direct mortality of fish and fish prey organisms (e.g., phytoplankton, zooplankton, and benthic macroinvertebrates); introduced nonnative aquatic species that have increased predation on native fishes; and have modified the river's seasonal hydrology, temperature, and aquatic and riparian habitat. The cumulative effects of past, current, and probable future projects have resulted in a cumulatively significant impact on fish and fish prey populations in the San Joaquin River. The remainder of this assessment addresses whether the project would result in a cumulatively considerable incremental contribution to this significant cumulative impact.

Project construction would cause temporary underwater noise and vibrations locally near the east-bank outfall site. Past construction projects and the probable future projects listed above have produced and will produce underwater noise and vibrations in and near their work sites. However, such underwater noise and vibrations are both temporary and localized to the area of work in their geographic extent. Because past, current, and probable future in-river construction projects do not occur in the same place or immediately adjacent to one another, do not occur at the same time, and do not persist after the construction activity is completed, their respective underwater noise and vibration effects cannot combine to result in a cumulative impact. Moreover, the underwater noise and vibration levels from the project are not expected to reach levels that would cause injury, mortality, or chronic adverse behavior effects on fish or their prey organisms. Therefore, the project's temporary construction-related underwater noise and vibration effects in the San Joaquin River **would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact related to noise and vibrations** on fish and fish prey populations in the San Joaquin River.

Project construction would involve the placement and removal of a cofferdam and dewatering inside the cofferdam. In addition, project construction would involve the placement of riprap below the water line. Some of the related past, present, and probable future construction projects listed above have involved and will involve similar activities. However, any fish injury or mortality from such project construction-related activities would be of small magnitude and would not have population-level effects on fish or their prey organisms. Therefore, project construction **would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact related to direct injury or mortality** on fish and fish prey populations in the San Joaquin River.

The project would abandon in place the current outfall structure for the RWCF within the San Joaquin River channel and replace it with a new outfall in the San Joaquin River. The thermal plume associated with the RWCF discharge would be moved about 0.4 mile upstream from its current location. The Lathrop Consolidated Treatment Facility Surface Water Discharge Project (listed in Table 5-2) also would place a new outfall in the San Joaquin River channel that would result in a new thermal plume in the river. The Lathrop outfall would be located approximately 15 miles upstream from the proposed RWCF relocated outfall; therefore, its thermal plume and the resultant effect on river temperature could not combine with the RWCF discharge thermal plume.

As discussed in Section 4.3, "Aquatic Biological Resources," the new east-bank RWCF outfall structure and the thermal plume associated with it, like the existing west-bank outfall, would not block or delay the movements of resident or anadromous fishes past the outfall. In addition, the new east-bank outfall structure and thermal plume associated with the new outfall, like the existing west-bank outfall, would not cause substantially increased predation on special-status fishes (e.g., steelhead, Chinook salmon, green sturgeon, delta smelt) emigrating past them. When abandoned in place, the west-bank outfall structure also would not cause substantially increased predation on special-status fishes emigrating past the old outfall. The thermal plume associated with the new east-bank outfall would not cause mortality or any adverse chronic sublethal effects on fish or their prey organisms that swim or drift through the thermal plume. Because the project would not block or delay fish passage in the San Joaquin River, cause increased predation on special-status fishes, or cause thermally induced mortality or any adverse chronic sublethal effects on fish or their prey organisms from plume temperatures, the project **would not result in a cumulatively considerable incremental contribution to a cumulatively significant impact related to river temperature conditions** on fish and fish prey populations in the San Joaquin River.

For the reasons discussed above, the project would not result in a cumulatively considerable incremental contribution to a significant cumulative impact related to aquatic biological resources.

6 ALTERNATIVES ANALYSIS

6.1 INTRODUCTION

State CEQA Guidelines Section 15126.6(a) requires EIRs to describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

This section of the CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. Subsection (b) states the purpose of the alternatives analysis, as follows:

Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant environmental effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The State CEQA Guidelines require that the EIR include information about each alternative sufficient to allow meaningful evaluation, analysis, and comparison with the proposed project. If implementing an alternative would cause one or more significant environmental effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (Section 15126.6[d]).

The State CEQA Guidelines also require that the "no project" alternative be considered (Section 15126.6[e]).

In defining "feasibility" (e.g., "feasibly attain most of the basic objectives of the project"), Section 15126.6(f)(1) states, in part:

Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

In determining what alternatives should be analyzed in the EIR, it is important to consider the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by the lead agency's decision-making body, here the Stockton City Council. (See Public Resources Code Section 21081[a][3].)

6.1.1 Project Purpose and Objectives

One of the key factors in considering alternatives is whether they can feasibly attain most of the objectives of the project. Chapter 3, "Project Description," Section 3.3, "Project Purpose and Objectives," states the project objectives, which are repeated here for reference:

- ▶ Further consolidate treatment facilities, thereby eliminating the need to construct approximately 2,000 feet of 54-inch pipeline along the western edge of the San Joaquin River.
- ▶ Allow gravity discharge of effluent to the San Joaquin River to the maximum extent possible (more than 90 percent of the time), thereby reducing overall disposal cost.
- ▶ Comply with receiving water limitations specified in the RWCF National Pollutant Discharge Elimination System (NPDES) permit.

6.1.2 Significant Effects of the RWCF Modifications Project

Impacts associated with implementation of the project are evaluated in Chapters 4 and 5. As identified in Chapter 2, "Executive Summary," Table 2-1, "Summary of Environmental Impacts and Mitigation Measures," construction and/or operation of the project would have the potential to cause the following significant but mitigable environmental impacts.

TERRESTRIAL BIOLOGICAL RESOURCES

- ▶ Impact 4.2-1: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Plant Species and Habitat
- ▶ Impact 4.2-2: Potential for Project Construction to Result in Disturbance to or Loss of Western Pond Turtle
- ▶ Impact 4.2-3: Potential for Project Construction to Result in Disturbance to or Loss of Burrowing Owl
- ▶ Impact 4.2-4: Potential for Project Construction to Result in Disturbance to or Loss of Swainson's Hawk, White-Tailed Kite, and Other Nesting Raptors
- ▶ Impact 4.2-5: Potential for Project Construction to Result in Disturbance to or Loss of Song Sparrow ("Modesto" Population) and Other Nesting Birds
- ▶ Impact 4.2-6: Potential for Project Construction to Result in Disturbance to or Loss of Special-Status Bats
- ▶ Impact 4.2-7: Potential for the Project to Result in Disturbance to or Loss of Waters of the United States and State
- ▶ Impact 4.2-8: Potential for Project Construction to Result in Disturbance to or Loss of Riparian Habitat

AQUATIC BIOLOGICAL RESOURCES

- ▶ Impact 4.3-3: Potential for Project Construction to Cause Direct Fish Injury or Mortality, Resulting in Impacts on Fish Populations

These impacts were considered in the development of reasonable project alternatives.

6.2 ALTERNATIVES CONSIDERED, BUT NOT ANALYZED IN DETAIL

State CEQA Guidelines Section 15126.6(c) provides the following guidance in selecting a range of reasonable alternatives for the project. The range of potential alternatives shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant impacts. The EIR should also identify any alternatives that were considered by the lead agency but were rejected during the planning or scoping process and briefly explain the reasons underlying the lead agency's determination.

Because of the project purpose and objectives (i.e., relocation of the RWCF river outfall to further consolidate facilities, maximize ability to discharge by gravity flow, and comply with NPDES permit limitations), alternatives that feasibly attain most of these project objectives are limited.

The RWCF Modifications Project EIR presented alternatives to discharge to the San Joaquin River, including reuse of wastewater for groundwater recharge, irrigation, and industrial supply, but these alternatives were not selected for detailed analysis because they are infeasible and would not meet the basic project objectives. These alternatives continue to be infeasible for the reasons cited in the RWCF Modifications Project EIR.

Siting the outfall at an alternative location on the east bank adjacent to the RWCF main plant facilities would achieve the project objectives but would not avoid or substantially lessen one or more significant impacts. The outfall location would be farther away from the main plant facilities, including the final effluent pump station (FEPS). Siting the outfall at an alternative location would require substantially more ground disturbance because a longer pipeline would be required to connect the FEPS to the outfall structure. Furthermore, a new pipeline would need to be built across the levee, whereas the project involves rehabilitating an existing pipeline within the levee, which would involve less disturbance to the levee structure and stability. Building a pipeline across the levee also would involve securing additional agency permits, potentially lengthening the construction timeline. Because of these issues, an alternative outfall location on the east bank is considered to be an infeasible alternative and is not considered further for implementation.

6.3 ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

This section presents two alternatives to the project that are evaluated in detail. The first is the No-Project Alternative, the evaluation of which is required by the State CEQA Guidelines. The second is the Diffuser Outfall Alternative. The impact analyses that follow describe the impacts of the alternatives relative to the impacts described in Chapter 4. The relative impacts are described, followed by a summary term characterizing the impacts, as compared to those of the project, as "Less," "Similar," or "Greater."

6.3.1 No-Project Alternative

The CEQA Guidelines state that, among other alternatives, a "no-project" alternative shall be evaluated in relation to the proposed project (Section 15126.6[e]). Under the No-Project Alternative, the City would continue to implement the RWCF Modifications Project as described in the RWCF Modifications Project EIR, which has the discharge of RWCF effluent continuing through the outfall on the west side of the San Joaquin River.

The No-Project Alternative constitutes no change to the RWCF Modifications Project; thus, the City would continue to implement the project as described in the RWCF Modifications Project EIR. Under the No-Project Alternative, the existing outfall on the west bank of the San Joaquin River would be used to discharge effluent from the RWCF to the San Joaquin River. This would require the installation of 2,000 feet of pipeline to connect the FEPS to the outfall on the west bank of the river. The new construction would occur on land, and no in-river construction would occur. After the modified RWCF on the east side of the river is operational, the siphon and pumps would be required to operate 100 percent of the time to move effluent to the existing west-bank outfall.

IMPACT ANALYSIS

Hydrology and Water Quality

Under the No-Project Alternative, there would be no construction activities adjacent to or in the San Joaquin River. Therefore, there would be no potential for construction-related impacts on hydrology or water quality. Also, because discharge of effluent from the existing RWCF outfall on the west bank of the river would continue to occur and a new outfall structure would not be constructed on the east bank of the river, river hydrology and site drainage conditions would continue to be as they are under existing conditions. Water quality conditions in the river would be as described and assessed in the RWCF Modifications Project EIR. However, this alternative may make it more challenging to comply with temperature limitations included in the NPDES permit. Implementing the project would not result in any significant impacts on hydrology and water quality. Hence, implementing the No-Project Alternative would not lessen or eliminate any significant hydrology and water quality impacts. Because in-river construction

activities would occur under the project but not under the No-Project Alternative, the impacts of the No-Project Alternative on hydrology and water quality would be somewhat less compared to those of the project. *[Less]*

Terrestrial Biological Resources

Under the No-Project Alternative, there would be no construction activities adjacent to or in the San Joaquin River, and the existing outfall structure on the west side of the river would continue to be used to discharge RWCF treated effluent. Therefore, the current type, extent, and quality of habitat on the project site would be unchanged from existing conditions. The No-Project Alternative would not affect special-status plant or animal species and would not result in the loss of waters of the United States or state or loss of riparian habitat. By comparison, implementing the project would result in temporary construction disturbances and removal of two riparian trees, as well as temporary loss of understory herbaceous riparian vegetation, which would result in potentially significant impacts on special-status plant species and habitat; western pond turtle; burrowing owl; Swainson's hawk, white-tailed kite, and other nesting raptors; song sparrow ("Modesto" population) and other nesting birds; and special-status bats. Implementing the project would not result in any significant impacts on terrestrial biological resources after mitigation. Hence, implementing the No-Project Alternative would not lessen or eliminate any significant project impacts. Because the No-Project Alternative, unlike the project, would not involve any work within the river channel or on the channel banks, would not result in vegetation removal, and would not create visual or auditory disturbances that would potentially result in loss of active bird nests or bat roosts, the effects of the No-Project Alternative on terrestrial biological resources would be somewhat less compared to those of the project. *[Less]*

Aquatic Biological Resources

Under the No-Project Alternative, there would be no construction activities adjacent to or in the San Joaquin River, and the existing outfall structure would continue to be used to discharge RWCF treated effluent. Therefore, there would be no potential for construction-related impacts on aquatic biological resources. As described above, water quality conditions under project operations would not change from that assessed in the Modifications Project EIR. The project would not result in any significant impacts on aquatic biological resources after mitigation. Hence, implementing the No-Project Alternative would not lessen or eliminate any significant project impacts. The No-Project Alternative would not itself result in any significant impacts on aquatic biological resources. Because the No-Project Alternative, unlike the project, would not involve any work within the river channel, the effects of the No-Project Alternative on aquatic biological resources would be less compared to those of the project. *[Less]*

ABILITY TO ACHIEVE PROJECT OBJECTIVES

The No-Project Alternative would require construction of a new pipeline to connect the FEPS to the outfall on the west bank of the San Joaquin River. Because the existing outfall on the west bank of the river would continue to be used, this alternative would not meet the first project objective. It also would require continued pumping of final RWCF effluent to the existing west-bank outfall for discharge to the river, which would not achieve the second project objective. Finally, discharge from the existing west-bank outfall, which is shallower than the proposed east-bank outfall, may not always be able to achieve the temperature limitations in the RWCF NPDES permit. Therefore, the No-Project Alternative may be unable to fully achieve the third project objective. Therefore, the No-Project Alternative does not meet any of the three project objectives.

6.3.2 Diffuser Outfall Alternative

The Diffuser Outfall Alternative would move the outfall to the same new location identified for the project and would involve the same primary construction and installation elements described for the project except that the discharge of treated effluent to the San Joaquin River would go through a multiport bottom diffuser outfall instead of the side bank outfall as planned for the project. The preliminary design efforts identified a 72-inch diffuser outfall with a length of 130 feet and ten 16-inch ports in alternating directions as the most applicable configuration for wastewater discharge. The diffuser would be oriented perpendicular to river flow and centered in the river channel. Additionally,

the diffuser ports would be angled 15 degrees from horizontal. This diffuser configuration was chosen based on mixing and head loss evaluations, which compared this configuration to other potential diffuser configurations.

HYDROLOGY AND WATER QUALITY

Under the Diffuser Outfall Alternative, there would be greater construction activities and bottom disturbances within the San Joaquin River channel. The size of the cofferdammed area of the channel that would be dewatered would be equal to or greater than that of the project to accommodate the diffuser placement, depending on construction approach. Therefore, there would be a similar or greater potential for construction-related impacts on hydrology and water quality.

Under operation of this alternative, the effluent discharge rate to the river and resulting constituent concentrations in the river would be the same as described and assessed for the project. However, implementing the Diffuser Outfall Alternative may make it more challenging to comply with temperature limitations included in the NPDES permit. One of the NPDES permit receiving water temperature limitations specifies that the discharge shall not cause the creation of a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of the river channel at any point. The RWCF effluent could be up to 20°F warmer than background river temperatures, particularly in the winter months when river temperatures are lowest. With a diffuser outfall, RWCF effluent would be discharged across approximately 70–75% of the channel width at the river bottom. Because the diffuser would discharge effluent across more than 25 percent of the channel width, a zone defined by water temperatures of more than 1°F above the background river temperature could be created that exceeds more than 25 percent of the cross-sectional area of the river channel near the outfall, particularly when effluent temperatures are substantially warmer than river temperatures, which would result in non-compliance with the NPDES permit.

Because the project would not result in any significant impacts on hydrology and water quality, the Diffuser Outfall Alternative would not lessen or eliminate any significant project impacts on hydrology and water quality. Implementation of the Diffuser Outfall Alternative also would not itself result in any significant impacts on hydrology and water quality. Nevertheless, because of the likely involvement of a larger cofferdammed construction site within the channel and a lesser likelihood of full compliance with all NPDES permit temperature limitations, the impacts of the Diffuser Outfall Alternative on hydrology and water quality would be somewhat greater compared to those of the project. *[Greater]*

TERRESTRIAL BIOLOGICAL RESOURCES

Similar to the project, implementing the Diffuser Outfall Alternative would result in removal of a minimal amount of riparian vegetation from the San Joaquin River channel and banks, as well as construction activities that would disturb existing on-site species and habitats and waters of the United States and state. These disturbances could result in loss of the same special-status species. Therefore, implementing this alternative would result in impacts on special-status species similar to those that would occur under the project. The Diffuser Outfall Alternative, however, would require dewatering of a larger portion of the San Joaquin River for installation of the diffuser components. Therefore, the construction footprint would be larger than that of the project and would involve a greater area of riverine habitat disturbance. It is anticipated that, as for the project, the impacts would be reduced to a less-than-significant level after mitigation, but the impacts of the Diffuser Outfall Alternative on terrestrial biological resources would be somewhat greater compared to those of the project because of the larger disturbance area. *[Greater]*.

AQUATIC BIOLOGICAL RESOURCES

Under the Diffuser Outfall Alternative, there would be greater construction activities and bottom disturbances in the San Joaquin River channel. The size of the cofferdammed area of the channel that would be dewatered would be equal to or greater than that of the project to accommodate the diffuser placement, depending on construction

approach. Therefore, there would be a similar or greater potential for construction-related impacts on riverine aquatic habitat. Effects on riparian habitat would be the same as those for the project.

Under operations of this alternative, the diffuser pipe on the bottom of the river and up the east bank would provide greater potential predatory fish holding areas, thereby potentially increasing predation on emigrating special-status fishes at the site compared to that which would occur under the project. Fully mixed San Joaquin River temperatures would differ negligibly from those under the project. However, by having a diffuser covering approximately 75 percent of the river bottom width, the near-field thermal plume would cover most of the river channel width, with only narrow zones of passage along both banks unaffected by the discharge. The shape of the thermal plume under the Diffuser Outfall Alternative has greater potential to block or substantially delay the upstream immigration of anadromous salmonids past the outfall location. Nevertheless, blockage and substantial delay of anadromous fish migration would not be expected to occur under this alternative based on studies performed on fish passage at the Sacramento Regional County Sanitation District's Sacramento Regional Wastewater Treatment Plant's diffuser outfall in the lower Sacramento River at Freeport (Robertson-Bryan, Inc. 2013). Because plume temperatures would be attenuated to within 1–2°F of river background temperatures within tens of feet from the diffuser, the thermal plume would not be expected to cause mortality or any chronic adverse sublethal effects on fishes swimming through the plume or on larval fishes, plankton, and benthic macroinvertebrates drifting through the plume.

The project would not result in any significant impacts on aquatic biological resources after mitigation. Hence, the Diffuser Outfall Alternative would not lessen or eliminate any significant project impacts. Implementation of the Diffuser Outfall Alternative also would result in the same fish loss impact related to enclosing part of the river channel in a cofferdam and dewatering for in-river construction. This impact would be mitigated in the same manner as proposed for the project. However, if the cofferdammed area for the Diffuser Outfall Alternative would be larger in area to facilitate placement of the diffuser, then the magnitude of this impact could be somewhat greater, despite being mitigated to a less-than-significant level. Because of the likely involvement of a larger cofferdammed construction site within the channel, a greater area of riverine aquatic habitat disturbance, and a lesser likelihood of full compliance with all NPDES permit temperature limitations, the impacts of the Diffuser Outfall Alternative on aquatic biological resources would be somewhat greater compared to those of the project. *[Greater]*

ABILITY TO ACHIEVE PROJECT OBJECTIVES

The Diffuser Outfall Alternative would achieve the first two project objectives but may not fully achieve the third objective because of the outfall configuration and the geographic shape of the thermal plume it would produce.

6.3.3 Comparison of Alternatives

Table 6-1 summarizes the environmental analyses provided above for the project alternatives.

Table 6-1 Environmental Analyses Summary

Resource Area	Project	No-Project Alternative	Diffuser Outfall Alternative
Hydrology and water quality	Less than significant	Less	Greater
Terrestrial biological resources	Less than significant (with mitigation)	Less	Greater
Aquatic biological resources	Less than significant (with mitigation)	Less	Greater

6.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines require identification of an environmentally superior alternative from among the range of reasonable alternatives that were evaluated (Section 15126.6[e]).

The No-Project Alternative would result in reduced construction-related impacts related to hydrology and water quality, terrestrial biological resources, and aquatic biological resources compared to the project. However, the No-

Project Alternative would not improve temperature conditions in the river for aquatic life, which the project would do. Further, the No-Project Alternative would not attain any of the project objectives. Therefore, the No-Project Alternative is not the environmentally superior alternative.

Implementing the Diffuser Outfall Alternative would result in significant environmental impacts similar to those associated with construction of the project. In addition, the Diffuser Outfall Alternative would not improve temperature conditions in the river for aquatic life as well as the project would do. For these reasons, the Diffuser Outfall Alternative would not attain the project objective to comply with NPDES permit limitations for temperature as well as the project would.

Although the State CEQA Guidelines stipulate that an EIR shall identify an environmentally superior alternative from among the alternatives to the project, in this instance, the Diffuser Outfall Alternative would not result in fewer significant environmental impacts, relative to the project. Moreover, neither alternative can fully achieve all three project objectives. In addition, all significant impacts of the project can be mitigated to a less-than-significant level, and all project objectives would be met under the project.

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7 OTHER CEQA-MANDATED SECTIONS

7.1 GROWTH INDUCEMENT

7.1.1 CEQA Requirements

CEQA Section 21100(b)(5) specifies that the growth-inducing impacts of a project must be addressed in an EIR. Section 15126.2(e) of the State CEQA Guidelines provides the following guidance for assessing growth-inducing impacts of a project:

Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can induce growth directly, indirectly, or both. Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in:

- ▶ substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- ▶ substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; or
- ▶ removal of an obstacle to additional growth and development, such as removal of a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

The State CEQA Guidelines do not distinguish between planned and unplanned growth for purposes of considering whether a project would foster additional growth. Therefore, for purposes of this EIR, to reach the conclusion that a project is growth-inducing as defined by CEQA, the EIR must find that it would foster (i.e., promote, encourage, allow) additional growth in economic activity, population, or housing, regardless of whether the growth is already approved by and consistent with local plans. The conclusion does not determine that induced growth is beneficial or detrimental, consistent with Section 15126.2(e) of the State CEQA Guidelines.

If the analysis conducted for the EIR results in a determination that a project is growth-inducing, the next question is whether that growth may cause adverse effects on the environment. Environmental effects resulting from induced growth (i.e., growth-induced effects) fit the CEQA definition of "indirect" effects in Section 15358(a)(2) of the State CEQA Guidelines. These indirect or secondary effects of growth may result in significant environmental impacts. CEQA does not require that the EIR speculate unduly about the precise location and site-specific characteristics of significant, indirect effects caused by induced growth, but a good-faith effort is required to disclose what is feasible to assess. Potential secondary effects of growth could include consequences—such as conversion of open space to developed uses, increased demand on community and public services and infrastructure, increased traffic and noise, degradation of air and water quality, or degradation or loss of plant and wildlife habitat—that are the result of growth fostered by the project.

The decision to allow those projects that result from induced growth is the subject of separate decision making by the lead agency responsible for considering such projects. Because the decision to allow growth is subject to separate discretionary decision making, and such decision making is itself subject to CEQA, the analysis of growth-inducing effects is not intended to determine site-specific environmental impacts and specific mitigation for the potentially induced growth. Rather, the discussion is intended to disclose the potential for environmental effects to occur more generally, such that decision makers are aware that additional environmental effects are a possibility if growth-inducing projects are approved. The decisions regarding whether impacts would occur, what their extent would be, and whether the impacts could be mitigated are appropriately left to consideration by the agency responsible for approving such projects at such times as complete applications for development are submitted.

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and nonresidential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. Because the general plan of a community defines the location, type, and intensity of growth, it is the primary means of regulating development and growth in California.

7.1.2 Growth-Inducing Impacts

Mechanisms by which a project may directly induce growth include (1) creating jobs that attract economic or population growth to the area, (2) promoting the construction of homes that would bring new residents to the area, and (3) removing an obstacle that impedes growth in the area. Consistent with the RWCF Modifications Project, the proposed outfall relocation would not directly induce growth for the following reasons:

- ▶ As described in Chapter 3, "Project Description," construction of the proposed outfall is expected to last up to 3 months with a workforce of 10–20 people. In combination with the other elements proposed in the RWCF Modifications Project, the workforce would not exceed 80–90 workers per month, as evaluated in the RWCF Modifications Project EIR. Operation and maintenance of the relocated outfall would not require any additional permanent RWCF staff. Relocation of the outfall would not generate a sufficient number of jobs, either temporarily during construction or during operation and maintenance, to attract appreciable economic or population growth to the City of Stockton. Furthermore, the City's unemployment rate (6.6 percent as of November 2021) suggests an ample and available labor pool (U.S. Bureau of Labor Statistics 2022).
- ▶ The proposed outfall relocation would not involve the construction of any new residential units that could bring new residents to the City.
- ▶ The proposed outfall relocation would not result in any changes to the RWCF Modifications Project that would increase the treatment capacity or increase the existing permitted discharge rate at the RWCF. Therefore, the proposed outfall relocation would not remove a limitation on growth related to wastewater treatment capacity.
- ▶ Finally, the proposed outfall relocation would not involve the extension of sewer collection service; therefore, implementing the project would not allow new areas to be served.

The Stockton General Plan 2035 was the adopted general plan for the City of Stockton when the RWCF Modifications Project EIR was prepared. The EIR concluded that the previous project would improve the reliability of the RWCF to serve the growth planned in the Stockton General Plan 2035. Because the RWCF Modifications Project would facilitate City growth in accordance with the general plan, the RWCF Modification Project EIR concluded that the previous project would result in secondary impacts related to that level of development. The Stockton General Plan 2035 EIR (2006) identifies these secondary effects of growth, which include significant and unavoidable impacts related to traffic and circulation; agricultural land, open space, and habitat; and air quality and greenhouse gas emissions. In addition, the Stockton General Plan 2035 EIR identified secondary effects on water supply but determined that these impacts would be less than significant. Additional information about these secondary effects can be found in Section 7.1.2, "Growth-Inducing Impacts," of the RWCF Modification Project EIR.

Subsequent to the release of the RWCF Modifications Project EIR, the City of Stockton updated its general plan. The Envision Stockton 2040 General Plan was adopted on December 4, 2018 (City of Stockton 2018a). This general plan update extends the planning horizon from 2035 to 2040 and shifts the policy framework to emphasize new construction and development in existing "infill" neighborhoods, compared to "outfill" areas at the periphery of the City. The Envision Stockton 2040 General Plan is specifically intended to guide City growth, land use, infrastructure, and City services, as well as implement policies to avoid and mitigate the environmental impacts of growth through 2040. The secondary effects of growth were evaluated in the Envision Stockton 2040 General Plan EIR (City of Stockton 2018b). These secondary effects are generally consistent with the secondary effects described in the Stockton General Plan 2035 EIR, as presented in Section 7.1.2, "Growth-Inducing Impacts," of the RWCF Modifications Project EIR. The general plan EIR is available on the City's website:

<http://www.stocktongov.com/government/departments/communityDevelop/cdPlanGenDocs.html>. In addition, the General Plan EIR is available for viewing at the City of Stockton Community Development Department - Planning, located at 345 N. El Dorado Street, Stockton, 95202, during regular business hours.

As with the RWCF Modifications Project, the proposed outfall relocation would help improve the reliability of the RWCF to serve the growth planned in the City's General Plan. Therefore, the revised project would facilitate City growth in accordance with the Envision Stockton 2040 General Plan and would result in secondary impacts related to that level of development similar to those evaluated previously in the RWCF Modifications Project EIR. The following discussion is a summary of the potential secondary effects of City growth as identified in the Stockton 2040 General Plan EIR (City of Stockton 2018b). As noted above, the secondary effects described in the Stockton 2040 General Plan EIR are generally consistent with the secondary effects described in the Stockton General Plan EIR, as presented in Section 7.1.2, "Growth-Inducing Impacts," of the RWCF Modifications Project EIR:

- ▶ **Agricultural land:** Although the general plan includes policies to reduce and partially offset the conversion of farmland, the general plan EIR found that development would result in the conversion of farmlands of concern under CEQA and lands with active Williamson Act contracts for nonagricultural uses. This impact was determined to be significant and unavoidable.
- ▶ **Air quality and greenhouse gas emissions:** The general plan EIR indicated that implementation of the general plan, including construction activities and operation of development projects allowed under the general plan, would generate emissions that would exceed the San Joaquin Valley Air Pollution Control District regional significance thresholds and would result in a substantial increase in greenhouse gas emissions. The City has adopted policies to mitigate air quality and greenhouse gas emissions impacts. However, air quality and climate change impacts associated with City growth would be potentially significant and unavoidable.
- ▶ **Traffic and circulation:** The general plan EIR indicates that buildout of development would result in a significant level of service impacts on roadway and freeway segments in the City's planning area. The City adopted several mitigation measures to address traffic impacts, including proposed improvements at affected roadway and freeway segments. These measures notwithstanding, the City identified traffic congestion as a potentially significant and unavoidable impact associated with development pursuant to the general plan.
- ▶ **Noise:** The general plan EIR indicates that buildout of development would result in significant increases in traffic noise levels compared to existing conditions along several roadway segments. No feasible mitigation was available to mitigate these noise impacts. Therefore, noise impacts associated with increased traffic from development allowed by the general plan would be potentially significant and unavoidable.
- ▶ **Water supply:** The general plan EIR indicated that surface water and groundwater supplies are or would be available to serve planned growth in the City's service area. The City adopted policies that support access to sufficient water supplies, including water conservation and efficiency requirements and directives regarding public utility infrastructure. The general plan EIR did not identify significant water supply impacts.

7.2 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

State CEQA Guidelines Section 15126.2(c) requires EIRs to include a discussion of the significant environmental effects that cannot be avoided if the proposed project is implemented. As documented in Chapter 4 (project-level impacts) and Chapter 5 (cumulative impacts) of this Draft Supplemental EIR, impacts of the proposed outfall relocation related to hydrology and water quality would be less than significant, and impacts related to aquatic and terrestrial biological resources would be reduced to less-than-significant levels after implementation of mitigation measures. Therefore, the proposed outfall relocation would not result in significant and unavoidable adverse impacts.

7.3 SIGNIFICANT AND IRREVERSIBLE ENVIRONMENTAL CHANGES

The State CEQA Guidelines requires a discussion of any significant irreversible environmental changes that would be caused by the project. Specifically, State CEQA Guidelines Section 15126.2(d) states:

Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The project would result in the irreversible and irretrievable commitment of energy and material resources during construction and operation, including:

- ▶ construction materials, including such resources as soil, rocks, wood, concrete, glass, and steel; and
- ▶ energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction, operation, and maintenance.

The use of these nonrenewable resources would account for a minimal portion of the region's resources and would not affect the availability of these resources for other needs within the region. As discussed in Section 1.4, "Scope of This Draft Supplemental EIR," the construction equipment, hauling trips, and worker vehicle trips needed to construct the project would be within the type and number needed to construct features of the RWCF Modifications Project that would no longer be constructed as a result of the outfall relocation. Therefore, implementing the project would not result in inefficient use of energy, as described in Section 4.4, "Energy," of the RWCF Modifications Project EIR. Construction contractors selected would use best available engineering techniques, construction and design practices, and equipment operating procedures. Furthermore, the revised RWCF Modifications Project would use less energy relative to existing conditions because RWCF effluent would be discharged to the San Joaquin River by gravity flow more than 90 percent of the time rather than pumped to the existing outfall. Moreover, the project would not require more RWCF staff or result in more vehicular trips related to RWCF maintenance than previously evaluated in the RWCF Modifications Project EIR or in comparison to existing conditions.

8 REPORT PREPARATION

City of Stockton (Lead Agency)

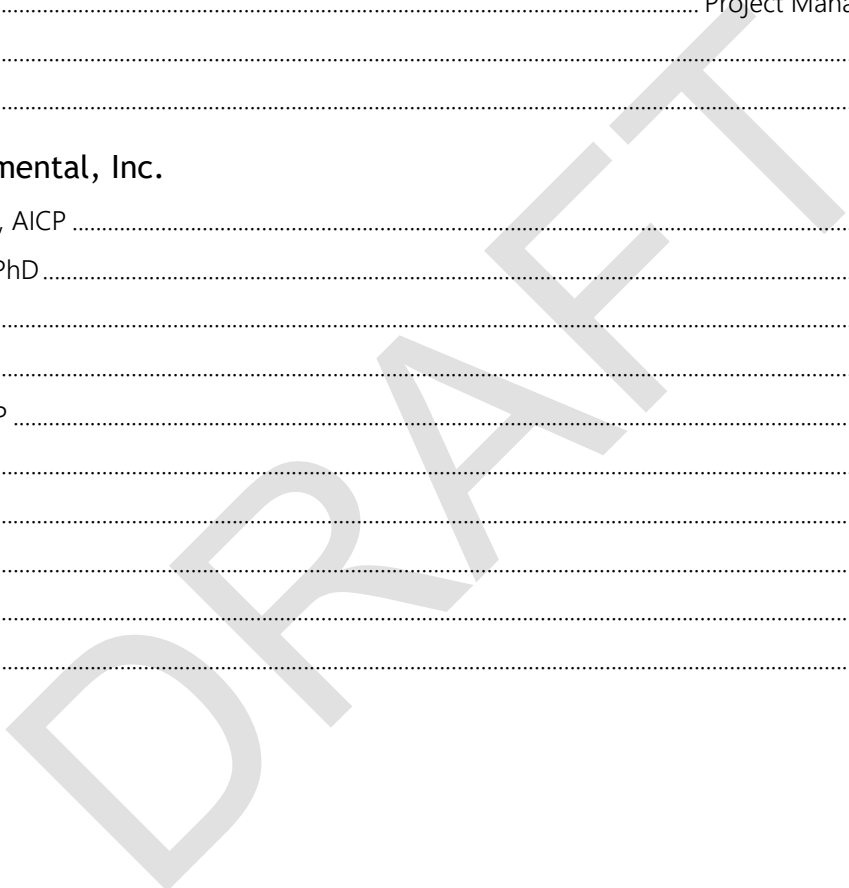
C. Mel Lytle, PhDDirector, Municipal Utilities Department
 Ali Gharegozloo, PE.....Engineering Services Manager, Municipal Utilities Department
 Deedee AntypasDeputy Director of Wastewater Operations, Municipal Utilities Department

Robertson-Bryan, Inc.

Michael Bryan, PhD.....Principal-in-Charge, Biologist
 Michelle Brown, PE..... Project Manager, Associate Engineer
 Art O'Brien, PE..... Principal Engineer
 Cyle Moon, PE..... Senior Engineer

Ascent Environmental, Inc.

Sydney Coatsworth, AICP Principal
 Andrea Shephard, PhD..... Project Manager
 Nicole Greenfield..... Environmental Planner
 Tammie Beyerl..... Senior Biologist
 Zachary Miller, AICP Noise Specialist
 Brian Perry..... Graphics Specialist
 Phi Ngo GIS Specialist
 Jim Merk..... Editor
 Michele Mattei..... Publishing Specialist
 Gayiety Lane..... Publishing Specialist



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Chapter 5 Cumulative Impacts

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Chapter 6 Alternatives

Robertson-Bryan, Inc. 2013. *Temperature Study to Assess the Thermal Impacts of the Sacramento Regional Wastewater Treatment Plant Discharge on Aquatic Life of the Lower Sacramento River*. Prepared for Regional Water Quality Control Board, Central Valley Region, on behalf of Sacramento Regional County Sanitation District.

Chapter 7 Other CEQA-Mandated Sections

City of Stockton. 2018a (December). *Envision Stockton 2040 General Plan*. Available: http://www.stocktonca.gov/files/Adopted_Plan.pdf. Accessed January 26, 2022.

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Appendix A

Project Thermal Plume Graphics

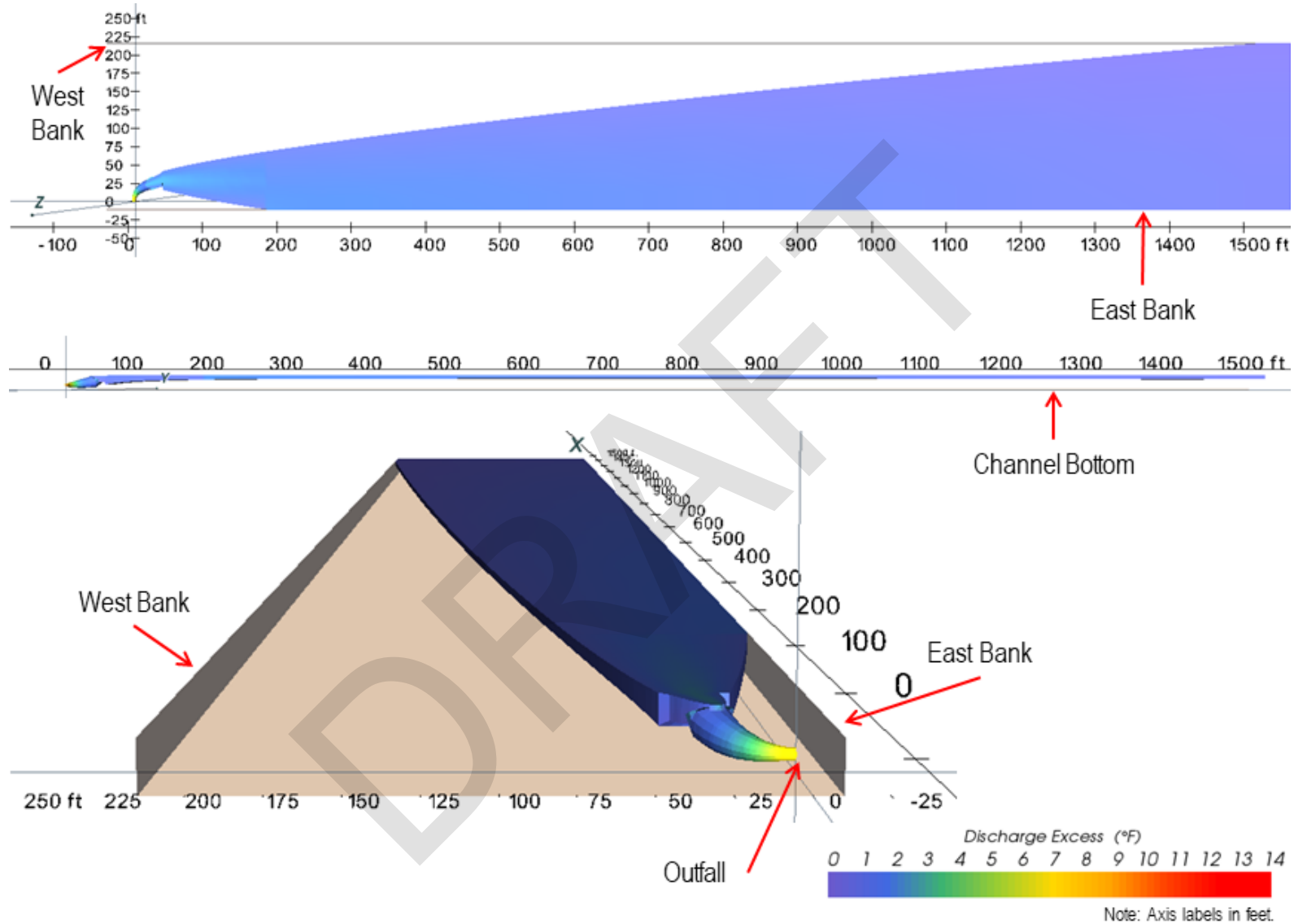


Figure D-1 March Project median-case thermal plume, based on effluent temperature of 74.6°F, river temperature of 61.2°F (13.4°F temperature differential), effluent flow of 32.2 mgd, and river velocity of 0.86 fps.

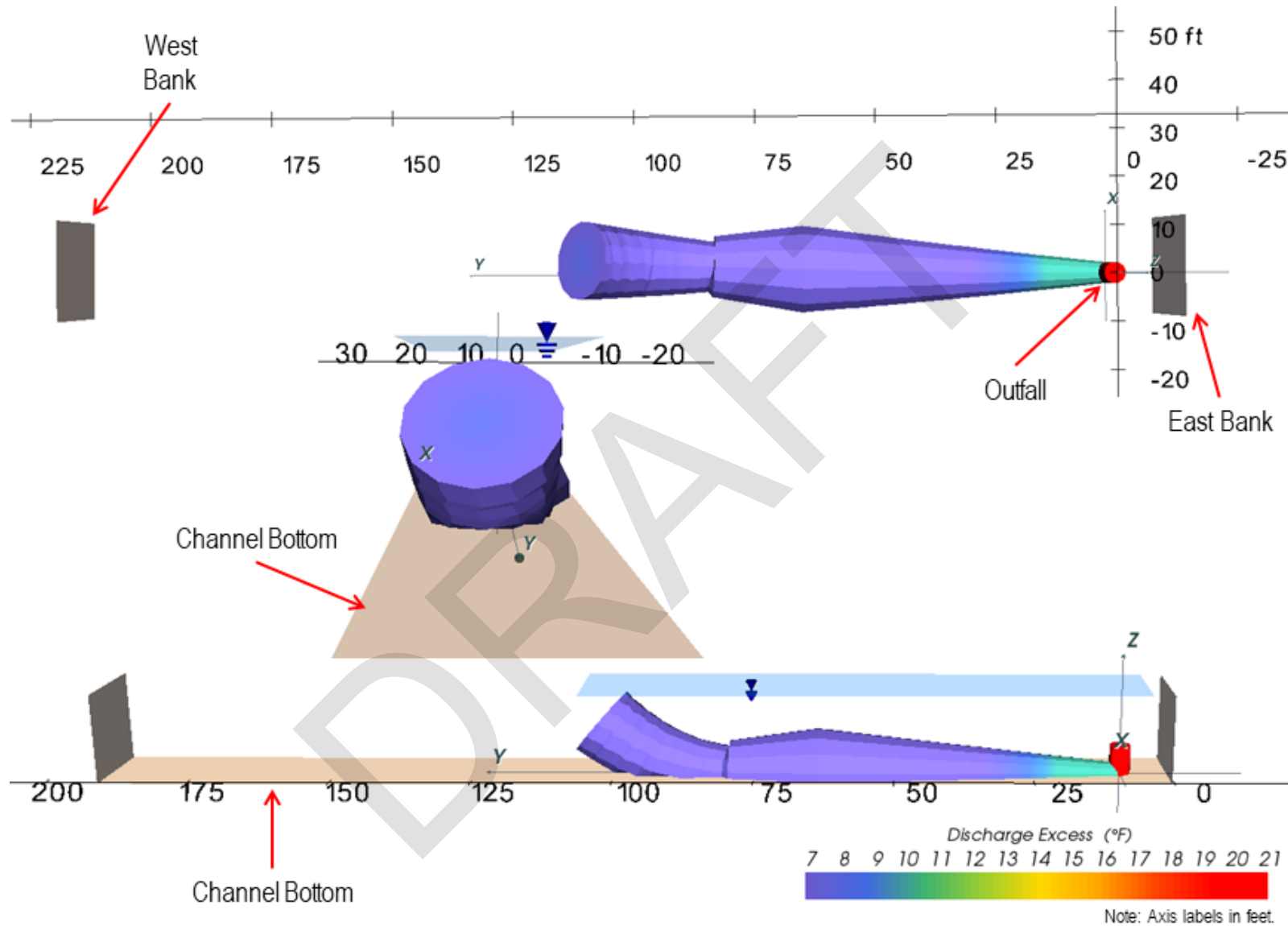
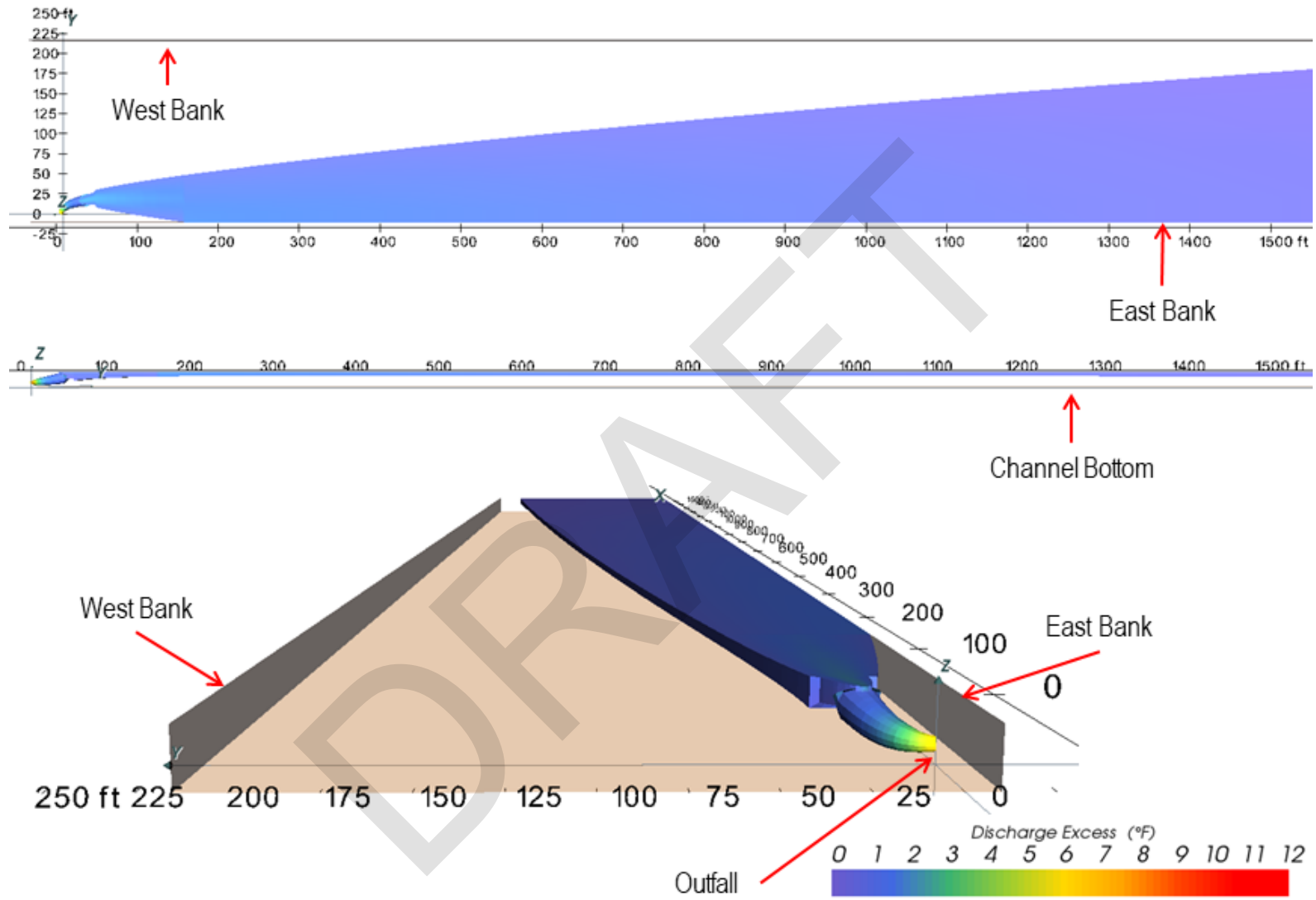


Figure D-2 March Project worst-case thermal plume, based on effluent temperature of 69.6°F, river temperature of 49.5°F (20.1°F temperature differential), effluent flow of 52.0 mgd, and river velocity of 0.05 fps.



Note: Axis labels in feet.

Figure D-3 April project median-case thermal plume, based on effluent temperature of 80.0°F, river temperature of 68.3°F (11.7°F temperature differential), effluent flow of 24.7 mgd, and river velocity of 0.95 fps.

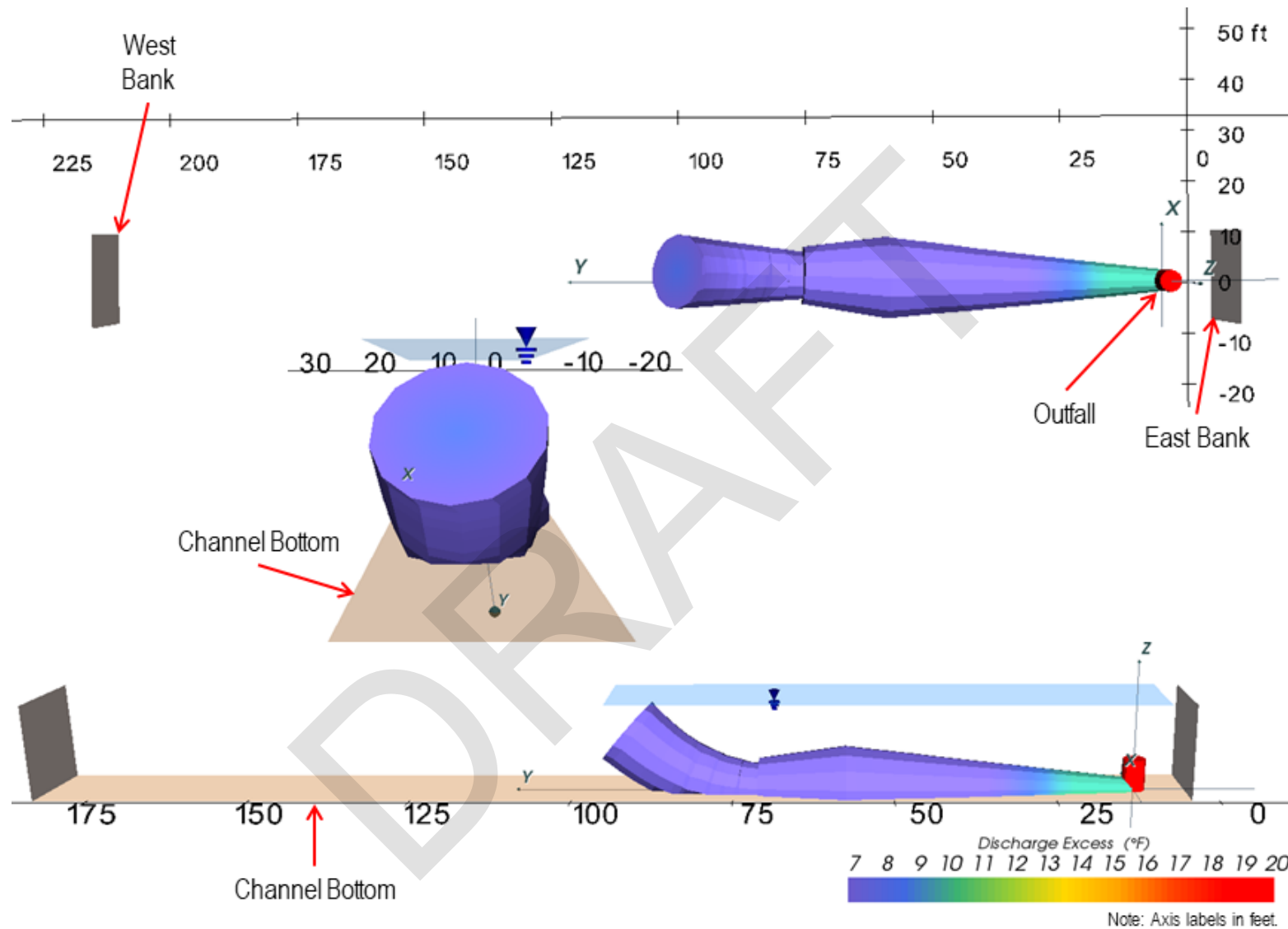


Figure D-4 April project worst-case thermal plume, based on effluent temperature of 79.5°F, river temperature of 59.7°F (19.8°F temperature differential), effluent flow of 54.1 mgd, and river velocity of 0.05 fps.

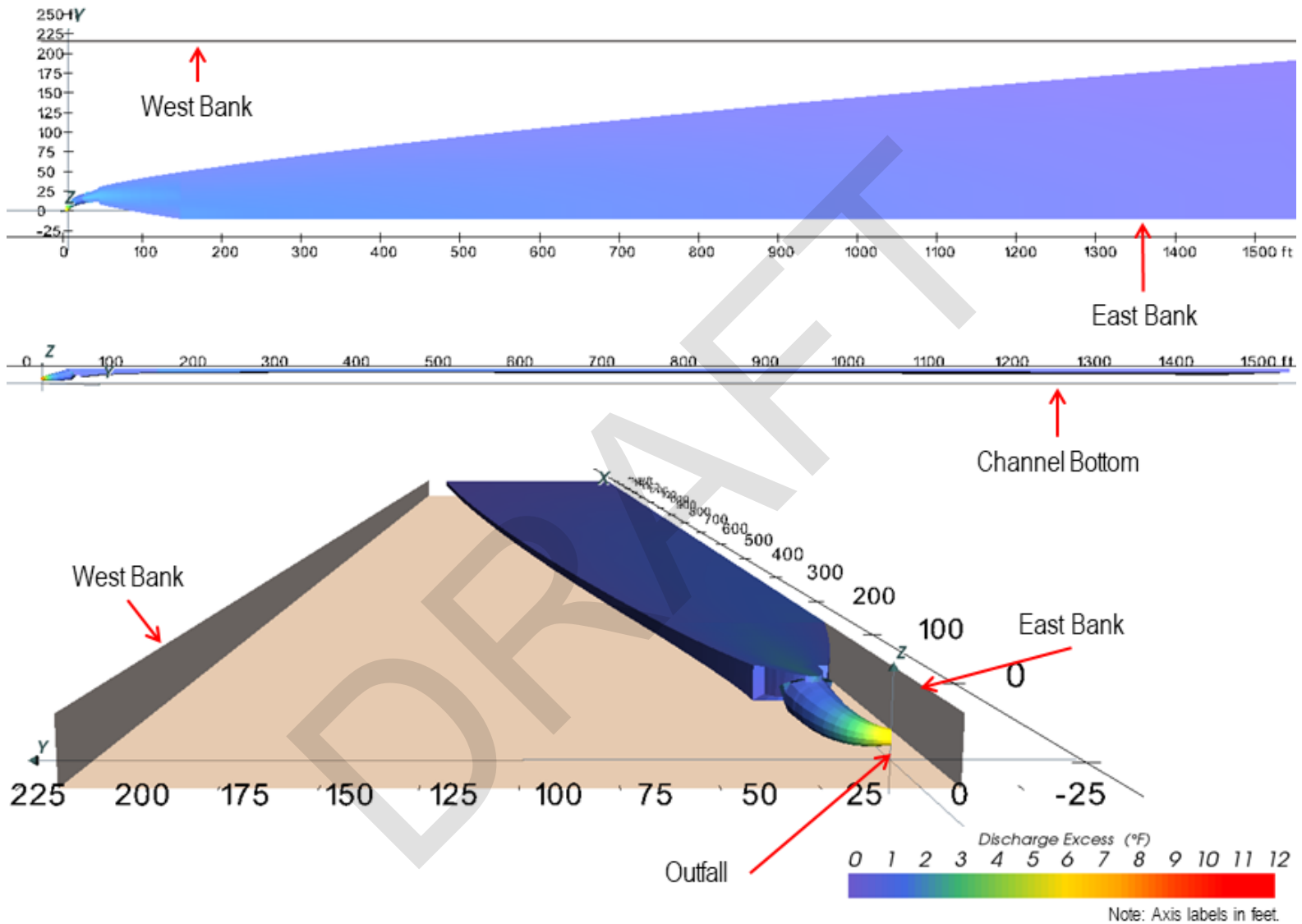


Figure D-5 May project median-case thermal plume, based on effluent temperature of 80.9°F, river temperature of 69.4°F (11.5°F temperature differential), effluent flow of 24.3 mgd, and river velocity of 0.89 fps.

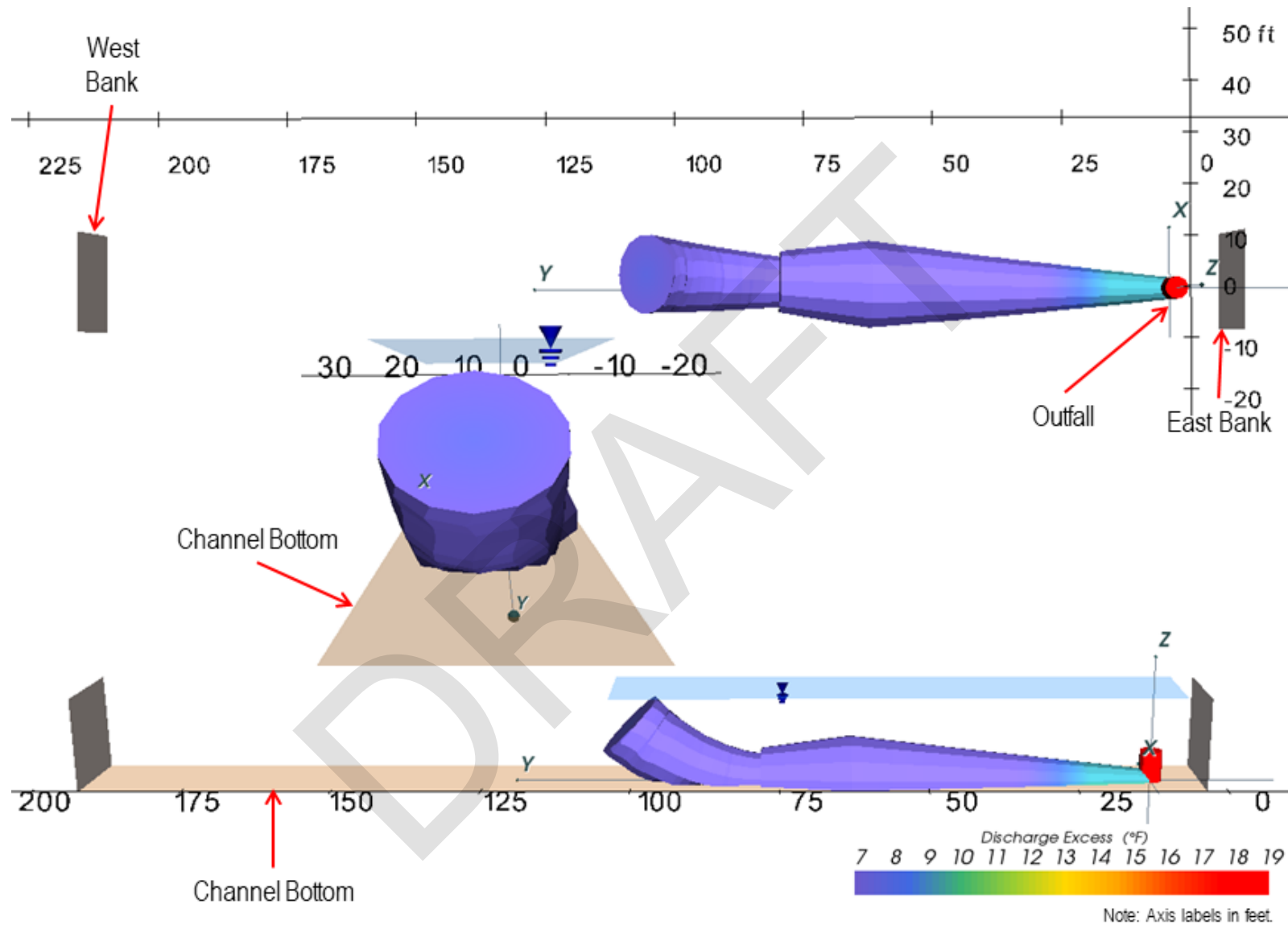


Figure D-6 May project worst-case thermal plume, based on effluent temperature of 74.6°F, river temperature of °F (55.8°F temperature differential), effluent flow of 52.8 mgd, and river velocity of 0.05 fps.

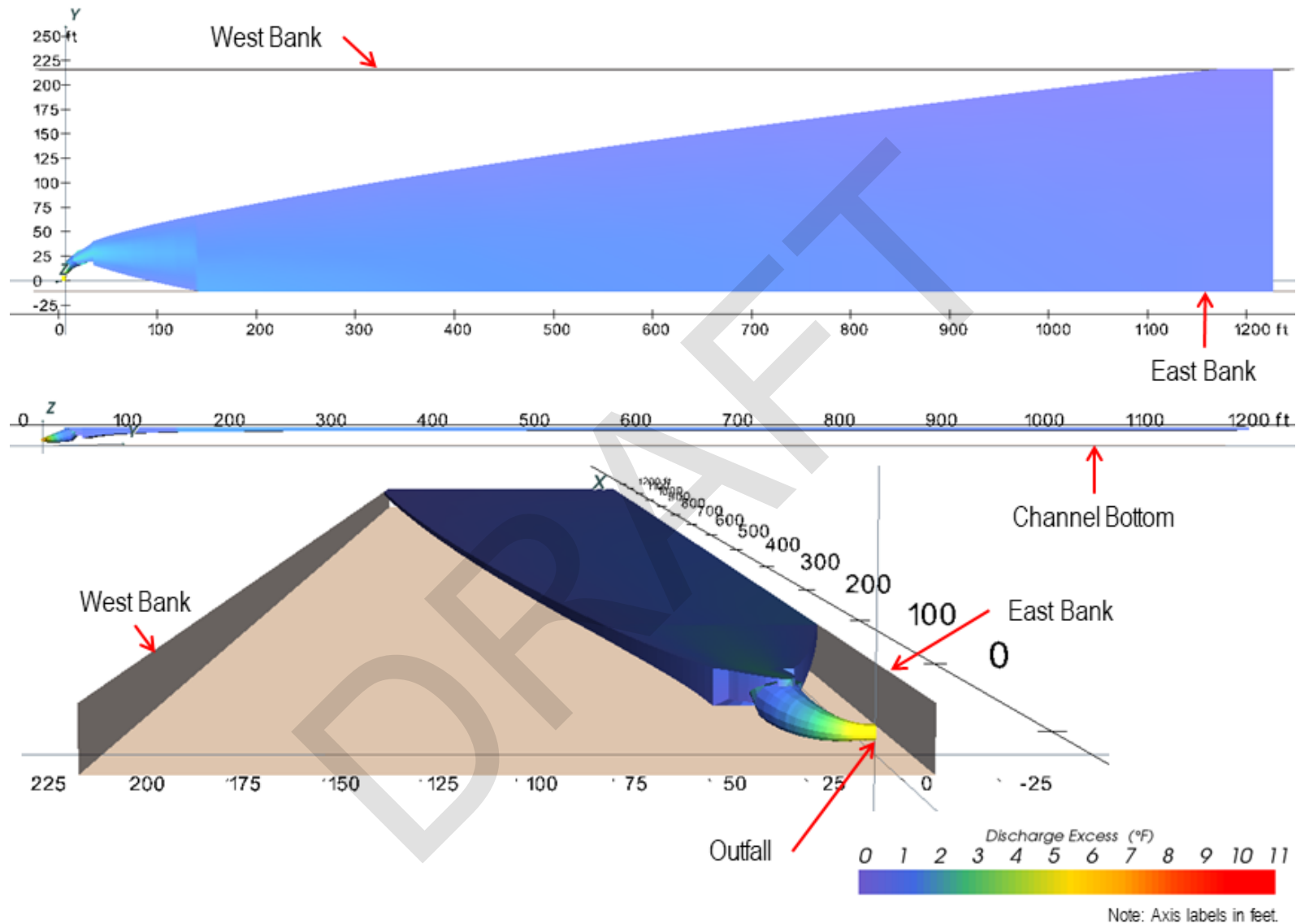


Figure D-7 October Project median-case thermal plume, based on effluent temperature of 82.2°F, river temperature of 72.1°F (10.1°F temperature differential), effluent flow of 25.1 mgd, and river velocity of 0.65 fps.

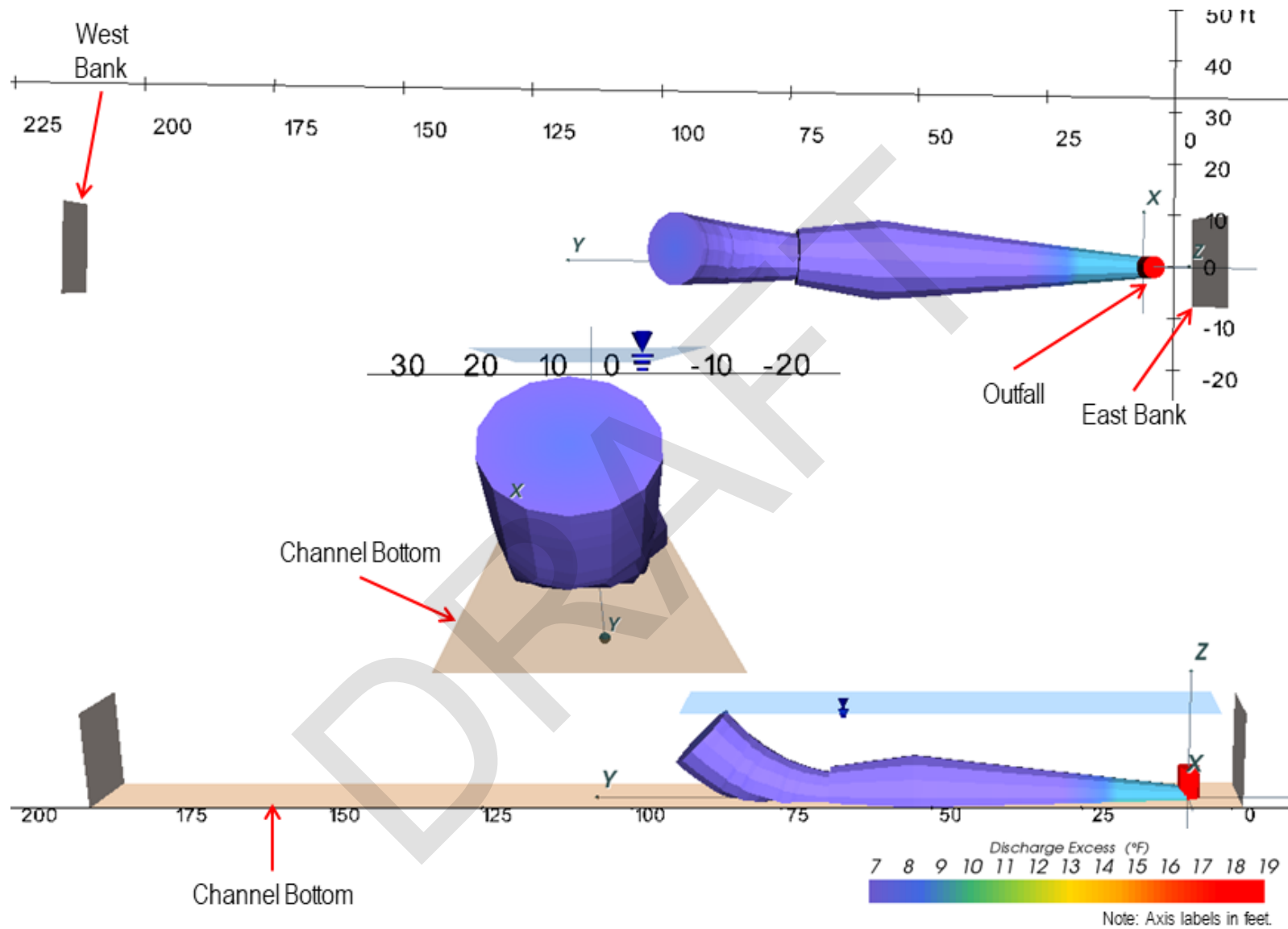


Figure D-8 October Project worst-case thermal plume, based on effluent temperature of 80.4°F, river temperature of 61.9°F (18.5°F temperature differential), effluent flow of 51.0 mgd, and river velocity of 0.05 fps.

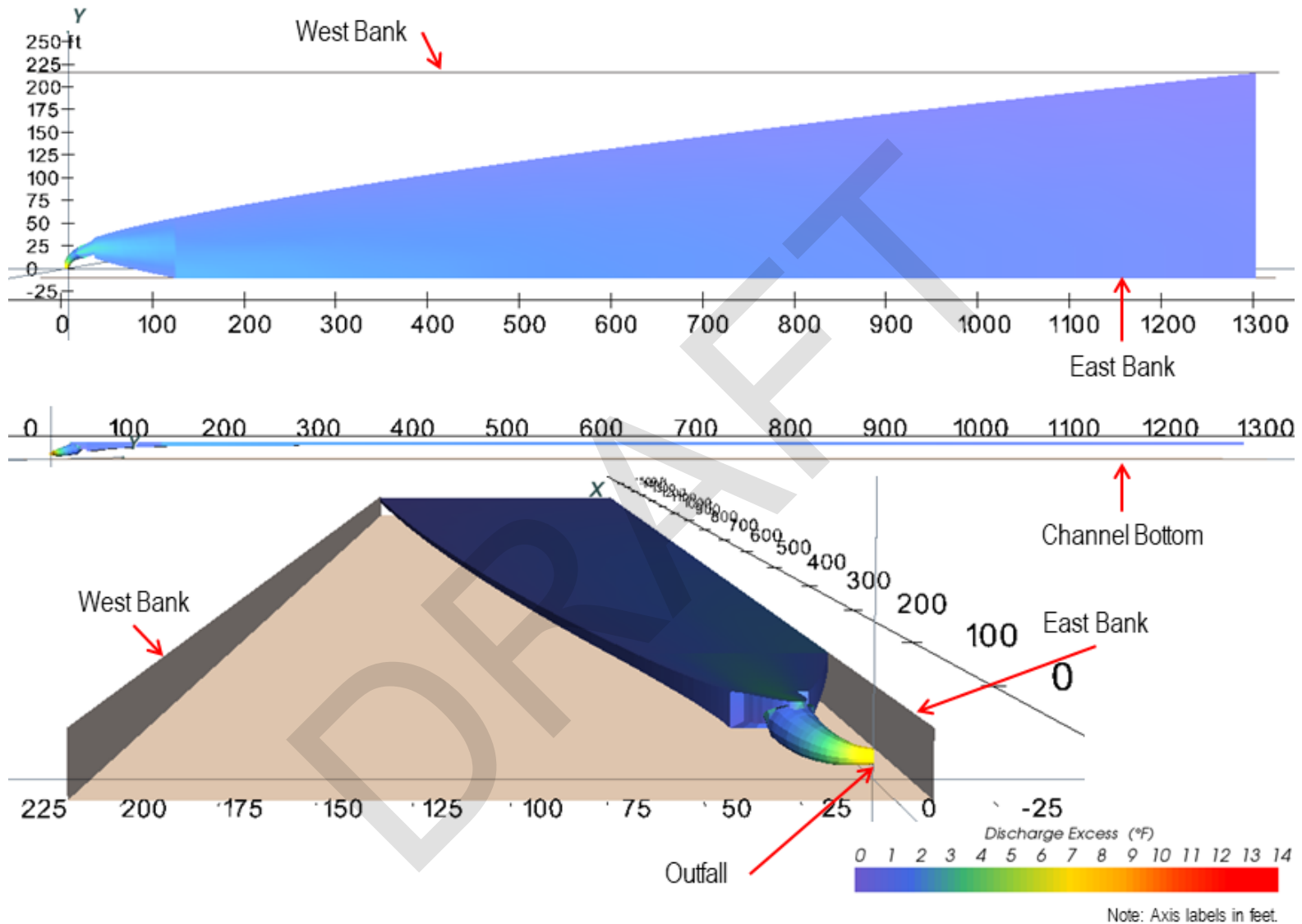


Figure D-9 November Project median-case thermal plume, based on effluent temperature of 75.9°F, river temperature of 61.9°F (14.0°F temperature differential), effluent flow of 52.0 mgd, and river velocity of 0.71 fps.

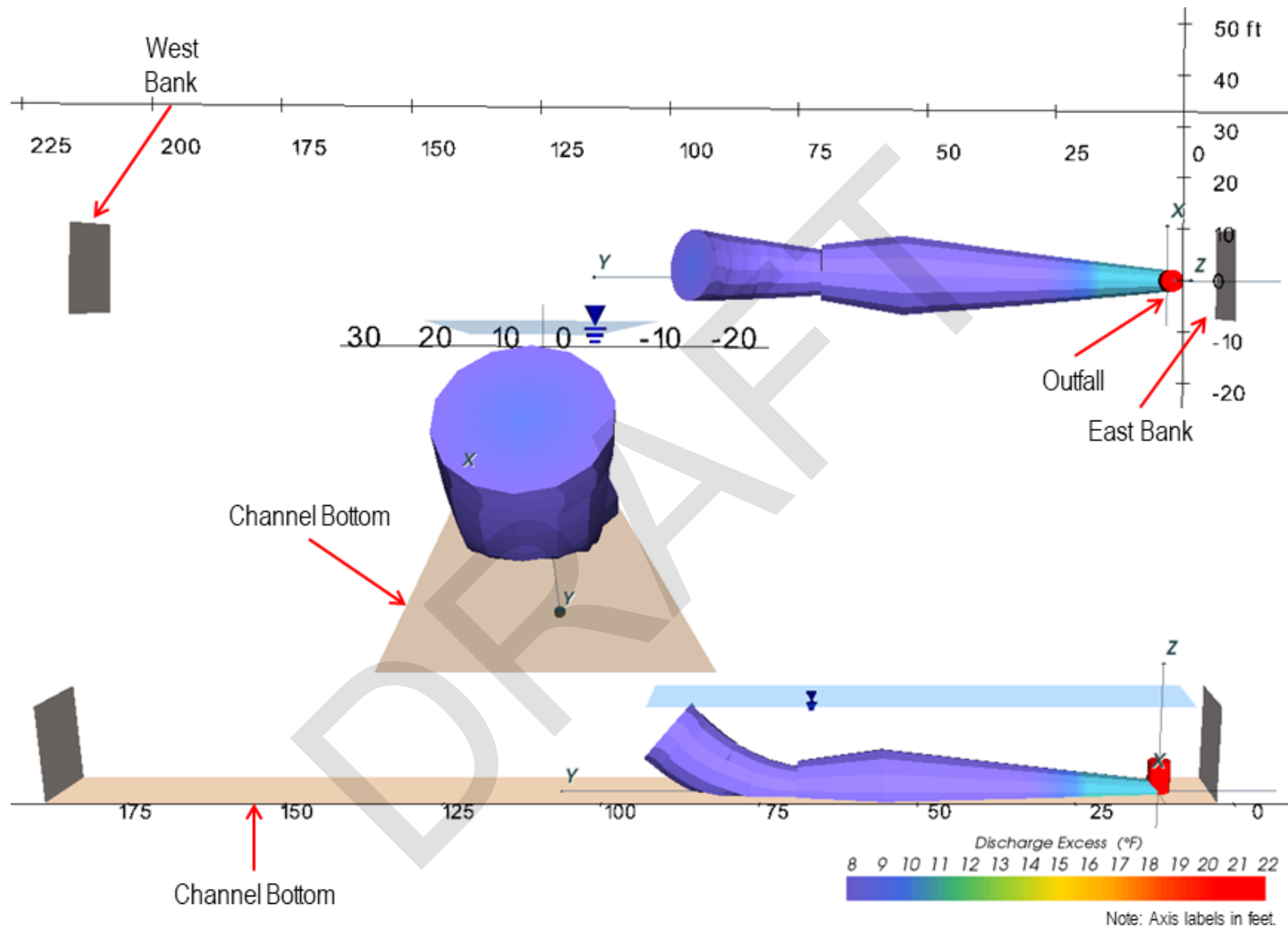


Figure D-10 November Project worst-case thermal plume, based on effluent temperature of 74.4°F, river temperature of 52.9°F (21.4°F temperature differential), effluent flow of 48.7 mgd, and river velocity of 0.05 fps.